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PLATE 1. COSTUMES—Ancient. FIG. 1.

1. Egyptian woman in the Kalasiris. 2. Egyptian with apron and Sphinxhood. 3. Greek with chlamys: 4. Greek woman in double cloak. 5. Greek woman in long skirt and wide upper garment. 6. Roman with toga (time of emperors). 7. Roman lictor with sagum. 8. Roman woman in tunic, palla. 9. Roman peasant with sleeveless coat.

PLATE 1. COSTUMES—Middle Ages. FIG. 2

1. Man with coat and mantle; 11th century. 2. Warrior in Full Armor with spear. 3. Woman with schapel, gown and surcoat; 11th century. 4. Man with hood, schecke and dupfing; 14th century. 5. Woman with Krueseler, gown and mantle; 14th century. 6. Man in scalloped surtout with sash turban and tappert; 15th century. 7. Woman in scalloped robe and turban; 15th century. 8, 9. Man and woman in costume with tinkling bells; 15th century.

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Total number of Articles, 801.

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CANON. The Greek word *κανών* means originally a straight rod or pole, and metaphorically what serves to keep a thing upright or straight, a rule. In the New Testament it occurs in Gal. vi. 16 and 2 Cor. x. 13, 15, 16, signifying in the former passage a measure, in the latter, what is measured, a district. There are three opinions as to the origin of its application to the writings used by the church. According to Semler, Baur, and others, the word had originally the sense of list or catalogue—the books publicly read in Christian assemblies. Others, as Steiner, suppose that since the Alexandrian grammarians applied it to collections of old Greek authors as models of excellence or classics, it meant classical (canonical) writings. According to a third opinion, the term included from the first the idea of a regulating principle. This is the more probable, because the same idea lies in the New Testament use of the noun, and pervades its applications in the language of the early Fathers down to the time of Constantine, as Credner has shown.[1] The "*κανών* of the church" in the Clementine homilics,[2] the "ecclesiastical *κανών*"[3] and "the *κανών* of the truth" in Clement and Irenæus,[4] the *κανών* of the faith in Polycrates,[5] the *regula fidei* of Tertullian,[6] and the *libri regulares* of Origen[7] imply a *normative principle.* Credner's view of *κανών* as an abbreviation of *γραφαὶ κανόνος*, equivalent to *Scripturæ legis* in Diocletian's Act,[8] is too artificial, and is unsanctioned by usage.

The two significations of the word are—a rule or fundamental principle, and a collection or list of books that form or contain the rule.

The earliest example of its application to a catalogue of the Old or New Testament books occurs in the Latin translation of Origen's homily on Joshua, where the original seems to have been *κανών*. The word itself is certainly in Amphilochius,[9] as well as in Jerome[10] and Rufinus.[11] As the Latin translation of Origen has *canonicus* and *canonizatus*, we infer that he used *κανονικός*, opposed as it is to *apocryphus* or *secretus*. The first occurrence of *κανονικός* is in the 59th canon of the Council of Laodicea, where it is contrasted with *ἰδιωτικὸς* and *ἀκανόνιστος*. *Κανονιζόμενα*, "*canonized* books," is first used in Athanasius's festal epistle.[12] The kind of rule which the earliest fathers thought the Scriptures to be can only be conjectured; it is certain that they believed the Old Testament books to be a divine and infallible guide. But the New Testament was not so considered till towards the close of the 2d century, when the conception of a Catholic Church was realized. The collection of writings was not called *Scripture*, or put on a par with the Old Testament as sacred and inspired, till the time of Theophilus of Antioch (about 180 A.D.). Hence Irenæus applies the epithets divine and perfect to the Scriptures; and Clement of Alexandria calls them inspired.

When distinctions were made among the Biblical writings other words were employed, synonymous with *κανονιζόμενα* or *κεκανονισμένα*, such as *ἐνδιάθηκα*, *ὡρισμένα*. The canon was thus a catalogue of writings, forming a rule of truth, sacred, divine, revealed by God for the instruction of men. The rule was perfect for its purpose.

The Old Testament Canon.

The individual who first gave public sanction to a portion of the national Jewish literature was Ezra, who laid the foundation of a canon. He was the leader in restoring the theocracy after the exile, "a ready scribe in the law of Moses, who had prepared his heart to seek the law of the Lord and to teach in Israel statutes and judgments." The question how far Ezra was also the redactor of the Pentateuch, or made additions to it, will be discussed in its proper place (see PENTATEUCH). Here it is sufficient to observe that the public authority he conferred on the Law is the first step in the formation of the canon.

After the first collection was made attention was directed to other national documents. Of these the prophetic books were the most conspicuous; and the order of men from whom they came, or whose names they bore, stood out in a favorable light, when looked back at from the restored theocracy; because many of their predictions had been fulfilled. Exhortations and warnings, which had often fallen upon listless ears, had been verified by experience. A desire to gather together the earlier prophetic writings would naturally accompany or follow the zeal displayed in bringing forth the Pentateuch to public view. Hence the historical books of the nation which described the divine guidance of the people, as well as the kings under whom the earliest prophets lived (Joshua—Kings), were first adopted.

This second canon originated with Nehemiah, of whom it is said in the second book of Maccabees, that, when founding a library, "he gathered together the acts of the kings, and the prophets, and the (Psalms) of David, and the epistles of the kings concerning the holy gifts."[13] These words, though somewhat ambiguous, and admitting different explanations, present an historical statement which should not be summarily rejected, as it is by Gractz. "The Acts of the Kings" contained the two books of Kings (including those now called after Samuel), with Joshua and Judges, of which last Ruth was the concluding part; for Joshua was now separate from the Mosaic books, with which it was closely connected at first. This historical portion was the proper continuation of Ezra's canon. The "Prophets" comprehended the four greater and twelve minor ones. Not all the latter, however; for Jonah is of subsequent date. Lamentations were united to Jeremiah as one book. The "Psalms of David" also belong to this canon, and may have been almost coextensive with the first three divisions of the present book. The epistles of the kings concerning the holy gifts are not extant. They appear to have been the documents of heathen (Persian for the most part) kings favorable to the rebuilding of Jerusalem and its temple. Nehemiah's canon was identical to some ex-

[1] *Zur Geschichte des Kanons*, pp. 3–68.
[2] *Clement. Hom.*, ap. Coteler., vol. i. p. 608.
[3] *Stromata*, vi. 15, p. 803, ed. Potter.
[4] *Adv. Hæres.*, i. 95.
[5] Euseb. *H. E.*, v. 24.
[6] *De præscript. Hæreticorum*, chs. 12, 13.
[7] *Comment. in Mat.*, iii. p. 916; ed. Delarue.
[8] *Monumenta vetera ad Donatistarum historiam pertinentia*, ed. Dupin, p. 168.
[9] At the end of the *Iambi ad Seleucum*, on the books of the New Testament, he adds, *οὗτος ἀψευδέστατος κανὼν ἂν εἴη τῶν θεοπνεύστων γραφῶν.*
[10] *Prologus galeatus in* ii. *Reg.*
[11] *Expos. in Symb. Apost.*, 37, p. 374, ed. Migne.
[12] After the word is added *καὶ παραδοθέντα, πιστευθέντα τὲ θεῖα εἶναι. Opp.*, vol. i. p. 961, ed. Benedict.
[13] Chap. ii. 13.

tent with the second division of the Biblical books. It wanted Jonah, perhaps Malachi, but it had "the Epistles of the Kings." It was larger than the second Hebrew division of the Old Testament, and had probably been preceded by smaller collections of prophetic productions before the captivity. We know that in the captivity itself, and immediately after, older prophecies were edited.

Whether Nehemiah himself collected the books, or whether he merely set the thing on foot and saw that it was carried out by the learned men of the time, can only be conjectured. As he was not a priest or a scribe like Ezra, but a statesman, the latter supposition is the more probable. This collection was highly esteemed; though it did not take equal rank with the first. It was not completed before the close of the 4th century B.C., because the book of Jonah was probably not written till that time. The close of the prophetic canon could not have taken place till some period had elapsed after Malachi,—a period sufficient for the growth of a general consciousness that the prophetic function had ceased with the youngest of the prophets. Besides the historical books which preceded, there were in it four prophetic ones—Jeremiah, Ezekiel, Isaiah, the twelve minor prophets. Ruth belonged to the book of Judges, and Lamentations to Jeremiah; but they were afterwards detached and put into the third division or canon. Definite allusions to this prophetic collection do not occur till the 2d century B.C. Daniel speaks of a passage in Jeremiah being in "the books" or "writings;"[1] and Sirach, both in the prologue and the 49th chapter, presupposes its completion. Such was the second or Nehemiah canon, partly gradual in its formation.

The third canon, in which the other books of the Old Testament were included, was not made at once. Its contents were multifarious, differing widely from one another in age and character—poetical, prophetic, didactic, historical. Such as seemed worthy of preservation, though they had not been included in the second canon, were gathered together during the space of a hundred and fifty years. The oldest part consisted of psalms supposed to belong to David, which were a supplement to those in Nehemiah's collection,—perhaps the last two divisions, with some exceptions (books fourth and fifth). Next to the Psalms were Proverbs, Job, Canticles, which, though non-prophetic, and probably excluded on that account from the sacred canon, must have existed before the exile. Enriched with the latest additions, they survived the national disasters, and claimed a place next to the Psalms. They were but a portion of the literature current in and after the 5th century B.C., as may be inferred from the epilogue to Ecclesiastes and the Wisdom of Sirach. The historical work compiled by the chronicle-writer was separated, Ezra being put first as the most important part and referring also to the church of the 6th and 5th centuries, whose history had not been written. The Chronicles themselves were placed last, being considered of less value than the first part, as they contained the summary of a period already described, though with numerous adaptations to post-exile times. The youngest portion consisted of the book of Daniel, not written till the Maccabean period (between 170 and 160 B.C.); and probably of several psalms which were inserted in different places of the collection so as to make the whole number 150. The list continued open, and no stringent principle guided selection. The character of the collection was somewhat indefinite. It was called *c'thubim*, *i. e.*, writings,[2]—a general epithet suited to the contents.

The earliest attestation of this third canon is that of the prologue to Jesus Sirach, where not only *the law and the prophets* are specified, but "the other books of the fathers," or "the rest of the books."[3] No information is given as to its extent, or the particular books included. They may have been for the most part the same as the present ones. The passage does not show that the third list was closed. The better writings of the fathers, such as tended to learning and wisdom, are not excluded by the definite article. In like manner, neither Philo nor the New Testament gives exact information as to the contents of the division in question. Indeed, several books (Canticles, Esther, Ecclesiastes) are unnoticed in the latter. The argument drawn from Matthew xxiii. 35, that the Chronicles were then the last book of the canon, is inconclusive, as the Zechariah there named was probably different from the Zechariah in 2 Chronicles xxiv. The third canon is not proved to be closed by any of these witnesses, much less by a passage of 2 Maccabees ii. 14, which is sometimes adduced for the purpose.

A more definite testimony respecting the canon is given by Josephus towards the end of the first century A.D.: "For we have not an innumerable multitude of books among us, ... but only twenty-two books, which contain the records of all the past times; which are justly believed to be divine. And of them five belong to Moses. . . . . But as to the time from the death of Moses till the reign of Artaxerxes king of Persia, the prophets who were after Moses wrote down what was done in their times in thirteen books. The remaining four books contain hymns to God and precepts for the conduct of human life. It is true our history has been written since Artaxerxes very particularly, but has not been esteemed of the like authority with the former by our forefathers, because there has not been an exact succession of prophets since that time; and how firmly we have given credit to these books of our own nation is evident by what we do; for during so many ages as have already passed, no one has been so bold as either to add anything to them, to take anything from them, or to make any change in them; but it has become natural to all Jews immediately and from their very birth to esteem these books to contain divine doctrines, and to persist in them, and, if occasion be, willingly to die for them."[4] This list agrees with our present canon, showing that the Palestinian Jews were tolerably unanimous as to the extent of the collection. The thirteen prophets include Job; the four lyric and moral books are Psalms, Proverbs, Ecclesiastes, and Canticles.

The canon, however, was not considered to be closed in the 1st century before and the 1st after Christ. There were doubts about some portions. The book of Ezekiel gave offence, because some of its statements seemed to contradict the law. Doubts about others were of a more serious nature,—about Ecclesiastes, the Canticles, Esther, and the Proverbs. The first was impugned because it had contradictory passages and a heretical tendency; the second, because of its worldly and sensual tone; Esther for its want of religiousness; and Proverbs on account of inconsistencies. This skepticism went far to procure the exclusion of the suspected works from the canon, and their relegation to the class of the *g'nuzim*.[5] But it did not prevail. Hananiah, son of Hezekiah, son of Garon, about 32 B.C., is said to have reconciled the contradictions and allayed the doubts.[6] But these traces of resistance to the fixity of the canon were not the last. They reappeared about 65 A.D., as we learn from the Talmud,[7] when the controversy turned mainly upon the canonicity of Ecclesiastes, which the school of Shammai, who had the majority, opposed; so that the book was probably excluded.[8] The question emerged again at a later synod at Jabneh or Jamnia, when R. Eleaser ben Asaria was chosen patriarch, and Gamaliel the second deposed. Here it was decided, not unanimously, however, but by a majority of Hillelites, that Ecclesiastes and the Song of Songs "pollute the hands," *i. e.*, belong properly to the Hagiographa. This was about 90 A.D.[9] Thus the question of the canonicity of certain books was discussed at two synods. The canon was virtually settled at Jamnia, where was confirmed what R. Akiba said of the Canticles in his usual extravagant way: "No day in the whole history of the world is of so much worth as the one in which the Song of Songs was given to Israel, for all the Scriptures are holy; but the Song of Songs is most holy."[10] As the Hagiographa were not read in public, with the exception of Esther, opinions of the Jewish rabbins might still differ about Canticles and Ecclesiastes, even after the synod at Jamnia.

Jewish literature began to degenerate after the captivity, and it continued to do so. It leant upon the past more and more, having an external and formal character with little of the living soul. The independence of their religious literature disappeared with the national independence of the Jews; and the genius of the people was too exclu-

[1] Ix. 2.

[2] כְּתוּבִים, translated by the Greek ἁγιόγραφα, hagiographa.

[3] τὰ ἄλλα πατρία βιβλία; τὰ λοιπὰ τῶν βιβλίων.

[4] *Contra Apion*, i. 8.

[5] גְּנוּזִים, literally *concealed, withdrawn from public use.*

[6] See Fürst's *Der Kanon des alten Testaments, u.s.w.*, pp. 147, 148.

[7] *Tract. Sabbat.*, ch. i. [8] *Adoyoth*, v. 3.

[9] See Graetz's *Kohelet*, pp. 162, 163.

[10] One who said, "Whoever reads such writings as Sirach and the later books loses all part in everlasting life," can have no weight.

sive to receive much expansion from the spirit of nations with whom they came in contact. In such circumstances, amid the general consciousness of present misfortune, which the hope of a brighter future could not dispel, and regretful retrospects of the past tinged with ideal splendor, the exact time of drawing a line between books that might be included in the third division of the canon must have been arbitrary. In the absence of a normal principle to determine selection, the productions were arbitrarily separated. Not that they were badly adjusted. On the contrary, the canon as a whole was wisely settled. Yet the critical spirit of learned Jews in the future could not be extinguished by anticipation. The canon was not really settled for all time by a synodical gathering at Jamnia; for Sirach was added to the Hagiographa by some rabbins about the beginning of the 4th century;[1] while Baruch circulated long in Hebrew, and was publicly read on the day of atonement in the 3d century according to the apostolic constitutions.[2] These two books were in high repute for a considerable time, possessing a kind of canonical credit even among the learned Jews of Palestine. Rab, Jochanan, Elasar, Rabba bar Mare, occasionally refer to Sirach in the way in which the *c'thubim* were quoted; the writer of Daniel used Baruch; and the translator of Jeremiah put it into Greek.

With the formation of the canon we may now connect the labors of the Great Synagogue, so far as Jewish authorities present credible information regarding it. The Talmudic and other accounts are legendary in part, and also incorrect. Little as is known of its members or doings, some idea may be gathered from scattered notices about it as well as from analogy.

The oldest notice of the Great Synagogue is that in the Pirke Aboth, about 200 A.D., where it is said that "Moses received the law from Mount Sinai and delivered it to Joshua, Joshua to the elders, the elders to the prophets, and the prophets delivered it to the men of the Great Synagogue. These last spake three words: Be cautious in pronouncing judgment; make many disciples; put a hedge about the law."[3] In Baba Bathra their Biblical labors are somewhat minutely described: "Moses wrote his book, and the section of Balaam, and Job. Joshua wrote his book and eight verses in the law. Samuel wrote his book and Judges and Ruth. David wrote the psalms of the ten elders, etc., etc. Jeremiah wrote his book, Kings, and Lamentations. Hezekiah and his colleagues wrote Isaiah, Proverbs, Canticles, and Coheleth. The men of the Great Synagogue wrote Ezekiel, the twelve prophets, Daniel, and Ezra. Ezra wrote his book and the genealogy in Chronicles down to himself."[4] It is not clear what is meant by "writing" (כְּתָב) in the latter part of the statement. It means *composition* in the first part, as the context undoubtedly shows; and that is Rashi's explanation of the verb throughout.[5] Perhaps, however, when used of the Great Synagogue it means no more than *edit*. That body put into their present form and received into the national library the works specified. Late writers, such as Abarbanel, Abraham ben David, ben Maimun, etc., record that Ezra was president, and that it consisted of 120 members, including Haggai, Zechariah, Malachi, etc.; but the names and number are evidently conjectural and incorrect.[6] These late notices deserve little credit.[7]

As Ezra is called "a ready scribe," and his labors in connection with the law were important, he may have organized a body of scribes who should work in harmony, attending, among other concerns, to the preservation and correction of the national literature. It must be admitted, however, that the priests enumerated in Nehemiah x. 1, etc., and the "company of scribes"[8] in 1 Maccabees vii. 12 (comp. ii. 42), afford no basis for such a college. Still, there is nothing improbable in the hypothesis. A succession of scribes and priests, if not conjointly, at least in harmony, continued to labor till the corporation ceased to exist with Simon the Just, who is mentioned as the last belonging to it, *i.e.*, from 444 B.C. till about 200. What they did can only be inferred from the proceedings of Ezra himself, and from the prevailing views as well as wants of the times they lived in. Those who began with Ezra, seeing what he did, would naturally follow his example, and would not scruple, if it seemed best, to revise the text in substance; but their chief work related to the form of the text. After the last canon was made, about a century or more anterior to the Christian era, the text was not considered inviolate by the learned Jews; it received modifications and interpolations long after. The process of redaction had not ceased before the time of Christ. This was owing, among other causes, to the state of parties among the Jews, as well as the intrusion of Greek literature and culture, whose influence the Palestinian Jews themselves were not able to withstand altogether.

The canon did not include all the national literature; and if it be asked on what principle books were admitted, it is not easy to answer. The higher the value of the writings, the more conducive to the religious life and advancement of the people, they were the more readily accepted. Real or apparent importance determined their adoption. In judging of their value different considerations weighed. Some were regulative in the department of the legal and ethical; the prophetic claimed a divine origin; the lyric or poetic touched and elevated the ideal faculty on which religion acts. The nation, early imbued with the theocratic spirit, and believing itself the chosen of God, was favorably inclined toward documents in which that stand-point was assumed. The names of men renowned for their piety, wisdom, or knowledge of divine things, which some books bore, ensured their admission. A variety of considerations contributed to the gradual formation of the canon; and the best part of the national literature was incorporated.

Of the three divisions, "The Law" or Pentateuch was most highly venerated by the Jews. It was the first translated into Greek, and in Philo's view was inspired in a way peculiar to itself. "The Prophets," or second division, occupied a somewhat lower place in their estimation, but were read in the public services as the law had been before. The "*C'thubim*," or third division, was not looked upon as equal to the Prophets in importance; only the five Megiloth were publicly read. The three parts of the collection present the three gradations of sanctity which the books assumed successively in Israelite estimation. A certain reverence was attached to all as soon as they were made canonical; but the reverence was not of equal height, and the supposed authority was proportionately varied.[9] The consciousness of prophetism being extinct soon after the return from Babylon was a genuine instinct. With the extinction of the Jewish state the religious spirit almost evaporated. The idealism which the old prophets proclaimed in contrast with the symbolic religion of the state gave place to forms and an attachment to the written law. Religion came to be a thing of the understanding, the subject of learned treatment; and its essence was reduced to dogmas or precepts. Thus it ceased to be spiritual, or a thing in which the heart had free scope for its highest aspirations. The narrow prophetism that appeared after the restoration was little more than an echo of the past, falling in with an external and written legalism. The literature of the people deteriorated in quality, and prophecy became apocalypse.

When the three divisions were united, the ecclesiastical respect which had gathered around the law and the prophets from ancient times began to be transferred to the *c'thubim*. A belief in their sanctity increased apace in the 1st century before the Christian era, so that *sacredness* and *canonicity* were almost identical. The doubts of individuals, it is true, were still expressed respecting certain books of the *c'thubim*, but they had no perceptible effect upon the current opinion. The sanctity attaching to the last division as well as the others did not permit the total displacement of any part.

The origin of the threefold division of the canon is not, as Oehler supposes,[10] a reflection of the different stages of religious development through which the nation passed, as if the foundation were the Law, the ulterior tendency in its objective aspect the Prophets, and its subjective aspect the Hagiographa. The books of Chronicles and others refute this arbitrary conception. The triplicity lies in the manner in which the books were collected. Men who belonged to different periods and possessed different degrees of culture worked successively in the formation of the

[1] Zunz's *Die gottesdienstlichen Vorträge*, pp. 101, 102.
[2] v. 20, p. 124, ed. Ueltzen. [3] Chapter i. [4] Fol. 15, 1.
[5] See Herzfeld's *Geschichte des Volkes Israel*, vol. ii. p. 94.
[6] See Buxtorf's *Tiberias*, chapter x. p. 88, &c.
[7] Herzfeld's *Geschichte des Volkes Israel*, vol. i. p. 380, &c.
[8] Συναγωγὴ γραμματέων, without the article.

[9] Dillman, in the *Jahrbücher für deutsche Theologie*, Bd. iii. p. 422.
[10] Article "Kanon" in Herzog's *Encyklopædie*, vol. vii. p. 253; and the same author's *Prolegomena zur Theologie des alt. Test.*, pp. 91, 92.

canon. It resulted out of the circumstances in which it was made, and the subjective ideas of those who made it.

The places of the separate books within the first division or *Torah* were determined by the succession of the historical events narrated. The second division naturally begins with Moses's successor, Joshua. Judges, Samuel, and Kings follow according to the regular chronology. To the former prophets, as Joshua to Kings were called, the latter were attached, Isaiah, Jeremiah, and Ezekiel,—succeeded by the twelve minor prophets, arranged for the most part according to their times, though the length of individual prophecies also influenced their position, together with similarity of contents. The arrangement of books in the third division depended on their age, character, and authors. The Psalms were put first, because David was supposed to be the author of many, and on account of their intrinsic value in promoting the religious life of the people. After the Psalms came the three poetical works attributed to Solomon, with the book of Job among them,—Proverbs, Job, Canticles, Ecclesiastes. The book of Esther followed, since it was intended to further the observance of the Purim feast; with the late book of Daniel, which had some affinity to Esther in its relation to heathenism and to Greek life. To Ezra and Nehemiah, which were adopted before the other part of the chronicle-book and separated from it, were added the so-called Chronicles. Such was the original succession of the third division or *c'thubim;* but it did not remain unaltered. For the use of the synagogue the five Megiloth were put together, so that Ruth (originally the last part of Judges) and the Lamentations (appended at first to Jeremiah's prophecies) were taken out of the second and put into the third canon. This caused a separation of Canticles and Ecclesiastes.

The Samaritan canon consists of the Pentateuch alone. This restricted collection is owing to the fact that, when the Samaritans separated from the Jews and began their worship on Gerizim, no more than the Mosaic writings had been invested by Ezra with canonical dignity. The hostile feeling between the rivals hindered the reception of books subsequently canonized. The idea of their having the oldest and most sacred part in its entirety satisfied their spiritual wants. Some have thought that the Sadducees, who already existed as a party before the Maccabean period, agreed with the Samaritans in rejecting all but the Pentateuch; yet this is doubtful. It is true that the Samaritans themselves say so;[1] and that some of the church fathers, Origen, Jerome, and others, agree; but little reliance can be put on the statement. The latter, perhaps, confounded the Samaritans and Sadducees. It is also noteworthy that Christ, in refuting the Sadducees, appeals to the Pentateuch alone; but the conclusion that he did so because of their admitting no more than that portion does not follow.

The Alexandrian canon differed from the Palestinian. The Greek translation commonly called the Septuagint contains some later productions which the Palestinian Jews did not adopt, not only from their aversion to Greek literature generally, but also from the recent origin of the books, and perhaps their want of prophetic sanction. The closing line of the third part in the Alexandrian canon was more or less fluctuating—capable of admitting recent writings appearing under the garb of old names and histories, or embracing religious subjects; while the Palestinian collection was pretty well determined, and all but finally settled. The judgment of the Alexandrians was freer than that of their brethren in the mother country. They had even separated in a measure from the latter, by erecting a temple at Leontopolis; and their enlargement of the canon was another step of divergence. The influence of Greek learning and philosophy led to a more liberal treatment of Jewish books. Nor had they the criterion of language for the separation of canonical and uncanonical; both classes were before them in the same tongue. The enlarged canon was not formally sanctioned; it had not the approval of the Sanhedrim; yet it was to the Alexandrians what the Palestinian one was to the Palestinians. If Jews who were not well acquainted with Hebrew used the apocryphal and canonical books alike, it was a matter of feeling and custom; and if those who knew the old language better adhered to the canonical one more closely, it was a matter of tradition and language. The former set little value on the prevalent consciousness of the race that the spirit of prophecy was extinct; their view of the Spirit's operation was larger. The latter clung to the past with all the more tenacity that the old life of the nation had degenerated. The identity of the Palestinian and Alexandrian canons must be abandoned. It is said, indeed, that Philo neither mentions nor quotes the Greek additions; but neither does he quote several canonical books. According to Eichhorn, no fewer than eight of the latter are unnoticed by him.[2] Besides, he had peculiar views of inspiration, and quoted loosely from memory. Believing as he did in the inspiration of the Greek version as a whole, it is difficult to think that he made a distinction between the different parts of it. The argument for the identity of the two canons deduced from 4 Esdras xiv. 44, &c., as if the twenty-four open books were distinguished from the other writings dictated to Ezra, is of no force, both because the reading is uncertain and, even if seventy be distinguished from twenty-four in the passage, verisimilitude required that an Egyptian Jew himself must make Ezra conform to the old Palestinian canon. It is also alleged that the grandson of Jesus Sirach, who translated his grandfather's work during his abode in Egypt, knew no difference between the Hebrew and Greek canon, though he speaks of the Greek version; he speaks as a Palestinian, without having occasion to allude to the difference between the canonical books of the Palestinian and Egyptian Jews. The latter may have reckoned the apocryphal writings in the third division; and therefore the translator of Jesus Sirach could recognize them in the ordinary classification. The mention of three classes is not opposed to their presence in the third. The general use of an enlarged canon in Egypt cannot be denied, though it was somewhat loose, was not regarded as a completed collection, and wanted express rabbinical sanction. The very way in which apocryphal are inserted among canonical books in the Alexandrian canon, shows the equal rank assigned to both. Esdras first and second succeed the Chronicles; Tobit and Judith are between Nehemiah and Esther; the Wisdom of Solomon and Sirach follow Canticles; Baruch succeeds Jeremiah; Daniel is followed by Susanna and other productions of the same class; and the whole closes with the three books of Maccabees. Such is the order in the Vatican MS.

The threefold division of the canon, indicating three stages in its formation, has continued. Josephus, indeed, gives another, based on the nature of the separate books, not on MSS. We learn nothing from him of its history, which is somewhat remarkable, considering that he did not live two centuries after the last work had been added. The account of the canon's final arrangement was unknown to him. The number of the books was variously estimated. Josephus gives twenty-two, which was the usual number among Christian writers in the 2d, 3d, and 4th centuries, having been derived from the letters of the Hebrew alphabet. Origen, Jerome, and others have it. It continued longest among the teachers of the Greek Church, and is even in Nicephorus's stichometry.[3] The enumeration in question has Ruth with Judges, and Lamentations with Jeremiah. In Epiphanius[4] the number twenty-seven is found, made by taking the alphabet enlarged with the five final letters, and dividing Samuel, Kings, and Chronicles into two books each. The Talmud has twenty-four,[5] which originated in the Greek alphabet, and probably proceeded from Alexandria. After the Pentateuch and the former prophets, which are in the usual order, it gives Jeremiah as the first of the later, succeeded by Ezekiel and Isaiah with the twelve minor prophets. The Talmud knows no other reason for such an order than that it was made according to the contents of the prophetic books, not according to the times of the writers. This solution is unsatisfactory. It is more probable that chronology had to do with the arrangement.[6] The Talmudic order of the Hagiographa is Ruth, Psalms, Job, Proverbs, Ecclesiastes, Canticles, Lamentations, Daniel, Esther, Ezra, Chronicles. Here Ruth precedes the Psalter, coming as near the former prophets as possible; for it properly belongs to them, the contents associating it with the Judges' time. The Talmudic order is that usually adopted in German MSS.

The Masoretic arrangement differs from the Talmudic in putting Isaiah before Jeremiah and Ezekiel. The Hagiographa are—Psalms, Proverbs, Job, Canticles, Ruth,

[1] See Abulfath's *Annal. Samar.*, p. 102, 9, &c.

[2] *Einleitung in das alte Testament*, vol. i. p. 133.

[3] See Credner's *Zur Geschichte des Kanons*, p. 124.

[4] *De mens. et pond.*, chapters 22, 23, vol. ii. p. 180, ed. Petav.

[5] *Baba Bathra*, fol. 14, 2. [6] See Fürst, *Der Kanon, u. s. w.* p. 14, &c.

Lamentations, Ecclesiastes, Esther, Daniel, Ezra (with Nehemiah), Chronicles.[1] MSS. often differ arbitrarily, because transcribers did not consider themselves bound to any one arrangement.[2] According to some, a very old testimony to the commencing and concluding books of the third division is given by the New Testament (Luke xxiv. 44; Matthew xxiii. 35), agreeably to which the Psalms were first and the Chronicles last; but this is inconclusive.

The Alexandrian translators, as we have seen already, placed the books differently from the Palestinian Jews. In their version Daniel comes after Ezekiel, so that it is put beside the greater prophets. Was this done by Jews or Christians? Perhaps by the latter, who put it between the greater and lesser prophets, or, in other words, out of the third into the second division, because of dogmatic grounds, and so effaced a trace of the correct chronology. Little importance, however, can be attached to the order of the books in the Septuagint, because the work was done at different times by different persons. But whatever may have been the arrangement of the parts when the whole was complete, we know that it was disturbed by Protestants separating the apocryphal writings and putting them all together.

The writings of the New Testament show their authors' acquaintance with the apocryphal books. They have expressions and ideas derived from them. Stier collected 102 passages which bear some resemblance to others in the Apocrypha;[3] but they needed sifting, and were cut down to a much smaller number by Bleek. They are James i. 19, from Sirach v. 11 and iv. 29; 1 Peter i. 6, 7, from Wisdom iii. 3–7; Hebrews xi. 34, 35, from 2 Maccabees vi. 18–vii. 42; Hebrews i. 3, from Wisdom vii. 26, &c.; Romans i. 20–32, from Wisdom xiii.–xv.; Romans ix. 21, from Wisdom xv. 7; Eph. vi. 13–17, from Wisdom v. 18–20; 1 Cor. ii. 10, &c., from Judith viii. 14. Others are less probable.[4] When Bishop Cosin says that "in all the New Testament we find not any one passage of the apocryphal books to have been alleged either by Christ or his apostles for the confirmation of their doctrine,"[5] the argument, though based on a fact, is scarcely conclusive; else Esther, Canticles, Ecclesiastes, and other works might be equally discredited. Yet it is probable that the New Testament writers, though quoting the Septuagint much more than the original, were disinclined to the additional parts of the Alexandrian canon. They were Palestinian themselves, or had in view Judaizers of a narrow creed. The apostle Paul, at least, and probably the other writers of the New Testament, believed in the literal inspiration of the Biblical books, for he uses an argument in the Galatian epistle which turns upon the singular or plural of a noun.[6] And as the inspiration of the Septuagint translators was commonly held by the Christians of the early centuries, it may be that the apostles and evangelists made no distinction between its parts Jude quotes Enoch, an apocryphal work not in the Alexandrian canon; so that he at least had no rigid notions about the difference of canonical and uncanonical writings. Still we know that the compass of the Old Testament canon was somewhat unsettled to the Christians of the 1st century, as it was to the Hellenist Jews themselves. It is true that the Law, the Prophets, and the Psalms were universally recognized as authoritative; but the extent of the third division was indefinite, so that the non-citation of the three books respecting which there was a difference of opinion among the Jews may not have been accidental. Inasmuch, however, as the Greek-speaking Jews received more books than their Palestinian brethren, the apostles and their immediate successors were not disinclined to the use of the apocryphal productions. The undefined boundary of the canon facilitated the recognition of other sacred writings, such as the primitive records of the new revelation.

The early fathers used the Greek Bible, as almost all of them were ignorant of Hebrew. Thus restricted, they naturally considered its parts alike, citing apocryphal and canonical in the same way. Accordingly, Irenæus († 202) quotes Baruch under the name of "Jeremiah the prophet;"[7] and the additions to Daniel as "Daniel the prophet."[8] Clement of Alexandria († 220) uses the apocryphal books like the canonical ones, for explanation and proof indiscriminately. He is fond of referring to Baruch, which he cites upwards of twenty-four times in the second book of his *Pædagogus*, and in a manner to show that he esteemed it as highly as many other parts of the Old Testament. A passage from Baruch is introduced by the phrase[9] "the divine Scripture says;" and another from Tobit by[10] "Scripture has briefly signified this, saying." Tertullian († 220) quotes the Wisdom of Solomon expressly as Solomon's,[11] and introduces Sirach by "as it is written."[12] He cites Baruch as Jeremiah.[13] He also believed in the authenticity of the book of Enoch, and defends it at some length.[14] Cyprian often cites the Greek additions to the Palestinian canon. He introduces Tobit with the words "as it is written,"[15] or "divine Scripture teaches, saying;"[16] and Wisdom with "the Holy Spirit shows by Solomon."[17] The African fathers followed the Alexandrian canon without scruple.

Melito of Sardis († after 171) made it his special business to inquire among the Palestinian Jews about the number and names of their canonical books; and the result was the following list:—the five books of Moses, Joshua, Judges, Ruth, four books of Kings, two of Chronicles, the Psalms of David, the Proverbs of Solomon, Ecclesiastes, the Song of Songs, Job, Isaiah, Jeremiah, the twelve in one book, Daniel, Ezekiel, Ezra.[18] Here Ezra includes Nehemiah; and Esther is absent, because the Jews whom he consulted did not consider it canonical.

Origen's († 254) list does not differ much from the Palestinian one. After the Pentateuch, Joshua, Judges, Ruth, Kings first and second, Samuel, Chronicles, come Ezra first and second, Psalms, Proverbs, Ecclesiastes, Canticles, Isaiah, Jeremiah with Lamentations and the epistle, Daniel, Ezekiel, Job, Esther. Besides these there are the Maccabees, which are inscribed *Sarbeth sarbane el.*[19] The twelve prophets are omitted in the Greek; but the mistake is rectified in Rufinus's Latin version, where they follow Canticles, as in Hilary and Cyril of Jerusalem. It is remarkable that Baruch is given, and why? Because Origen took it from the MSS. of the Septuagint he had before him, in which the epistle is attributed to Jeremiah. But the catalogue had no influence upon his practice. He followed the prevailing view of the extended canon. Sirach is introduced by "for this also is written;"[20] the book of Wisdom is cited as "a divine word,"[21] Tobit as "Scripture."[22] His view of the additions to the book of Daniel and Esther, as well as his opinion about Tobit, are sufficiently expressed in the epistle to Africanus, so that scattered quotations from these parts of Scripture can be properly estimated. Of the history of Susanna he ventures to say that the Jews withdrew it on purpose from the people.[23] He seems to argue in favor of books used and read in the churches, though they may be put out of the canon by the Jews. As divine Providence had preserved the sacred Scriptures, no alteration should be made in the ecclesiastical tradition respecting books sanctioned by the churches, though they be external to the Hebrew canon.

The New Testament Canon in the first three Centuries.

The first Christians relied on the Old Testament as their chief religious book. To them it was of divine origin and authority. The New Testament writings came into gradual use by the side of the older Jewish documents, according to the times in which they appeared and the reputed names of the authors.

When Marcion came from Pontus to Rome (144 A.D.), he brought with him a Scripture-collection consisting of ten Pauline epistles. Those addressed to Timothy and Titus, with the epistle to the Hebrews, were not in it. The gospel of Marcion was Luke's in an altered state. From this and other facts we conclude that external parties were the first who carried out the idea of collecting Christian writings, and of putting them either beside or over against

[1] Hody, *De Bibliorum textibus originalibus*, p. 644.
[2] Hody gives lists of the order in which the books stand in some early printed editions and in a few MSS., p. 645.
[3] *Die Apokryphen, u. s. w.*, p. 14, &c.
[4] *Studien und Kritiken* for 1853, p. 267, &c.
[5] *A Scholastical History of the Canon*, p. 22.
[6] See Rothe, "Zur Dogmatik," in *Studien u. Kritiken*, 1860, p. 67, &c.
[7] *Advers. Hæres.*, v. 35, referring to Baruch iv. 36, and v. p. 335, ed. Massuet.
[8] *Advers. Hæres.*, iv. 26, referring to Daniel xiii. 20 in the Septuagint.
[9] *Pædagog.*, ii. 3.
[10] *Stromata*, ii. 23.
[11] *Advers. Valentinianos*, ch. 2.
[12] *De Exhortatione Castitatis*, ch. 2.
[13] *Contra Gnosticos*, ch. 8.
[14] *De Habitu Muliebri*, ch. 3.
[15] *Epist.* 55, p. 110, ed. Fell.
[16] *De Orat. Domin.*, p. 153.
[17] *De Exhortat. Martyrii*, ch. 12, p. 182.
[18] Euseb. *H. E.*, lib. iv. ch. 26.
[19] Euseb. *H. E.*, lib. vi. p. 25.
[20] *Comment. in Joann.*, tom. xxxii. ch. 14, ed. Huet, p. 409.
[21] *Contra Cels.* iii. 72; vol. i. p. 494, ed. Delarue.
[22] *De Oratione*, ii. p. 215.
[23] *Opp.* ed. Delarue, vol. i. p. 12.

the sacred books of the Old Testament, in support of their systems. As to Basilides (125 A.D.), his supposed quotations from the New Testament in Hippolytus are too precarious to be trusted.[1] It is inferred from statements in Origen and Jerome that he had a gospel of his own somewhat like Luke's, but extra-canonical. His son Isadore and succeeding disciples used Matthew's gospel. Jerome says that Marcion and Basilides denied the Pauline authorship of the epistle to the Hebrews and the pastoral ones.[2] It is also doubtful whether Valentinus's (140–166) alleged citations from the New Testament can be relied upon. The passages of this kind ascribed to him by the fathers belong in a great measure to his disciples; and Henrici has not proved his position that he used John's gospel. But his followers, including Ptolemy (180 A.D.) and Heracleon (185–200), quote the gospels and other portions of the New Testament. From Hippolytus's account of the Ophites, Peratæ, and Sethians, we infer that the Christian writings were much employed by them. An apocryphal work they rarely cite. More than 160 citations from the New Testament have been gathered out of their writings.[3] We may admit that these Ophites and Peratæ were of early origin, the former being the oldest known of the Gnostic parties; but there is no proof that the acquaintance with the New Testament which Hippolytus attributes to them belongs to the first rather than the second half of the 2d century. The early existence of the sect does not show an early citation of the Christian books by it, especially of John's gospel; unless its primary were its last stage. Later and earlier Ophites are not distinguished in the *Philosophumena*. Hence there is a presumption that the author had the former in view, which is favored by no mention of them occurring in the "Adversus omnes Hæreses" usually appended to Tertullian's *Præscriptiones Hæreticorum*, and by Irenæus's derivation of their heresy from that of Valentinus. The latter father does not even speak of the Peratæ. Clement of Alexandria is the first who alludes to them. The early heretics were desirous of confirming their peculiar opinions by the writings current among catholic Christians, so that the formation of a canon by them began soon after the commencement of the 2d century, and continued till the end of it—contemporaneously with the development of a catholic church and its necessary adjunct a catholic canon.

No New Testament canon, except a partial and unauthoritative one, existed till the latter half of the 2d century, that is, till the idea of a catholic church began to be entertained. The Ebionites or Jewish Christians had their favorite gospels and Acts. The gospel of Matthew was highly prized by them, existing as it did in various recensions. Other documents, such as the Revelation of John, and the preaching of Peter (a Jewish-Christian history subsequently re-written and employed in the Clementine Recognitions and Homilies), were also in esteem. Even so late as 170–175, Hegesippus, a Jewish Christian, used the gospel according to the Hebrews and despised Paul's writings, in conformity with the leading principle of the party to which he belonged, viz., the identity of Jesus's words with the Old Testament. The Clementine Homilies (161–180) used the four canonical gospels, even the fourth, which they assign to the apostle John. The gospel according to the Egyptians was also employed. Paul's epistles were rejected, of course, as well as the Acts; since the apostle of the Gentiles was pointed at in Simon Magus, whom Peter refutes. It is, therefore, obvious that a collection of the New Testament writings could make little progress among the Ebionites of the 2d century. Their reverence for the Law and the Prophets hindered another canon. Among the Gentile Christians the formation of a canon took place more rapidly, though Judaic influences retarded it even there. After Paul's epistles were interchanged between churches a few of them would soon be put together. A collection of this kind is implied in 2 Peter iii. 16.

The apostolic fathers quote from the Old Testament, to them an inspired and sacred thing. They have scarcely any express citations from the New Testament. *Allusions* occur, especially to the epistles. The letter of Clement to the Corinthians (about 120) does not use written gospels, though it presupposes an acquaintance with the epistles to the Romans, Corinthians, and Hebrews. Where "Scripture" is cited, or the expression "it is written" occurs, the Old Testament is meant.

Hermas (about 130) seems to have used the epistles to the Ephesians and Hebrews, those of James and 1 Peter, perhaps, too, the Acts; but there is great uncertainty about the matter, and he has no express quotation from any part of the New Testament. The writer often alludes to words of Jesus found in Matthew's gospel, so that he may have been acquainted with it.

Barnabas (about 119) has but one quotation from the New Testament, if, indeed, it be such. Apparently, Matthew xx. 16 is introduced by "it is written," showing that the gospel was considered Scripture. This is the earliest trace of canonical authority being transferred from the Old Testament to Christian writings.

As far as we can judge from Eusebius's account of Papias[4] († 163), that writer knew nothing of a New Testament canon. He speaks of Matthew and Mark; but whether he had their present gospels is uncertain. According to Andreas of Cæsarea he was acquainted with the Apocalypse of John, while Eusebius testifies to his knowledge of 1 Peter and 1 John. But he seems to have had no conception of canonical authority attaching to any part of the New Testament.

Traces of later ideas about the canonicity of the New Testament appear in the shorter Greek recension of the seven Ignatian epistles (about 175). There "the Gospel" and "the Epistles" are recognized as the constituents of the book.[5] The writer also used the gospel according to the Hebrews, for there is a quotation from it in the epistle to the Smyrnians.[6] The second part of the collection seems to have wanted the epistle to the Ephesians.[7]

Justin Martyr (150 A.D.) knew some of the synoptic gospels —the first and third. The evidence of his acquaintance with Mark's is but small. His knowledge of the fourth is denied by many, and zealously defended by others. Thoma finds proof that Justin used it freely as a text-book of gnosis, without recognizing it as the historical work of an apostle.[8] It is pretty certain that he employed an extra-canonical gospel, perhaps the so-called gospel of the Hebrews. He had also the older acts of Pilate. Paul's epistles are never mentioned, though he doubtless knew them. Having little sympathy with Paulinism, he attached his belief to the primitive apostles. The Apocalypse, 1 Peter, and 1 John he esteemed highly; the epistle to the Hebrews and the Acts he treated in the same way as the Pauline writings. Justin's canon, as far as divine authority and inspiration are concerned, was the Old Testament. He was merely on the threshold of a divine canon made up of primitive Christian writings, attaching no exclusive sanctity to those he used, because they were not to him the only source of doctrine. Even of the Apocalypse he says, "A man among us named John, &c., wrote it."[9] In his time none of the gospels had been canonized, not even the synoptists, if, indeed, he knew them all. Oral tradition was the chief fountain of Christian knowledge, as it had been for a century. In his opinion this tradition was embodied in writing; but the documents in which he looked for all that related to Christ were not the gospels alone. Others he used freely, not looking upon any as *inspired*. Though lessons out of the gospels (some of our present ones and others), as also out of the prophets, were read in assemblies on the first day of the week,[10] the act of converting the Christian writings into Scripture was posterior; for the mere reading of a gospel in churches on Sunday does not prove that it was considered divinely authoritative; and the use of the epistles, which formed the second and less valued part of the collection, must still have been limited.

Justin's disciple, Tatian (160–180), who wrote an address to the Greeks, quotes the beginning of John's gospel; and his *Diatessaron* or *Harmony* probably included selections from the four canonical ones; but too little is known of it to enable us to speak with certainty. Doubtless he was acquainted with Paul's writings, as he quotes statements contained in them. He seems, however, to have rejected several of his epistles, probably 1 and 2 Timothy.[11]

In Polycarp's epistle (150–166) there are reminiscences of the synoptic gospels; and most of Paul's epistles as well as 1 Peter were used by the writer. But the idea of canonical authority, or a peculiar inspiration belonging to these writings, is absent.

Athenagoras of Athens wrote an apology addressed to Marcus Aurelius (176). In it he uses written and unwritten tradition, testing all by the Old Testament, which was his only authoritative canon. He makes no reference to the Christian documents,

[1] Davidson's *Introduction to the Study of the N. Testam.*, vol. ii. p. 388.
[2] *Explanatio in Epist. ad Titum*, vol. iv. p. 407, ed. Benedict.
[3] See the Indexes to Duncker and Schneidewin's edition.
[4] *Hist. Eccles.*, iii. 39.
[5] *Epist. ad Philadelph.*, ch. 5. See Hefele's note on the passage. The other well-known passage in ch. viii. is too uncertain in reading and meaning to be adduced here.
[6] Chapter iii. [7] *To the Ephesians*, chapter xii.
[8] See *Zeitschrift für wissenschaftliche Theologie*, 1875, p. 490, *et seq.*
[9] *Dialogus*, part ii. p. 315, ed. Thirlby. Comp. on Justin, Tjeenk-Willink's *Justinus Martyr in zijne Verhouding tot Paulus.*
[10] *Apolog.* i. p. 97, ed. Thirlby.
[11] Hieronymi, *Procem. in Epist. ad Titum.*

but adduces words of Jesus with the verb "he says." His treatise on the resurrection appeals to a passage in one of Paul's epistles.[1]

The author of the epistle to Diognetus (about 200) shows his acquaintance with the gospels and Paul's epistles; but he never cites the New Testament by way of proof. Words are introduced into his discourse in passing, and from memory.

Dionysius of Corinth (170) complains of the falsification of his writings, but consoles himself with the fact that the same is done to the "Scriptures of the Lord," *i. e.*, the gospels containing the Lord's words; or rather the two parts of the early collection, "the gospel" and "the apostle" together; which agrees best with the age and tenor of his letters.[2] If such be the meaning, the collection is put on a par with the Old Testament, and regarded as inspired. But Hegesippus still made a distinction between "the divine writings" (the Old Testament) and "the words of the Lord;"[3] showing that Holy Scripture was nothing else, in his opinion, than the Jewish books. He also used the gospel of the Hebrews and Jewish tradition.[4]

The letter of the churches at Vienne and Lyons (177) has quotations from the epistles to the Romans, Philippians, 1 Timothy, 1 Peter, Acts, the gospels of Luke and John, the Apocalypse. The last is expressly called "Scripture."[5] This shows a fusion of the two original tendencies—the Petrine and Pauline, and the formation of a catholic church with a common canon of authority. Accordingly, the two apostles, Peter and Paul, are mentioned together.

Theophilus of Antioch (180) was familiar with the gospels and most of Paul's epistles, as also the Apocalypse. He puts the prophetic and apostolic Scriptures on the same level, because they proceeded from men who had the same spirit. Passages are cited from Paul as "the divine word."[6]

The conception of a catholic *canon* was realized about the same time as that of a catholic *church*. One hundred and seventy years from the coming of Christ elapsed before the collection assumed a form that carried with it the idea of *holy* and *inspired*.[7] The way in which it was done was by raising the apostolic writings higher and higher till they were of equal authority with the Old Testament, so that the church might have a rule of appeal. The Old Testament was not brought down to the New; the New was raised to the Old. It is clear that the earliest church fathers did not use the books of the New Testament as sacred documents clothed with divine authority, but followed for the most part, at least till the middle of the second century, apostolic tradition orally transmitted. They were not solicitous about a canon circumscribed within certain limits.

In the second half, then, of the second century there was a canon of the New Testament consisting of two parts called *the gospel* (τὸ εὐαγγέλιον) and *the apostle* (ὁ ἀπόστολος). The first was complete, containing the four gospels alone; the second, which was incomplete, contained the Acts of the Apostles and epistles, *i.e.*, thirteen letters of Paul, one of Peter, one of John, and the Revelation. How and where this canon originated is uncertain. Its birth-place may have been Asia Minor, like Marcion's; but it may have grown about the same time in Asia Minor, Alexandria, and Western Africa. At all events, Irenæus, Clement of Alexandria, and Tertullian speak of its two parts; and the three agree in recognizing its existence.

Irenæus had a canon which he adopted as apostolic. In his view it was of binding force and authoritative. This contained the four gospels, the Acts, thirteen epistles of Paul, the first epistle of John, and the Revelation. He had also a sort of appendix or deutero-canon (which he highly esteemed, without putting it on a par with the received collection), consisting of John's second epistle, the first of Peter, and the Shepherd of Hermas. The last he calls a "Scripture" because it was prophetic.[8] The epistle to the Hebrews, that of Jude, James's, 2 Peter, and 3 John he ignored.

Clement's collection was more extended than Irenæus's. His appendix or deutero-canon included the epistle to the Hebrews, 2 John, Jude, the Apocalypse of Peter, the Shepherd of Hermas, the epistles of Clement and Barnabas. He recognizes no distinction between the New Testament writings except by the more frequent use of those generally received, and the degree of importance attached to them. Yet Barnabas is cited as an apostle.[9] So is the Roman Clement.[10] The Shepherd of Hermas is spoken of as divine.[11] Thus the line of the Homologoumena is not marked off even to the same extent as in Irenæus, and is seen but obscurely.

Tertullian's canon consisted of the gospels, Acts, thirteen epistles of Paul, the Apocalypse, and 1 John. As an appendix he had the Epistle to the Hebrews, that of Jude, the Shepherd of Hermas, 2 John probably, and 1 Peter. This deutero-canon was not regarded as authoritative. No trace occurs in his works of James's epistle, 2 Peter, and 3 John. He used the Shepherd, but thought little of it, with the Montanists in general.[12]

These three fathers did not fix the canon absolutely. Its limits were still unsettled. But they sanctioned most of the books now accepted as divine, putting some extra-canonical productions almost on the same level with the rest, at least in practice.

The canon of Muratori is a fragmentary list which was made towards the end of the 2d century (170). Its birthplace is uncertain, though there are traces of Roman origin. Its translation from the Greek is assumed; but that is uncertain. It begins with the four gospels in the usual order, and proceeds to the Acts, thirteen epistles of Paul, the epistles of John, that of Jude, and the Apocalypse. The epistle to the Hebrews, 1 and 2 Peter, and James are not named. The epistle "to the Laodiceans" is probably that to the Ephesians, which had this superscription in Marcion's canon; and that "to the Alexandrians" seems to be the epistle to the Hebrews. According to the usual punctuation, both are said to have been forged in Paul's name, an opinion which may have been entertained among Roman Christians about 170 A.D. The epistle to the Hebrews was rejected in the West, and may have been thought a supposititious work in the interests of Paulism with some reason, because of its internal character. The story about the origin of the fourth gospel, with its apostolic and episcopal attestation, evinces a desire to establish the authenticity of a work which had not obtained universal acceptance at the time. It is difficult to make out the meaning in various places; and there is considerable diversity of opinion among the expositors of the document.[13]

The stichometrical list of the Old and New Testament Scriptures in the Latin of the Clermont MS. (D) was that *read* in the African Church in the 3d century. It is peculiar. After the Pentateuch, Joshua, Judges, Ruth, and the historical books, follow Psalms, Proverbs, Ecclesiastes, Canticles, Wisdom, Sirach, the twelve minor prophets, the four greater, three books of the Maccabees, Judith, Esdras, Esther, Job, and Tobit. In the New Testament, the four gospels, Matthew, John, Mark, Luke, are succeeded by ten epistles of Paul, two of Peter, the epistle of James, three of John, and that of Jude. The epistle to the Hebrews (characterized as that of Barnabas), the Revelation of John, the Acts of the Apostles, the Shepherd of Hermas, the Acts of Paul, the Revelation of Peter, follow. There are thus three New Testament works, afterwards reckoned apocryphal. It is possible that the carelessness of a transcriber may have caused some of the singularities observable in this list,—such as the omission of the epistles to the Philippians and Thessalonians; but the end shows a freer idea of books fitted for reading than what was usual even at that early time in the African Church.[14] In Syria a version of the New Testament for the use of the church was probably made early in the 3d century. This work, commonly called the Peshito, wants 2 Peter, 2 and 3 John, Jude, and the Apocalypse. It has, however, all the other books, including the epistle of James and that to the Hebrews. The last two were received as apostolic.

Toward the middle of the 3d century Origen's testimony respecting the Canon († 254) is of great value. He seems to have distinguished three classes of books—authentic ones, whose apostolic origin was generally admitted, those not authentic, and a middle class not generally recognized, or in regard to which his own opinion wavered. The first contained those already adopted at the beginning of the century both in the East and West, with the Apocalypse, and the epistle to the Hebrews so far as it contains Pauline ideas;[15] to the second belongs the Shepherd of Hermas, though he hesitated a little about it, the epistle of Barnabas, the acts of Paul, the gospel according to the Hebrews, the gospel of the Egyptians, and the preaching of Peter;[16] to the third, the epistle of James, that of Jude, 2 Peter, 2 and 3 John.[17] The separation of the various writings is not formally made, nor does Origen give a list of them. His classification is gathered from his works; and though its application admitted of considerable latitude, he is cautious enough, appealing to the tradition of the church, and throwing in qualifying expressions.[18]

[1] Chapter xviii. [2] Euseb. *H. E.*, iv. 23. [3] *Ibid.*, iv. 22.
[4] Photii *Bibliotheca*, cod. 232.
[5] Euseb. *H. E.*, v. 1, p. 144, ed. Bright.
[6] θεῖος λόγος. *Ad Autolycum*, iii. 14, p. 1141, ed. Migne.
[7] See Davidson's *Introduction to the Study of the New Testament*, vol. ii. p. 508, &c. [8] *Advers. Hæres.*, iv. 20, 2.
[9] *Stromata*, ii. 6, p. 965, ed. Migne. [10] *Ibid.*, iv. 17, p. 1312.
[11] *Ibid.*, i. 29, p. 928.

[12] *De Pudicitia*, cap. 10.
[13] It is printed and copiously commented on by Credner in his *Geschichte des neutestamentlichen Kanon*, edited by Volkmar, p. 141, &c., and by Westcott *On the Canon*, Appendix C, p. 466, 2d edition. Many others have explained it; last of all Hilgenfeld.
[14] Tischendorf edited the Pauline epistles from this MS. 1852.
[15] τὰ ἐν τῇ διαθήκῃ βιβλία, ἐνδιάθηκα, ὁμολογούμενα. [16] νόθα.
[17] ἀντιλεγόμενα. Euseb., *Hist. Eccles.*, vi. 25, iii. 25.
[18] See *Comment. in Matth.*, iii., p. 463; *Ibid.*, p. 814; *Comment. in ep. ad Roman.*, iv. p. 683; *in Matth.*, iii. p. 644; *Homil.*, viii. *in Numb.*, ii. p. 294; *Contra Cels.*, i. 63, p. 378; *De Principiis præf.*, i. p. 49. *Opp.*, ed. Delarue. See also Euseb. *H. E.* vi. 25.

The canon of Eusebius († 340) is given at length in his *Ecclesiastical History*.[1] He divides the books into three classes, containing those writings *generally received*,[2] those *controverted*,[3] and the *heretical*[4] (iii. 31). The first has the four gospels, the Acts, thirteen epistles of Paul, 1 John, 1 Peter, the Apocalypse.[5] The second class is subdivided into two, the first corresponding to Origen's *mixed* or *intermediate* writings,[6] the second to his *spurious* ones.[7] The former subdivision contains the epistles of James, 2 Peter, Jude, 2 and 3 John; the latter, the Acts of Paul, the Shepherd, the Revelation of Peter, the epistle of Barnabas, the Doctrines of the Apostles, the Apocalypse of John, the gospel according to the Hebrews. The third class has the gospels of Peter and of Thomas, the traditions of Matthias, the Acts of Peter, Andrew, and John. The subdivisions of the second class are indefinite. The only distinction which Eusebius put between them was that of ecclesiastical use. Though he classes as spurious the Acts of Paul, the Shepherd, the Revelation of Peter, the epistle of Barnabas, the doctrines of the Apostles, the Apocalypse of John, the gospel according to the Hebrews, and does not apply the epithet to the epistle of James, the 2 of Peter, 2 and 3 John, he uses of James's in one place the verb *νοθεύομαι*.[8] In like manner he speaks of the Apocalypse of Peter and the epistle of Barnabas as controverted.[9] The mixed or spurious of Origen are vaguely separated by Eusebius; both come under the general head of the controverted; for after specifying them separately he sums up, "all these will belong to the class of the controverted," the very class already described as containing "books well known and recognized by most," implying also that they were read in the churches.[10] About 332 the Emperor Constantine entrusted Eusebius with the commission to make out a complete collection of the sacred Christian writings for the use of the Catholic Church. How this order was executed we are not told. But Credner is probably correct in saying that the code consisted of all that is now in the New Testament except the Revelation. The fifty copies which were made must have supplied Constantinople and the Greek Church for a considerable time with an authoritative canon.

Eusebius's catalogue agrees in substance with that of Origen. The historian followed ecclesiastical tradition. He inquired diligently into the prevailing opinions of the Christian churches and writers, the views held by others before and contemporaneously with himself, but could not attain to a decided result. His hesitation stood in the way of a clear, firm view of the question. The tradition respecting certain books was still wavering, and he was unable to fix it. Authority fettered his independent judgment. That he was inconsistent and confused does not need to be shown.

The exact principles that guided the formation of a canon in the earliest centuries cannot be discovered. Definite grounds for the reception or rejection of books were not very clearly apprehended. The choice was determined by various circumstances, of which apostolic origin was the chief, though this itself was insufficiently attested, for, if it be asked whether all the New Testament writings proceeded from the authors whose names they bear, criticism cannot reply in the affirmative. The example and influence of churches to which the writings had been first addressed must have acted upon the reception of books. Above all, individual teachers here and there saw the necessity of meeting heretics with their own weapons, in their own way, with *apostolic records* instead of oral tradition. The circumstances in which the orthodox were placed led to this step, effecting a bond of union whose need must have been felt while each church was isolated under its own bishop and the collective body could not take measures in common. Writings of more recent origin would be received with greater facility than such as had been in circulation for many years, especially if they professed to come from a prominent apostle. A code of apostolic writings, divine and perfect like the Old Testament, had to be presented as soon as possible against Gnostic and Manichæan heretics, whose doctrines were injurious to objective Christianity; while the multiplication of apocryphal works threatened to overwhelm genuine tradition with a heap of superstition.

[1] *Hist. Eccles.*, iii. 25; also 31, 39; vi. 13, 14.

[2] *ὁμολογούμενα, ἐνδιάθηκα, ἀναμφίλεκτα, ἀναντίῤῥητα.*

[3] *ἀντιλεγόμενα, γνώριμα δὲ τοῖς πολλοῖς, ἐν πλείσταις ἐκκλησίαις δεδημοσιευμένα, νόθα.*

[4] *ἄτοπα πάντη καὶ δυσσεβῆ, παντελῶς νόθα.*

[5] This last with the qualification *εἴγε φανείη*. In another place he states that it was rejected by some, and therefore it is also along with the *ἀντιλεγόμενα* or *νόθα*.

[6] *μικτά.*

[7] *νόθα.*

[8] *Hist. Eccles.*, ii. 23. Christophorson, Schmid, and Hug think that Eusebius gave the opinion of others in this word; but it is more likely that he gave his own, as Valesius thinks. See the note in Schmid's *Historia antiqua et vindicatio Canonis*, &c., p. 358.

[9] *Ibid.*, vi. 14.

[10] See Weber's *Beiträge zur Geschichte des neutestamentlichen Kanons*, p. 142, &c.

When it is asked, to whom do we owe the canon? the usual answer is, to the Church, which is hardly correct. The Church Catholic did not exist till after the middle of the second century. The preservation of the early Christian writings was owing, in the first instance, to the congregations to whom they were sent, and the neighboring ones with whom such congregations had friendly connection. The care of them devolved on the most influential teachers,—on those who occupied leading positions in the chief cities, or were most interested in apostolic writings as a source of instruction. The Christian books were mostly in the hands of the bishops. In process of time the canon was the care of assemblies or councils. But it had been made before the first general council by a few leading fathers towards the end of the second century in different countries. The formation of a Catholic Church and of a canon was simultaneous. The circumstances in which the collection originated were unfavorable to the authenticity of its materials, for tradition had been busy over them and their authors. Instead of attributing the formation of the canon to the Church, it would be more correct to say that the important stage in it was due to three teachers, each working separately and in his own way, who were intent upon the creation of a Christian society which did not appear in the apostolic age,—a visible organization united in faith,—where the discordant opinions of apostolic and sub-apostolic times should be finally merged. The canon was not the work of the Christian Church so much as of the men who were striving to form that Church, and could not get beyond the mould received by primitive Christian literature. The first mention of a "Catholic Church" occurs in *The Martyrdom of Polycarp*, an epistle that cannot be dated earlier than 160 A.D., and may perhaps be ten years later. But though the idea be there and in the Ignatian epistles, its established use is due to Irenæus, Tertullian, and Cyprian.

Origen was the first who took a somewhat scientific view of the relative value belonging to the different parts of the biblical collection. His examination of the canon was critical. Before him the leading books had been regarded as divine and sacred, the source of doctrinal and historic truth; and from this stand-point he did not depart. With him ecclesiastical tradition was a prevailing principle in the recognition of books belonging of right to the New Testament collection. He was also guided by the inspiration of the authors,—a criterion arbitrary in its application, as his own statements show. In his time, however, the collection was being gradually enlarged,—his third class, *i. e.*, the *mixed*, approaching reception into the first. But amid all the fluctuations of opinion to which certain portions of the New Testament were subject, and the unscientific procedure both of fathers and churches in the matter, though councils had not met to discuss it, and vague tradition had strengthened with time, a certain spiritual consciousness manifested itself throughout the East and West in the matter of the canon. Tolerable unanimity ensued. The result was a remarkable one, and calls for our gratitude. Though the development was pervaded by no critical or definite principle, it ended in a canon which has maintained its validity for centuries.

It is sometimes said that the history of the canon should be sought from definite catalogues, not from isolated quotations. The latter are supposed to be of slight value, the former to be the result of deliberate judgment. This remark is more specious than solid. In relation to the Old Testament, the catalogues given by the fathers, as by Melito and Origen, rest solely on the tradition of the Jews, apart from which they have no independent authority. As none except Jerome and Origen knew Hebrew, their lists of the Old Testament books are simply a reflection of what they learned from others. If they deviate in practice from their masters by quoting as Scripture other than the canonical books, they show their judgment overriding an external theory. The very men who give a list of the Jewish books evince an inclination to the Christian and enlarged canon. So Origen says, in his *Epistle to Africanus*, that "the churches use Tobit." In explaining the prophet Isaiah, Jerome employs Sirach vi. 6, in proof of his view, remarking that the apocryphal work is in the Christian catalogue. In like manner Epiphanius, in a passage against Aetius, after referring to the books of Scripture, adds, "as well as the books of Wisdom—*i. e.*, the Wisdom of Solomon and of Jesus son of Sirach—finally,

all the other books of Scripture." In another place he gives the canon of the Jews historically, and excludes the apocryphal Greek books; but here he includes some of the latter. We also learn from Jerome that Judith was in the number of the books reckoned up by the Nicene Council. Thus the fathers who give catalogues of the Old Testament show the existence of a Jewish and a Christian canon in relation to the Old Testament;—the latter wider than the former, their private opinion more favorable to the one, though the other was historically transmitted. In relation to the New Testament, the synods which drew up lists of the sacred books show the opinion of some leading father like Augustine, along with what custom had sanctioned. In this department no member of the synod exercised his critical faculty; a number together would decide such questions summarily. Bishops proceed in the track of tradition or authority.

The Canon from the Fourth Century.

I will now be convenient to treat of the two Testaments together, *i.e.*, the canon of the Bible. The canons of both have been considered separately to the end of the third century; they may be henceforward discussed together. We proceed, therefore, to the Bible-canon of the fourth century, first in the Greek Church and then in the Latin.

The Council of Laodicea, at which there was a predominant semi-Arian influence, forbade the reading of all non-canonical books. The 59th canon enacts, that "private psalms must not be read in the Church, nor uncanonized books; but only the canonical ones of the New and Old Testament." Tho 60th canon proceeds to give a list of such. All the books of the Old Testament are enumerated, but in a peculiar order, somewhat like the Septuagint one. With Jeremiah is specified Baruch, then the Lamentations and Epistle. The prophets are last; first the minor, next the major and Daniel. In the New Testament list are the usual seven catholic epistles, and fourteen of Paul, including that to the Hebrews. The Apocalypse alone is wanting. Credner has proved that this 60th canon is not original. It is of much later date.[1] The council was held in the year 363 A.D. Tho Apostolic Constitutions give a kind of canon like that in the 59th of Laodicea. After speaking of the books of Moses, Joshua, Judges, Kings, Chronicles, those belonging to the return from the captivity, those of Job, Solomon, the sixteen prophets, and the Psalms of David, our Acts, the epistles of Paul, and the four gospels are mentioned. It is remarkable that the catholic epistles are not mentioned. That they are indicated under Acts is altogether improbable. The Antiochian Church of that time doubted or denied the apostolicity of these letters, as is seen from Theodore, Cosmas, and others. Hence their absence from these Constitutions, which are a collection belonging to different times, the oldest portion not earlier perhaps than the third century.[2]

Cyril of Jerusalem, who took part in the Council of Laodicea, and died 386 A.D., gives a list of "the divine Scriptures." The books of the Old Testament are twenty-two, and the arrangement is usually that which is in the English Bible. With Jeremiah are associated "Baruch and the Epistle." All the New Testament books are given except the Apocalypse. The list agrees very nearly with that of Eusebius, by taking the latter's "controverted" writings into the class of the "generally received."[3] The writer insists on the necessity of unity in the Church upon the subject, and forbids the reading of writings not generally received. Yet he refers to Baruch (iii. 36–38) as "the prophet;" and in adducing the testimonies of the prophets for the existence of the Holy Spirit, the last is Daniel xiii. 41, 45.

In Athanasius's festal epistle (365) the Alexandrian archbishop undertakes "to set forth in order the books that are canonical and handed down and believed to be divine." His list of the Old Testament nearly agrees with Cyril's, except that Esther is omitted, and Ruth counted separately, to make out the twenty-two books. He adds, "there are other books not canonical, designed by the fathers to be read by those just joining us, and wishing to be instructed in the doctrine of piety:" *i.e.*, the Wisdom of Solomon and the Wisdom of Sirach, and Esther and Judith and Tobit, and the Doctrine of the Apostles (so called), and the Shepherd; "those being *canonical*, and these being *read*, let there be no mention of apocryphal writings," &c. The New Testament list is the same as Cyril's, with the addition of the Apocalypse.[4] He quotes several of the apocryphal books in the same way as he does the canonical. Thus he cites Tobit xii. 7 with "as it is written,"[5] and Sirach xxx. 4 with "as sacred Scripture somewhere says."[6] Elsewhere he applies to the latter (ii. 33) "the divine Spirit says;"[7] and Daniel xiii. 45 is cited under the name of "the Scripture."[8] Canonical and apocryphal are mentioned together, and similar language applied to them.

Gregory of Nazianzus († 389) puts his list into a poetical form. In the Old Testament it agrees with Athanasius's exactly, only he mentions none but the canonical books; in the New, he leaves out the Apocalypse, and so deviates from Athanasius.[9]

Amphilochius of Iconium († 395) gives a long catalogue of the Biblical books in verse. The canon of the Old Testament is the usual one, except that he says of Esther at the end, "Some judge that Esther should be added to the foregoing." He notices none of the apocryphal books. His New Testament canon agrees with tho present, only he excludes the Apocalypse as spurious, which is given as the judgment of the majority. He alludes to tho doubts that existed as to the epistle to the Hebrews, and to the number of catholic epistles (seven or three).[10] The concluding words show that no list was universally received at that time.

Epiphanius († 403) follows Athanasius in his canon. As to the number of the Old Testament books, he hesitates between twenty-two and twenty-seven; but tho contents are the same. At the end of the twenty-seven books of the New Testament, Wisdom and Sirach are mentioned as "divine writings;" elsewhere they are characterized as doubtful.[11] His practice shows his sentiments clearly enough, when he refers to the Book of Wisdom in such phrases as "Scripture," "as Solomon the most blessed of the prophets says;"[12] and cites Sirach (vii. 1) as well as Baruch as "Scripture."[13] He mentions the fact that the epistles of Clemens Romanus were read in the churches.[14]

Didymus of Alexandria († 392) speaks against 2 Peter that it is not in the canons.[15]

Chrysostom († 407) does not speak of the canon; but in tho New Testament he never quotes the four last catholic epistles or the Apocalypse. All the other parts he uses throughout his numerous works.[16]

Theodore of Mopsuestia († 428) was much freer than his contemporaries in dealing with the books of Scripture. It seems that he rejected Job, Canticles, Chronicles, and the Psalm-inscriptions in the New Testament, the epistle of James, and others of the catholic ones. But Leontius's account of his opinions cannot be adopted without suspicion.[17]

The catalogues of the Old Testament contained in the manuscripts B, C, and ℵ need not be given, as they are merely codices of the Septuagint, and have or had the books canonical and apocryphal belonging to that version. The list of the New Testament books in B is liko that of Athanasius. Imperfect at the end, it must havo had at first the Epistles to Timothy, Titus, Philemon, and the Apocalypse. C (cod. Ephræmi rescriptus) has fragments of tho New Testament, which show that it had originally all the present books in the same order as Athanasius's. ℵ or the Sinaitio manuscript has in addition to the New Testament the Epistle of Barnabas and the Shepherd of Hermas. The progress made by the Greek Church of the fourth and former part of the fifth century, in its conception of the canon, seems to be that the idea of ecclesiastical settlement, or public, legal, definitive establishment, was attached to the original one. A writing was considered canonical when a well-attested tradition put it among those composed by inspired men, apostles or others; and it had on that account a determining authority in matters of faith. Books which served as a rule of faith and were definitively set forth by the Church as divinely authoritative, were now termed canonical. Tho canon consisted of writings settled or determined by ecclesiastical law.[18] Such was the idea added to the original acceptation of canon. To canonical were opposed apocryphal writings, *i. e., heretical* and *fabricated* ones; while an intermediate class consisted of those read in the churches, which were useful, but not decisive in matters of belief. Another advance in the matter of the canon at this period was the genoral adoption of the Hebrew canon, with a relegation of the Greek additions in the Septuagint to the class "publicly read."[19] Yet doubts about the reception of Esther into the number of the canonical books were still entertained, though it was one of the Jewish canon. And the catholic epistles which had been doubted before—Jude, James, Second Peter—were now generally received. But there was a division of opinion about the Apocalypse.

We come to the period of the Latin corresponding to that of the Greek Church which has just been noticed. Augustine

1 *Geschichte des neutest. Kanon*, p. 217, &c.
2 See *Constit. Apostol.*, p. 67, ed. Ueltzen.
3 *Catech.*, iv. 22, pp. 66, 67, ed. Milles.
4 Athanasii *Opp.*, ed. Benedict, i. 2, pp. 962, 963.
5 ii. 1, p. 305. 6 i. 1, p. 183. 7 ii. p. 283.
8 ii. p. 9.
9 Gregorii Nazianzeni *Opp.*, ed. Migne, vol. iii. pp. 473, 474.
10 *Iambi ad Seleucum*, in Greg. Naz. *Opp.* ii. p. 194.
11 ἀμφιλέκτα. *Adv. Hæres.*, i. p. 19. See *Hæres.*, iii. tom. i. p. 941. *De ponder. et mensur.* 23. 12 Tom. i. pp. 573, 607, 713, ed. Petav.
13 Pp. 481, 755. 14 *Hæres.*, xxx. 15.
15 *Enarrat. in Ep. S. Petri Secundam*, p. 1774, ed. Migne.
16 See Montfaucon in his edition of Chrysostom's Works, vol. vi. pp. 364, 365, ed. Paris, 1835.
17 See Leontius Byzantinus contra Nestorianos et Eutychianos, lib. iii. in *Gallandi Bibliotheca*, xii. p. 690. Comp. Fritzsche *De Theodori Mopsuest. vita et scriptis*, Halæ, 1836.
18 βιβλία κανονιζόμενα, κανονικά, κεκανονισμένα, ἔνθεσμα.
19 Βιβλία ἀναγινωσκομενα.

(† 430) gave great attention to the subject, laboring to establish a complete canon, the necessity of which was generally felt. According to him the Scriptures which were received and acknowledged by all the churches of the day should be canonical. Of those not universally adopted, such as are received by the majority of the churches and the weightier should be preferred to those received by the fewer and less important churches.[1] In his enumeration of the forty-four books of the Old Testament, he gives, after Chronicles, other histories "which are neither connected with the order" specified in the preceding context "nor with one another," *i. e.*, Job, Tobit, Esther, Judith, the two books of the Maccabees, and Esdras. Wisdom and Ecclesiasticus, he thinks, should be numbered among the prophets, as deserving of authority and having a certain likeness to Solomon's writings. He says of the Maccabees that this Scripture has been received by the Church not uselessly, if it be read or heard soberly."[2] The famous passage in the treatise on Christian doctrine, where Augustine enumerates the whole canon, is qualified by no other; for though he knew the distinction between the canonical books of the Palestinian Jews and the so-called apocryphal ones, as well as the fact of some New Testament writings not being received universally, he considered church reception a sufficient warrant for canonical authority. Hence he considered the books of the Maccabees canonical, because so received by the Church; while he says of Wisdom and Sirach that they merited authoritative reception and numbering among the prophetic Scriptures. He raises, not lowers, the authority of the so-called apocryphal books which he mentions. He enumerates all the New Testament books, specifying the Pauline epistles as fourteen, and so reckoning that to the Hebrews as the apostle's; but he speaks of it elsewhere as an epistle about which some were uncertain, professing that he was influenced to admit it as canonical by the authority of the Oriental churches.[3] He speaks hesitatingly in various places about its Pauline authorship.

In 393 the African bishops held a council at Hippo, where the canon was discussed. The list of the canonical Scriptures given includes, besides the Palestinian one, Wisdom, Ecclesiasticus, Tobit, Judith, and the two books of Maccabees. The New Testament canon seems to have agreed exactly with our present one.[4] The Council of Carthage (397) repeated the statute of its predecessor, enumerating the same books of the Bible as canonical.[5] Augustine was the animating spirit of both councils, so that they may be taken as expressing his views on the subject.

Jerome († 420) gives a list of the twenty-two canonical books of the Old Testament, the same as that of the Palestinian Jews, remarking that some put Ruth and Lamentations among the Hagiographa, so making twenty-four books. All besides should be put among the Apocrypha. Wisdom, Sirach, Judith, Tobit, the Shepherd are not in the canon. The two books of Maccabees he regarded in the same light.[6] But though Jerome's words imply the apocryphal position of these extra-canonical books, he allows of their being read in public for the edification of the people, not to confirm the authority of doctrines; *i. e.*, they belong to "the ecclesiastical books" of Athanasius. His idea of "apocryphal" is wider and milder than that of some others in the Latin Church. It has been conjectured by Welte,[7] that the conclusions of the African councils in 393 and 397 influenced Jerome's views of the canon, so that his later writings allude to the apocryphal works in a more favorable manner than that of the *Prologus galeatus* or the preface to Solomon's books. One thing is clear, that he quotes different passages from the Apocrypha along with others from the Hebrew canon. In his letter to Eustochius, Sirach iii. 33 comes between citations from Matthew and Luke with the phrase "as it is written;" and xi. 30 has "holy Scripture" applied to it. Ruth, Esther, and Judith are spoken of as "holy volumes." The practice of Jerome differed from his theory; or rather he became less positive and altered his views somewhat with the progress of time and knowledge. As to the New Testament, he gives a catalogue of all that now belong to it, remarking of the epistle to the Hebrews and of the Apocalypse that he adopts both on the authority of ancient writers, not of present custom. His opinion about them was not decided.[8] In another work he gives the Epistle of Barnabas at the end of the canonical list. He also states the doubts of many respecting the epistle to Philemon, and about a Peter, Jude, 2 and 3 John. According to him the first epistle of Clemens Romanus was publicly read in some churches.[9]

Hilary of Poitiers († 368) seems to have followed Origen's catalogue. He gives twenty-two books, specifying "the epistle" of Jeremiah, and remarks that some added Tobit and Judith, making twenty-four, after the letters of the Greek alphabet. Wisdom and Sirach he cites as "prophets."[10] In the New Testament he never quotes James, Jude, 2 and 3 John, nor 2 Peter.

Rufinus († 410) enumerates the books of the Old and New Testaments which "are believed to be inspired by the Holy Spirit itself, according to the tradition of our ancestors, and have been handed down by the churches of Christ." All the books of the Hebrew canon and of the New Testament are specified. After the list he says, "these are they which the fathers include in the canon, by which they wished to establish the assertion of our faith." He adds that there are other books not *canonical*, but *ecclesiastical*—the Wisdom of Solomon, Sirach, Tobit, Judith, and the books of the Maccabees. Besides the usual New Testament works, he speaks of the Shepherd of Hermas and "the Judgment of Peter" as read in the churches, but not as authoritative in matters of faith.[11]

Philastrius († about 387) gives some account of the Scriptures and their contents in his time. The canonical Scriptures, which alone should be read in the Catholic Church, are said to be the Law and the Prophets, the gospels, Acts, thirteen epistles of Paul, and seven others. He speaks of heretics who reject John's gospel and the Apocalypse,—remarking also that some do not read the epistle to the Hebrews, not thinking it to be Paul's.[12] The influence of the East upon the West appears in the statements of this father upon the subject. He had several canonical lists before him: one at least from an Oriental-Arian source, which explains some assertions in his book.

Innocent I. of Rome wrote to Exsuperius (405), bishop of Toulouse, giving a list of the canonical books. Besides the Hebrew canon, he has Wisdom and Sirach, Tobit, Judith, the 2 Maccabees. The New Testament list is identical with the present. He also refers to pseudepigraphical writings which ought not only to be rejected but condemned.[13]

A canonical list appears in three different forms bearing the names of Damasus (366–384), Gelasius I. (492–496), and Hormisdas (514–523). According to the first, the books of the Old Testament are arranged in three orders. In the first are the Pentateuch, Joshua, Judges, Ruth, four Kings, two Chronicles, Psalms, Proverbs, Ecclesiastes, Canticles, Wisdom, and Ecclesiasticus; in the second, all the Prophets, including Baruch; in the third, Job, Tobit, Judith, Esther, Esdras, two Maccabees. The New Testament books are the four gospels, fourteen epistles of Paul, the Apocalypse, and Acts, with seven catholic epistles.

That which is called the Decree of Gelasius is almost identical with the preceding. It wants Baruch and Lamentations. It has also two Esdras instead of one. In the New Testament the epistle to the Hebrews is absent.

The Hormisdas form has the Lamentations of Jeremiah, and in the New Testament the epistle to the Hebrews.

The MSS. of these lists present some diversity; and Credner supposes the Damasus-list a fiction. But Thiel has vindicated its authenticity. It is possible that some interpolations may exist in the last two; but the first, which is the shortest, may well belong to the time of Damasus.[14]

In 419 A.D. another council at Carthage, at which Augustine was present, repeated the former list of books with a single alteration, viz., fourteen epistles of Paul (instead of thirteen).[15]

The preceding notices and catalogues show a general desire in the Western Church to settle the canon. The two most influential men of the period were Augustine and Jerome, who did not entirely agree. Both were unfitted for the critical examination of such a topic. The former was a gifted spiritual man, lacking learning and independence. Tradition dominated all his ideas about the difficult or disputed books,—a tradition arbitrarily assumed. He did not enter upon the question scientifically, on the basis of certain principles, but was content to take refuge in authority—the prevailing authority of leading churches. His judgment was weak, his sagacity moderate, and the absence of many-sidedness hindered a critical result. Jerome, again, was learned but timid, lacking the courage to face the question fairly or fundamentally, and the independence necessary to its right investigation. Belonging as he did to both churches, he recommended the practice of the one to the other. He, too, was chiefly influenced by tradition,—by Jewish teachers in respect to the Old Testament, and by general custom as to the New. Compared with the Eastern Church, the Western accepted a wider canon of the Old Testament, taking some books into the class of the canonical which the former put among those "to be read." In regard to the New Testament, all

[1] *De Doctrina Christiana*, ii. 8.
[2] *Contra Gaudent.* i. 38; *Opp.* Paris, 1837, vol. ix. p. 1006.
[3] *De peccat. merit.* i. 50; *Opp.* vol. x. p. 137, ed. Migne.
[4] Mansi, tom. iii. p. 924. [5] Ibid. p. 891.
[6] *Prologus galeatus in Libros Regum*; *Epist. ad Paulinum.*
[7] In Herbst's *Einleit.*, Erster Thiel, p. 37.
[8] *Ep. ad Dardan.*; *Opp.* vol. i. p. 1103, ed. Migne.
[9] See *Onomastica Sacra*; *Comment. in Ep. ad Philem.*; *De Viris Illustr.*
[10] *Proleg. in Psalm.*; *Opp.* ed. Migne, vol. i. p. 241.
[11] *Expos. in Symbol. Apostol.*, pp. 373, 374, ed. Migne.
[12] *De Hæres.* chs. 60 and 61, in Gallandi, vii. pp. 424, 425.
[13] Mansi, iii. pp. 1040, 1041.
[14] Credner's *Zur Geschichte des Kanons*, p. 151, &c., and Thiel's *Epistolæ Romanorum Pontificum Genuinæ*, tom. i.
[15] Mansi, iv. p. 430.

the catholic epistles and even the Apocalypse were received. The African churches and councils generally adopted this larger canon, which resulted from the fact of the old Latin versions of the Bible current in Africa being daughters of the Septuagint. If the Latins apparently looked upon the Greek as the original itself, the apocryphal books would soon get rank with the canonical. Still the more learned fathers, Jerome, Rufinus, and others, favored the Hebrew canon in distinguishing between canonical and ecclesiastical books. The influence of the Eastern upon the Western Church is still visible, though it could not extinguish the prevailing desire to include the disputed books. The Greek view was to receive nothing which had not apparently a good attestation of divine origin and apostolic authority; the Latin was to exclude nothing hallowed by descent and proved by custom. The former Church looked more to the sources of doctrine; the latter to those of edification. The one desired to contract those sources, so as not to be too rich; the other to enlarge the springs of edification, not to be too poor. Neither had the proper resources for the work, nor a right perception of the way in which it should be set about; and therefore they were not fortunate in their conclusions, differing in regard to points which affect the foundation of a satisfactory solution.

Notwithstanding the numerous endeavors both in the East and West to settle the canon during the 4th and 5th centuries, it was not finally closed. The doubts of individuals were still expressed, and succeeding ages testify to the want of universal agreement respecting several books. The question, however, was *practically* determined. No material change occurred again in the absolute rejection or admission of books. With some fluctuations, the canon remained very much as it was in the 4th and 5th centuries. Tradition had shaped and established its condition. General usage gave it a permanency which it was not easy to disturb. The history is mainly an objective one. Uncritical at its commencement, it was equally so in the two centuries which have just been considered.

The history of the canon in the Syrian church cannot be traced with much exactness. The Peshito version had only the Hebrew canonical books at first; the apocryphal were added afterwards. In the New Testament it wanted four of the catholic epistles and the Apocalypse. Ephrem (378) uses all the books in our canon, the apocryphal as well as the canonical. The former are cited by him in the same way as the latter. The Syrian version made by Polycarp at the request of Philoxenus of Mabug, had the four catholic epistles wanting in the Peshito; and the Charklean recension of it probably had the Apocalypse also, if that which was published by De Dieu at Leyden belongs to it. Junilius, though an African bishop (about 550), says that he got his knowledge from a Persian of the name of Paulus, who received his education in the school of Nisibis. He may, therefore, be considered a witness of the opinions of the Syrian church at the beginning of the 6th century. Dividing the biblical books into those of perfect, those of intermediate, and those of no authority, he makes the first the canonical; the second, those added to them by many (*plures*); the third, all the rest. In the first list he puts Ecclesiasticus. Among the second he puts 1 and 2 Chronicles, Job, Ezra and Nehemiah, Judith, Esther, 1 and 2 Maccabees; and in the New Testament, James, 2 Peter, Jude, 2 and 3 John. He also says that the Apocalypse of John is much doubted by the Orientals. In the third list—*i.e.*, books of no authority added by some (*quidam*) to the canonical—are put Wisdom and Canticles.[1] The catalogue is confused, and erroneous at least in the one respect, that Jerome is referred to as sanctioning the division given of the Old Testament books; for neither he nor the Jews agree with it.

The canon of the old Abyssinian church seems to have had all the books in the Septuagint, canonical and apocryphal together, little distinction being made between them. The New Testament agrees with the present Greek one. At a later period a list was made and constituted the legal one for the use of the church, having been derived from the Jacobite canons of the apostles. This gives in the Old Testament the Pentateuch, Joshua, Judges, Ruth, Judith, Kings, Chronicles, Ezra and Nehemiah, Esther, Tobit, two books of Maccabees, Job, Psalms, five books of Solomon, minor and greater prophets. External are the Wisdom of Sirach (for teaching children) and the book of Joseph ben Gorion—*i.e.*, that of the Maccabees. The New Testament has four gospels, Acts, seven apostolic epistles, fourteen of Paul, and the Revelation of John. Later catalogues vary much, and are often enlarged with the book of Enoch, 4 Esdras, the Apocalypse of Isaiah, &c. The canon of the Ethiopic church was fluctuating.[2]

The Armenian canon, if we may judge from printed editions, follows the Septuagint; but the books are put in a peculiar position. The three books of Maccabees follow the historical ones. In the New Testament the epistle to the Hebrews precedes those to Timothy and Titus; while Sirach, a second recension of Daniel, Manasseh, 3 Corinthians, with the account of John's death, are relegated to an appendix behind the New Testament.

The Bible canon of the Eastern Church in the Middle Ages shows no material change. Endeavors were made to remove the uncertainty arising from the existence of numerous lists; but former decisions and decrees of councils were repeated instead of a new, independent canon. Here belongs the catalogue in the Alexandrian MS. of the 5th century, which is peculiar. After the prophets come Esther, Tobit, Judith, Ezra and Nehemiah, 4 Maccabees, Psalms, Job, Proverbs, Ecclesiastes, Canticles, the all-virtuous Wisdom, the Wisdom of Jesus of Sirach. In the New Testament the Apocalypse is followed by two epistles of Clement. The list was probably made in Egypt. That of Anastasius Sinaita († 599) needs no remark. The apostolic canons (canon 76) give a list both of the Old and New Testament books, in which the usual canonical ones are supplemented by Judith, 3 Maccabees, and in the New Testament, by two epistles of Clement, and the Clementines in eight books. The Apocalypse is wanting. But the whole is a patchwork, borrowed from the Apostolic Constitutions, Athanasius's festal epistle, and other sources. It cannot be put earlier than the 5th century; and it is pretty certain that Judith and Maccabees are later insertions.[3] We have also Nicephorus's *Stichometry* (806–815);[4] Cosmas Indicopleustes (535), who never mentions the seven catholic epistles of the New Testament or the Apocalypse; the Council of Constantinople commonly called the *Trullan* (692), Johannes Damascenus († 754), the second Nicene Council (787), the *Synopsis divinæ Scripturæ Vet. et Novi Test.* (about 1000), Zonaras (about 1120), Alexius Aristenus (about 1160), and Nicephorus Callistus (1330).

In the Western church of the Middle Ages, diversity of opinion respecting certain books continued. Though the views of Augustine were generally followed, the stricter ones of Jerome found many adherents. The canon was fluctuating, and the practice of the churches in regard to it somewhat lax. Here belong Cassiodorus (about 550); the list in the Codex Amiatinus (about 550); and Isidore of Seville († 636), who, after enumerating three classes of Old Testament books, gives a fourth, not in the Hebrew canon. Here he specifies Wisdom, Ecclesiasticus, Tobit, Judith, 1 and 2 Maccabees, saying that the Church of Christ puts them among the divine books, honors and highly esteems them.[5] There are also the fourth council of Toledo (632), Gregory the Great († 604), Notker Labeo († 912), Ivo (about 1092), Bede († 735), Alcuin († 804), Rabanus Maurus († 856), Hugo de St. Victor († 1141), Peter of Clugny († 1156), John of Salisbury († 1182), Thomas Aquinas († 1270), Hugo de St. Caro († 1263), Wycliffe († 1384), Nicolaus of Lyra († 1340), &c. Several of these, as Hugo de St. Victor, John of Salisbury, Hugo de St. Caro, and Nicolaus of Lyra, followed Jerome in separating the canonical and apocryphal books of the Old Testament.[6]

As to the arrangement of the New Testament books, the gospels stand thus in several MSS. of the old Latin version, in *a, b, c, f, ff, q, cod. D* (Latin),—Matthew, John, Luke, Mark. In the Acts of the council at Ephesus (431), Cyril of Alexandria, Theodoret, and several Latin translations, they are Matthew, John, Mark, Luke. The Curetonian Syriac has Matthew, Mark, John, Luke; while a very old fragment of the gospels in Turin has Mark and Matthew.

The oldest order of the books, and that which lies at the basis of the current one given by Tertullian, is Gospels, Acts, Pauline epistles, Apocalypse, epistle of John. This was varied by putting the catholic epistles before the

[1] Galland. xii. p. 79, &c.

[2] See Dillmann in Ewald's *Jahrbücher*, v. p. 144, &c.
[3] See Credner, *Geschichte des neutest. Kanon*, pp. 235, 236.
[4] See Credner's *Zur Gesch. des Kanons*, p. 97, &c.
[5] *Etymolog.*, vi. 1. [6] See Hody, p. 648, &c.

Apocalypse, as in the Muratorian fragment. This order became the prevailing one in the West, with a few variations here and there, such as the placing of the Acts after the Pauline epistles by the Peshito, Jerome, and Epiphanius; or after the catholic epistles, immediately before the Apocalypse, by Augustine and the Spanish church; while in the Stichometry of the Clermont MS. they follow the Apocalypse as the last canonical book.

In the ancient Greek Church the order was different. There the usual one was Gospels, Acts, the catholic epistles, the Pauline epistles, and the Apocalypse. This exists in Cyril of Jerusalem, Athanasius, and the MSS. B and A. But the Sinaitic has Gospels, Pauline epistles, Acts, catholic epistles, Apocalypse.

The Pauline epistles seem to have been arranged according to their length; the catholic ones have that of James first, because the author was the bishop of the church at Jerusalem, then the epistles of Peter, the chief of the apostles.[1]

The Reformers generally returned to the Hebrew canon, dividing off the additional books of the Septuagint as well as those attached to the Vulgate. These they called apocryphal, after Jerome's example. The latter, though considered of no authority in matters of doctrine, were still pronounced useful and edifying. The principal reason that weighed with them was, that Christ and the apostles testified to none of the Septuagint additions.

Besides the canonical books of the Old Testament, Luther translated Judith, Wisdom, Tobit, Sirach, Baruch, 1 and 2 Maccabees, the Greek additions to Esther and Daniel, with the Prayer of Manasseh. His judgment respecting several of these is expressed in the prefaces to them. With regard to 1 Maccabees he thinks it almost equal to the other books of Holy Scripture, and not unworthy to be reckoned among them. Of Wisdom, he says, he was long in doubt whether it should be numbered among the canonical books; and of Sirach, that it is a right good book proceeding from a wise man. But he speaks unfavorably of several other apocryphal productions, as of Baruch and 2 Maccabees. It is evident, however, that he considered all he translated of *some* use to the Christian Church. He thought that the book of Esther should not belong to the canon.

Luther's judgment respecting some of the New Testament books was freer than most Protestants now are disposed to approve. He thought the epistle to the Hebrews was neither Paul's nor an apostle's, but proceeded from an excellent and learned man who may have been the disciple of apostles. He did not put it on an equality with the epistles written by apostles themselves. The Apocalypse he considered neither apostolic nor prophetic, but put it almost on the same level with the 4th book of Esdras, which he spoke elsewhere of tossing into the Elbe. This judgment was afterwards modified, not retracted. James's epistle he pronounced unapostolic. It was quite an epistle of straw. In like manner, he did not believe that Jude's epistle proceeded from an apostle. Considering it to have been taken from 2 Peter, and not well extracted either, he put it lower than the supposed original. The Reformer, as also his successors, made a distinction between the books of the New Testament similar to that of the old,—the *generally received* (homologoumena) and *controverted* books (antilegomena); but the Calvinists afterwards obliterated it, as the Roman Catholics at the Council of Trent did with the Old Testament. The epistle to the Hebrews, those of Jude and James, with the Apocalypse, belong to the latter class. Luther assigned a greater or less value to the separate writings of the New Testament, and left every one to do the same. He relied on their internal value more than tradition,—taking the "Word of God" in a deeper and wider sense than its coincidence with the Bible.

Bodenstein of Carlstadt examined the question of canonicity more thoroughly than any of his contemporaries, and followed out the principle of private judgment in regard to it. He divides the biblical books into three classes—1. Books of the highest dignity—viz., the Pentateuch and the Gospels; 2. Books of the second dignity—*i. e.*, the works termed prophetic by the Jews, and the fifteen epistles universally received; 3. Books of the third and lowest authority—*i. e.*, the Jewish Hagiographa and the seven antilegomena epistles of the New Testament. Among the Apocryphi he makes two classes—such as are out of the canon of the Hebrews yet hagiographical (Wisdom, Ecclesiasticus, Judith, Tobit, the two Maccabees), and those that are clearly apocryphal and to be rejected (third and fourth Esdras, Baruch, Prayer of Manasseh, a good part of the third chapter of Daniel, and the last two chapters of Daniel).[2]

Zwingli asserts that the Apocalypse is not a biblical book.[3]

Ecolampadius says—"We do not despise Judith, Tobit, Ecclesiasticus, Baruch, the last two Esdras, the three Maccabees, the last two chapters of Daniel, but we do not attribute to them divine authority with those others."[4] As to the books of the New Testament he would not compare the Apocalypse, James, Jude, 2 Peter, 2 and 3 John with the rest.[5]

Calvin did not think Paul to be the author of the epistle to the Hebrews, nor 2 Peter to have been written by Peter; but both in his opinion are canonical.

The later Helvetic Confession speaks of the Apocryphal books as read in the churches, but not used as authoritative in matters of faith.[6]

The Gallic Confession makes a distinction between canonical and other books, the former being the rule and norm of faith, not only by the consent of the Church, but much more by the testimony and intrinsic persuasion of the Spirit, by whose suggestions we are taught to distinguish them from other ecclesiastical books which, though useful, are not of the kind that any article of faith can be constituted by them.[7]

The Belgic Confession makes a distinction between the sacred and apocryphal books. The former may be read by the Church, but no doctrine can be derived from them. In the list of New Testament books given there are fourteen epistles of Paul.[8]

The Waldensian canon, in which the canonical are carefully separated from the apocryphal books, is not of the date 1120, but is a later document derived from or made by a Protestant after 1532. It is not genuine.

The canon of the Anglican Church (1562), given in the sixth Article of Religion, defines holy Scripture to be "those canonical books of the Old and New Testament, of whose authority was never any doubt in the Church." After giving the names and number of the canonical books, the article prefaces the apocryphal ones with, "And the other books (as Hierome saith) the Church doth read for example of life and instruction of manners; but yet doth it not apply them to establish any doctrine. Such are these following," &c., &c. At the end it is stated that "all the books of the New Testament, as they are commonly received, we do receive and account them canonical." The Article is ambiguous. If the canonical books enumerated are those meant in the phrase "of whose authority was never any doubt in the Church," the statement is incorrect. If a distinction is implied between the canonical books and such canonical ones as have never been doubted in the Church, the meaning is obscure. In either case the language is not explicit.

The Westminster Confession of Faith gives a list of all the books of the Old and New Testaments as the Word of God written,—adding that those called the Apocrypha are not of divine inspiration, and no part of the canon, of no authority in the Church, nor to be approved or made use of otherwise than as human writings.

The Roman Catholic canon was finally determined at the Council of Trent (1546), which adopted all the books in the Vulgate as sacred and canonical without distinction. But 3 and 4 Esdras, 3 Maccabees, and the Prayer of Manasseh were not included,—though the first and last appeared in the original Clementine edition of 1592, not, however, in the preceding one of Sixtus (1590). A council at Florence in 1441 had set the example, which was followed at Trent. But this stringent decree did not prevent individual Catholics from making a distinction between the books, in assuming a first and second canon, or proto-canonical and deutero-canonical books,—as did Sixtus Senensis, B. Lamy, Anton a matre Dei, Jahn, and others,—though it is hardly consistent with orthodox catholicism or the view of those who passed the decree. When the writings are said to be of different authority—

[1] See Credner's *Geschichte*, p. 393, *et seq.*

[2] Carlstadt's treatise is reprinted in Credner's *Zur Geschichte des Kanons*.

[3] *Werke*, edited by Schuler and Schulthess, vol. ii. p. 169.

[4] "Ep. ad Valdenses," 1530, apud Scultet. *Annal. evang.*, pp. 313, 314.

[5] *Ibid.*

[6] Niemeyer, *Collectio Confessionum*, p. 468.

[7] *Ibid.*, p. 330.

[8] *Ibid.*, pp. 361, 362.

some more, others less—the intent of the council is violated. The Vatican council (1870) confirmed the Tridentine decree respecting the canon.

The Greek Church, after several ineffectual attempts to uphold the old distinction between the canonical and ecclesiastical books by Metrophanes Critopulus, patriarch of Alexandria in 1625, and Cyril Lucaris, patriarch of Constantinople († 1638),[1] came to the same decision with the Romish, and canonized all the Apocrypha. This was done at a Jerusalem synod under Dositheus in 1672.

Semler († 1791) was the first scholar after the Reformation who set himself to correct the prevailing ideas respecting the canon. He had no definite principles to guide him, but judged books chiefly by their Christian value and use to the Church. Though his views are sometimes one sided, and his essays ill digested, he placed the subject in new lights, and his labors bore abundant fruit in after years.[2] He was followed by his disciple Corrodi, by G. L. Oeder, Michaelis, Herder, Lessing, and Eichhorn—most of whom recommended their views by a freshness of style which Semler did not command. In more recent times the whole question has been subjected to very thorough discussion.

We observe in conclusion that the canonical authority of Scripture does not depend on the church or its councils. The primitive church may be cited as a witness for it; that is all. Canonical authority lies in the Scripture itself; it is inherent in the books so far as they contain a revelation or declaration of the divine will. Hence there is truth in the statement of old theologians that the authority of Scripture is from God alone. The canonicity of the books is a distinct question from that of their authenticity. The latter is a thing of historic criticism, the former of doctrinal belief.

See De Wette's *Einleitung in das alte Testament*, by Schrader, 8th edition; Bleek's *Einleitung in das alt. Test.*, edited by Kamphausen; the same author's *Einleit. in das Neue Testament*, edited by Mangold; Dillmann in the *Jahrbücher für deutsch Theologie*, vol. iii.; Oehler and Landerer in Herzog's *Encyklopædie*, vol. vii.; Steiner and Holtzmann in Schenkel's *Bibel-Lexicon*, vol. iii.; Reuss's *Die Geschichte der heiligen Schriften neuen Testaments;* Credner's *Geschichte des neutest. Kanon*, by Volkmar; Ewald's *Geschichte des Volkes Israel*, vol. vii.; Diestel's *Geschichte des Alten Testamentes, in der Christliche Kirche;* Hilgenfeld's *Der Kanon und die Kritik des N. Test.;* the same author's *Historische-Kritische Einleitung in das neue Testament;* Holtzmann's *Kanon und Tradition;* Herzfeld's *Geschichte des Volkes Israel*, vol. ii.; Grätz's *Kohelet*, Anhang i.; Fürst's *Der Kanon des alten Testaments*, u.s.w.; *Versuch einer Beleuchtung der Geschichte des jüdischen und christlichen Bibelkanons* (by Corrodi); Weber's *Beiträge zur Geschichte des neutestamentlichen Kanons;* Jones's *New and full method of settling the canonical authority of the New Testament;* Westcott, *On the Canon of the New Testament;* Stuart's *Critical History and Defence of the Old Testament*, ed. Davidson. (S. D.)

CANON, a person who possesses a prebend, or revenue allotted for the performance of divine service in a cathedral or collegiate church.

Canons are of no great antiquity. Gregory of Tours mentions a college of canons instituted by Baldwin, archbishop of that city, in the 6th century. The common opinion attributes the institution of this order to Chrodegangus, bishop of Metz, about the middle of the 8th century. When the term *Canonici* is met with at an earlier date, it is employed in a more vague and generic sense, either as equivalent to the *clerus* or clergy at large, or as comprehending all who held any ecclesiastical office whatever, even of the humblest character, as that of a chanter, porter, etc.

Originally canons were only priests, or inferior ecclesiastics, who lived in community, residing by the cathedral church to assist the bishop, depending entirely on his will, supported by the revenues of the bishopric, and living in the same house as his domestics or counsellors. They even inherited his movables till the year 817, when this was prohibited by the council of Aix-la-Chapelle, and a new rule substituted in the place of that which had been appointed by Chrodegangus, and which was observed for the most part in the West till the 12th century. By degrees these communities of priests, shaking off their dependence, formed separate bodies, of which the bishops, however, were still heads. In the 10th century there were communities or congregations of the same kind established even in cities where there were no bishops; and these were called collegiates, as they used the terms congregation and college indifferently—the name chapter, now given to these bodies, being much more modern. Under the second race of the French kings the canonical or collegiate life had spread itself all over the country, and each cathedral had its chapter distinct from the rest of the clergy. They had the name canon from the Greek *κανόν*, which signifies three different things—a rule, a pension of fixed revenue to live on, and a catalogue or matricula, all which are applicable to them.

In time, the canons freed themselves from their rules, the observance relaxed, and at length they ceased to live in community; yet they still formed bodies, which through increase of wealth and the power naturally accruing to corporate societies claimed other functions besides the celebration of the common office in the church, assuming the rights of the rest of the clergy, making themselves necessary as a council of the bishop, taking upon them the administration of a see during a vacancy, and the election of a bishop to supply it. There are even some chapters exempt from the jurisdiction of the bishop, and owning no head but their dean. From the example of cathedral chapters, collegiate ones also continued to form bodies after they had abandoned living in community.

For details see Du Cange, *Glossarium Mediæ et Infimæ Latinitatis* (ed. 1842, Paris, Didot), *s. v. Canonicus*, and the references there given to Mabillon, Muratori, &c.; Walcott, *Sacred Archæology* (London, Reeve, 1868); Chéruel, *Dictionnaire Historique* (Paris, Hachette, 1855), art. *Chanoine;* and *Dictionary of Christian Antiquities*, by Smith and Cheetham (London, Murray, 1876), art. *Canonici*, where further references to Thomassini, Martigny, and others may be found. A recent French writer, M. de Coulanges, calls attention to the great amount of state interference in the arrangement of canons under Chrodegang, and again under Charlemagne (*Rev. des Deux Mondes* for 1st January, 1876). But the interference was mutual, as the French bishops of that date were much intermixed with state affairs. The relations of canons to monks, parochial clergy, bishops, and popes, may be gathered from the above named sources, and from both secular and ecclesiastical historians, as Lingard, Freeman, Canon Robertson, and others.

CANON LAW. The law that is embodied in the *Corpus Juris Canonici* is termed the CANON LAW. The rules enacted by the early church for its relations with the secular power, its own internal administration, or the conduct of its members, were called canons (*κανόνες, regulæ*), in contradistinction on the one hand to its articles of doctrine (*δόγματα*), and on the other to the enactments of the civil lawgiver (*νόμοι, leges*). Though at first applied only to the ordinances of an assembly of the church, the term canon came to be extended to include opinions of the fathers and decretals of the popes. Any collection of such laws was styled *Jus Canonicum*, a name which ultimately came to be confined to the collection *κατ' ἐξοχήν*, the *Corpus Juris Canonici*. Canon law must not be confounded with ecclesiastical law (*Jus Ecclesiasticum*). The former has the church for its source; the latter has the church for its subject. During the growth of the canon law the church extended her influence into all departments of life. Churchmen filled high offices of state and performed the duties of practical lawyers, while prelates often exercised civil jurisdiction over a considerable tract of country. Hence the legislation of the church embraced many subjects which properly belonged to the domain of municipal law. Ecclesiastical law, on the other hand, derives its binding authority solely from the state, and treats of the church as a religious institution. But its principles cannot be properly understood without a knowledge of the canon law, on which it is largely based.

I. EARLY HISTORY.—The earliest body known to us of purely church law is the spurious work called the *Apostolic Constitutions* (*διδασκαλία τῶν ἀποστόλων, Constitutiones Apostolorum*), which originated in Syria. Its eight books, of which the first six date from the end of the 3d century, and the two remaining ones from the first quarter of the fourth century, contain a variety of moral and liturgical precepts, and regulations on ecclesiastical discipline, claiming to proceed from the apostles themselves. As a supple-

Apostolic constitutions.

[1] Kimmel's *Monumenta fidei eccles. orient.* part i. p. 467.

[2] *Abhandlung von freier Untersuchung des Canon*, 4 parts, Halle, 1771–1775.

ment to the eighth book there appeared also in Syria, about the beginning of the 6th century, a collection of eighty-five disciplinary regulations under the name of the *Apostolic Canons* (*κανόνες τῶν ἀποστόλων, Canones Apostolorum*). The Council in Trullo (692) sanctioned the Constitutions as law for the Greek Church, but rejected the Canons. The Latin Church adopted neither, but subsequently fifty of the Canons found their way into the Western collections. Though not what they profess to be, these writings are instructive on early ecclesiastical usages and discipline.

Apostolic canons.

Editions:—*The Apostolical Constitutions*, edited by Dr. James Donaldson for Clark's Ante-Nicene Christian Library, Edinr., 1870; Ueltzen, *Constitutiones Apostolicæ* (Greek text), Suerini, 1853; *The Apostolical Canons*, in Greek, Latin, and English, with notes, edited and translated by the Rev. Thos. MacNally, London, 1867; Bunsen, *Analecta Antenicænia*, London, 1854, vol. ii.

In the 4th and 5th centuries collections which have not come down to us were made of the canons of the Eastern councils of Antioch, Ancyra, Neocæsarea, Nicæa, Sardica, Gangra, Laodicæa, Ephesus, Constantinople, and Chalcedon. (See the *Codex Canonum Ecclesiæ Universæ* of Justellus, Paris, 1610.) Joannes Scholasticus, patriarch of Constantinople in the reign of Justinian (564), reduced these and other canons into a systematic work divided into fifty books. A little later this was digested with corresponding fragments of the civil law relating to ecclesiastical affairs into a code called, from its combination of civil and ecclesiastical enactments, a Nomocanon. Of later compilations of the same description the most widely-known was the Nomocanon of the patriarch Photius (883).

Eastern canons.

Nomo-canons.

A most important consolidation of Greek canon law was effected in the year 692 by the labors of the council in Trullo (*Concilium Trullanum*, from Trullus, the hall in the imperial palace at Constantinople in which they sat, also called *Concilium Quinisextum*, from its being considered supplementary to the 5th and 6th general councils). They drew up an authoritative list of the subsisting laws of the church, comprising the Apostolic Canons, the canons of the ten councils mentioned above, those of several synods held at Carthage, and one at Constantinople (394), and the decisions of twelve Eastern patriarchs and prelates from the 3d to the 5th century. They added 102 canons of their own, and this code, with the addition of 22 canons of the Seventh Œcumenical Council held at Nicæa in 787, was the leading authority in the Greek Church till the middle of the 9th century. (For the later ecclesiastical literature of the East see Zachariæ, *Historæ Juris Græco-Romani Delineatio*, Heidelberg, 1839; and Mortreuil, *Histoire du Droit Byzantin*, Paris, 1843–46.)

Translations from the Greek collections gradually came into circulation among the Western clergy. The best known are two that date from the fifth century—the *Versio Isidoriana*, originating in Spain, and the so-called *Prisca* (sc. *Canonum Translatio*), which came from Italy. The Latin Church was thus enabled to add to the canons of African, Italian, French, and Spanish provincial councils those of the œcumenical councils of Nice, Constantinople, and Chalcedon, and of numerous Oriental synods. About the same time a new source of church law rose into importance in the letters addressed by the popes to the bishops of the various dioceses in answer to requests for advice on points of ecclesiastical management. Such letters were called *epistolæ decretales*, or shortly *decretales*, sometimes *constituta decretalia* or *decretalia*. Being communicated by the bishops, to whom they were addressed, to the neighboring dioceses they ruled similar cases occurring there. They were regarded as of equal authority with the canons of councils, and soon proved the most prolific source of canon law.

Western church.

Prisca.

Decretales.

Both classes of material contributed to the collection formed (in two separate parts afterwards conjoined) about the beginning of the 6th century by a learned Scythian monk Dionysius, surnamed *Exiguus* from the epithet he modestly applies to himself in the preface. The first part contains a translation of the Apostolic Canons, and of the canons of the councils of Nice, Ancyra, Neocæsarea, Gangra, Antioch, Laodicæa, and Constantinople, those of Chalcedon and Sardica in the original Latin, and the acts of the synod of Carthage (419) and other African synods. The second part is made up of papal decretals from Pope Siricius (385) to Anastasius II. (498), arranged in chronological order. Though never formally authorized, this collection, from its clear arrangement, the fidelity of its translations from the Greek, and the general authenticity of its contents, obtained speedy acceptance, and long maintained its ground against later compilations.

Dionysius Exiguus.

It is printed in the *Codex Canonum Vetus Ecclesiæ Romanæ* of Franc. Pithœus, Paris, 1687, fol. A copy of it, containing some additional matter, and known as the *Collectio Dionyso-Hadriana*, was presented to Charlemagne during his first visit to Rome in 774 by Pope Hadrian I., and was sanctioned by the synod of Aix-la-Chapelle (802) as the *codex canonum* for the Frankish empire. A collection of 232 African canons may also be mentioned, called the *Breviatio Canonum*, published by the Carthaginian deacon, Fulgentius Ferrandus, about the year 547. It formed the basis of the *Concordia Canonum*, a more complete work, by the African bishop Cresconius (690). A similar collection had been made about 580 by the Spanish bishop Martin of Braga (*Martinus Bracarensis*).

Collectio Dionyso-Hadriana.

Fulgentius Ferrandus.

Cresconius.

Martinus Bracarensis.

In Spain a large body of law had accumulated in the canons of the numerous councils which followed that of Elvira (305), the earliest known to us. A collection of native and foreign canons was in circulation there in the 6th century, and after being added to at various times was generally received towards the close of the next century. It was called the *Hispana* (sc. *Collectio*) from the country of its origin, and being erroneously attributed to Bishop Isidore of Seville, who died in 636, also acquired the name of *Collectio Isidoriana*. Like the *Dionyso-Hadriana* it is divided into two parts—the first containing a classified series of Greek, African, French, and Spanish canons, and the second the decretals from Pope Damasus (366) to Gregory the Great (604).

Hispana.

The Frankish clergy used, besides the *Dionyso-Hadriana*, the original work of Dionysius Exiguus, as well as a collection of Greek and African canons, Papal decretals, imperial constitutions, &c., which was produced in Gaul about the beginning of the 6th century, and is known to us as Quesnel's *Codex Canonum* from the name of its first editor (Paris, 1675). The different ecclesiastical provinces possessed in addition the canons of their own particular synods, and Papal decretals addressed to the bishops within their bounds; and many Frankish prelates were in the habit of drawing up for their subordinate clergy short compendiums of canon law, in which they inserted any particular regulations the local circumstances demanded. These so-called *Capitula Episcoporum* are printed in vols. xiii.–xv. of Mansi's *Sacrorum Conciliorum Collectio*.

Codex of Quesnel.

Capitula episcoporum.

The *Hispana* got into circulation among the Franks in a more or less corrupt form. One edition, which appeared about the middle of the 9th century, has become celebrated in church history as the *Collectio Pseudo-Isidoriana* or *False Decretals*. Everything connected with this collection, its date, its author, its subject-matter, its purpose, has formed the subject of controversy, giving rise to a considerable literature. We must here confine ourselves to the results of the latest criticism.

False Decretals.

The following particulars seem to be settled. The work, which is divided into three parts, was compiled by a single author, a Frankish ecclesiastic, between the years 840 and 860. From his styling himself in the preface *Isidorus Mercator*, Bishop Isidore of Seville was mistakenly supposed to be the author, and hence the name *Pseudo-Isidore*. After the preface, and some minor apocryphal documents, the first part contains fifty of the Apostolic Canons extracted from the *Hispana*, and sixty spurious decretals of the popes from Clement I. (101) to Melchiades (314), chronologically arranged. The second part consists chiefly of canons taken from the *Hispana*. The author has also used the latter as the substratum of the third part, but has interpolated thirty-five fictitious decretals. A supplement is appended to some of the manuscripts containing, with a few unimportant pieces, a series of brief regulations regarding processes against bishops. These are the so-called *Capitula Angilramni* (a bishop of Metz), which are now thought to be older than the main collection.

Capitula Angilramni.

No suspicion attached to the *Pseudo-Isidore* at the time of its appearance. On the contrary, it was everywhere accepted without question till Cardinal Nicolas of Cusa, in the 15th century, expressed doubts of the genuineness of some of its contents. During the next hundred years the untrustworthy nature of the book (printed by Merlin in his *Concilia Generalia*, Paris, 1523) was irrefragably demonstrated by the labors of Erasmus, the Magdeburg Centuriators, and especially the Calvinistic pastor, David Blondel. It was subjected to the fierce attacks of the Protestant Reformers, who approached the question less in a scientific spirit than with a desire to reveal the iniquities of the Church of Rome. They maintained with much acrimony that the work was a deliberate forgery, undertaken by command, or at least with the connivance, of the Pope, to exalt his temporal and spiritual power. In modern times the controversy has been carried on chiefly by lawyers, and, the theological dust having subsided, it has become easier to define the limits within which lie the only probable views as to the sources and object of the work. It is to be regretted that some symptoms have recently appeared of a revival of the former bitter feeling in connection with the Old Catholic movement in Germany. (*The Pope and the Council*, by Janus, 3d ed., London, 1870.)

The idea is exploded that the *False Decretals* were the invention of their author's brain, fabricated for purposes of Papal aggrandizement. Many of the apocryphal portions (the Apostolic Canons, &c.) had been for centuries in circulation as genuine. Of the decretals a considerable number are authentic, though antedated and ascribed to early popes to give them the authority of antiquity, while others embody the traditional contents of actual but lost decretals. The sources from which the compiler principally borrowed his materials were the Bible, the fathers, genuine canons and decretals, Roman law from the West Gothic Breviary of Alaric, the works of Rufinus and Cassiodorus on ecclesiastical history, and the biographies of popes in the *Liber Pontificalis*. It is now admitted by Protestant writers that the compilation was produced in the interest not of the Pope but of the bishops, in order, by protecting them from the oppression of temporal princes on the one hand and ecclesiastical councils on the other, to correct some abuses prevailing among the Franks. The tendency of the authorities collected was to support a right of appeal to the Pope in every *causa major, i.e.*, process where a bishop was concerned, and to make the permission of the Pope a necessary preliminary to the assembling of a provincial council. This arrangement did not really secure the independence of the episcopate. It merely shifted the supreme control from a body of men to a single individual, in accordance with the constitutional ideas of the Middle Ages.

It is still a matter of controversy how far the course of ecclesiastical history has been influenced by the *False Decretals*. On the one hand it is maintained, chiefly by Roman Catholic writers, that they effected no essential alteration on the previous constitution or discipline of the church, that they merely gave the form of enactment to the prevailing ideas of the time on church government, and that the latter would have developed in the same direction had no such compilation ever appeared. It is argued reasonably enough that if any great innovation had been introduced the genuineness of the work would not have remained so long unchallenged. Some Protestant writers on the other hand assert that the Papal claim to absolute supremacy, over councils and hierarchy within the church and the laity without, was a pretension unknown until the 9th century, and entirely based upon the *False Decretals*. The truth probably lies between the two views. The influence of the *Pseudo-Isidore* has been greatly overrated. But it cannot be denied that the embodiment in a definite shape of the indistinct but yet perceptible tendency of church development in the 9th century was of considerable service to the popes during the struggle of the Hildebrandine era. (The latest and best edition of the *False Decretals* is *Decretales Pseudo-Isidorianæ et Capitula Angilramni*, by Hinschius, Leipsic, 1863.)

Other sources of church law prior to the *Decretum* of Gratian may be mentioned. Many laws on the rights and duties of the clergy were contained in the different compilations of Roman law (Theodosian and Justinian codes, Julian's Epitome of the Novels, and the Breviary of Alaric) and the *Leges Barbarorum* (especially the *Lex Ripuaria Bajuvariorum* and *Alamannorum*). Of a similar character were some of the capitularies of the Frankish kings, a collection of which in four books was made by the Abbot Ansegisus of Fontanella in 827, and officially promulgated. A more important collection from an ecclesiastical point of view was that of Benedict, a deacon of Mainz (Benedictus *Levita*), who, by order of Bishop Otgar of Mainz, compiled a supplement to Ansegisus in three books about the year 850. In addition to capitularies the work comprises extracts from the above-named Roman and German sources, from the Bible, penitential-books, the fathers, and other ecclesiastical writers, as well as canons copied apparently from the *Hispana* and *Dionyso-Hadriana*. It resembles the *Pseudo-Isidore* in containing much apocryphal matter in the form of false capitularies directed to the removal of certain grievances of the Frankish episcopate. Being circulated as a supplement to Ansegisus it gained a considerable reputation, but was never officially recognized.[1] The *libri pœnitentiales*, or manuals of penance, are of importance as the foundation of the criminal branch of the canon law. The earliest ones of any note in the Western Church originated in England and Ireland, as for instance the *Liber Davidis* (Irish) of the 4th century, the penitential of Theodore, archbishop of Canterbury, in the 7th century, and in the 8th those of the Venerable Bede and of Egbert, archbishop of York. The Irish church discipline was introduced among the Franks, by whom the *Pœnitentiale Columbani* and the *Canones* and *Judicia Cummeani* (two Irish missionaries) were extensively used.[2] (Consult Jacobson in Herzog's *Real-Encyclopädie*, art. "Bussbücher.") The development of church-law was further influenced by the *Ordines Romani*, or books of ritual, the *Ordines Judiciorum*, or rules of procedure in the ecclesiastical courts, and the collections of *formulæ* or precedents used in the preparation of formal or official documents, notably the *Liber Diurnus*, a pontifical collection of the 8th century.

Benedictus Levita.

Libri pœnitentiales.

The *Pseudo-Isidore* continued to be the chief repertory of canon law till the time of Gratian; but many other collections more or less corrupt, differing from the earlier ones in their arrangement according to systematic instead of chronological order, were made during these three centuries. It will be sufficient to name the following, as they seem to have been used by Gratian in compiling his great work:—1. A collection of the 9th century, dedicated to Archbishop Anselm (II.) of Milan (*Collectio Anselmo Dedicata*), based mostly on the *Hispana*, and interesting as the first work of authority containing extracts from the *Pseudo-Isidore*; 2. The *Libri Duo de Synodalibus Causis et Disciplinis Ecclesiasticis* of the 10th century, by Regino, abbot of the monastery of Prüm in the Eifel, drawn from Frankish and German sources;[3] 3. The *Collectarium* or *Decretum*[4] of Bishop Burchard of Worms, in twenty books, compiled in the 11th century; 4. The *Pannormia* of Bishop Ivo of Chartres, dating from the 12th century,[5] and another work by the same author known as the *Decretum*;[6] 5. The *Liber de Misericordia et Justitia* of Algerus of Liége, composed between 1120 and 1128.[7]

Collectio Anselmo Dedicata.

Regino of Prüm.

Decretum Burchardi.

Pannormia.

Algerus of Liége.

II. The Corpus Juris Canonici.—The manuals of church law above referred to had not only become embarrassing by their number, but labored under defects that seriously impaired their practical utility. They contained much that was obsolete and much that was contradictory, many of them mixed up civil with church law, and their arrangement was unmethodical and cumbrous. These faults were to some extent remedied in the great collection that was formed between the middle of the 12th and the end of the 16th centuries, and became the recognized canon

[1] It is printed in vol. i. pp. 801–1232, of Baluze's *Capitularia Regum Francorum*, Paris, 1677.

[2] These are all printed by Wasserschleben in *Die Bussordnungen der Abendländischen Kirche mit einer Rechtsgeschichtlichen Einleitung*, Halle, 1851.

[3] Edition by Wasserschleben, Leipsic, 1840.

[4] *D. Burchardi Wormaciensis Decretorum*, libri xx., Cologne, 1543, and other editions.

[5] Edition by Melch. a Vosmediano, Louvain, 1557.

[6] Edited by Molinæus, Louvain, 1661.

[7] Printed by Martene in *Novus Thesaurus Anecdotorum*, vol. v. On these collections see Petr. et Hieron. Ballerinii, *De Antiquis Collectionibus et Collectoribus Canonum ad Gratianum usque Tractatus*, p. iv. c. 10–18, Venice, 1757; and Wasserschleben, *Beiträge zur Geschichte der Vorgratianischen Kirchenrechtsquellen*, Leipsic, 1839.

law code. The *Corpus Juris Canonici*, as it was called, consists of six portions, which may be classed under two heads, the Decretum and the Decretals.

Decretum. 1. The *Decretum Gratiani*. Up to this time canon law was regarded as a branch of theology, and was studied only in the seminaries attached to cathedrals or monasteries. Gratian. Gratian, a Camaldolensian monk of Bologna, first taught it as a separate science towards the middle of the 12th century. The school of Roman law founded in that city thirty or forty years before by Irnerius was then flourishing, and Gratian, living within the sphere of the new movement, became ambitious of introducing a similar scientific cultivation of canon law. He selected the whole subsisting law of the church from among the mass of canons, decretals, writings of the fathers, and ecclesiastical historians, &c., and digested it into the systematic work since called after him the *Decretum Gratiana*, which soon superseded all preceding compilations. It was early known by the name of the *Concordia Discordantium Canonum*, from an expression in one of the author's notes ("*auctoritatum dissonantia ad concordiam revocari*"); but whether Gratian himself made use of either name is uncertain. The work consists of three parts (*partes*). The first, treating of the sources of canon law and of ecclesiastical persons and offices, is divided according to the method of Paucapalea, Gratian's pupil, into 101 *distinctiones*, which are subdivided into *canones*. The second part consists of 36 *causæ* (cases proposed for solution), subdivided into *quæstiones* (the several questions raised by the case), under each of which are arranged the various *canones* (canons, decretals, &c.) bearing on the question. But *causa* xxxiii. *quæstio* 3, headed *Tractatus de Pœnitentia*, is divided like the main part into seven *distinctiones*, containing each several *canones*. The third part, which is entitled *De Consecratione*, gives, in five *distinctiones*, the law bearing on church ritual and the sacraments. The following is the method of citation. A reference to the first part indicates the initial words or number of the *canon* and the number of the *distinctio*, *e. g.*, can. Propter ecclesiasticas, dist. xviii. or c. 15, d. xviii. The second part is cited by the *canon*, *causa*, and *quæstio*, *e. g.* can. Si quis suadente, C. 17, qu. 4, or c. 29, C. xvii., qu. 4. The treatise *De Pœnitentia*, forming the third *quæstio* of the 33d *causa* of the second part, is referred to as if it were a separate work, *e.g.*, c. Principium, D. ii. de pœnit. or c. 45, D. ii. de pœnit. In quoting a passage from the third part the *canon* and *distinctio* are given, *e.g.*, c. Missar. solenn. D. I. de consecrat., or c. 12, D. I. de consecr.

Mode of citation.

Dicta Gratiana. The original notes appended by Gratian to many of the canons (*Dicta Gratiana*), though not entitled to the same weight as the text, are of great authority as emanating from the "father of canon law." The passages headed "Palea" (about fifty in number) are supposed to be additions made by Gratian's pupil Paucapalea, and are of equal credit with the rest of the work. The notes in the modern editions with the prefix "corr. Rom." are by the *Correctores Romani*, who published a revised text under the sanction of Pope Gregory XIII.

Paleæ.

Gratian had included in the *Decretum* the Papal decretals down to the year 1139. During the following century, owing to the struggles of the popes and emperors, and the general extension of ecclesiastical jurisdictions, the pontifical constitutions increased greatly in frequency. Innocent III. alone (*pater juris*) is said to have published 4000 laws. These constitutions went by the name of *decretales extravagantes* (*i.e.*, *extra decretum Gratiana vagantes*). Of the fifteen known collections of them, five especially, which in contrast to that of Gregory IX. are called the *Compilationes Antiquæ*, attained a high reputation in the schools and the courts. The *Compilatio Prima*, or oldest of them, is the *Breviarium Extravagantium* of Bishop Bernard of Pavia,[1] which is noteworthy as the model of arrangement for all subsequent collections. It is divided into five books treating of—(1) ecclesiastical officials and judges; (2) procedure in ecclesiastical courts; (3) rights, duties, and property of the clergy; (4) law of marriage; (5) criminal law and ecclesiastical discipline. This order is briefly summed up in the following hexameter:—

Compilationes Antiquæ.

Judex, Judicium, Clerus, Connubia, Crimen.

[1] Printed in Labbé, *Antiquæ Collectiones Decretalium*, Paris, 1609.

The *comp. tertia* and *comp. quinta* are the only two that received the Papal sanction.

2. The second part of the *Corpus Juris Canonici* is made up of the following four collections of decretals:—

(*a.*) *Decretals of Gregory IX.*—The same causes that occasioned the compilation of the *Decretum* induced Pope Gregory IX. to commission his chaplain, Raymond of Pennaforte (near Barcelona), formerly a professor of canon law in Bologna university (and since canonized), to digest into a code the decretals since the time of Gratian. The usual arrangement in five books was observed, and these were subdivided into *tituli*, consisting of *capita* in chronological order. It was completed in four years, and officially promulgated in 1234. Its original name was *Libri extra* (sc. *Decretum*), which was abbreviated to X. for convenience in citation, *e.g.*, cap. 9, X. de eo qui cognovit (iv. 13), or c. 9, X. 4, 13 refers to the 4th book, title 13, chap. 9. The laws are in the form of decisions pronounced in cases submitted to the Pope from all parts of Christendom. Among these are several cases from England and Scotland. (For a list of the latter see *Ecclesiæ Scoticanæ Statuta*, ii. 232.) Raymond, in accordance with the Pope's instructions, omitted such facts and other matter as he considered irrelevant to the case in hand. These so-called *partes decisæ* (generally indicated in the text by the words "et infra" or shortly "et j.") have been restored in modern editions, since without them the law is often to us unintelligible.

Decretals of Gregory IX.

Mode of citation.

Partes Decisæ.

(*b.*) The *Liber Sextus* was published by Pope Boniface VIII. in 1298. It contains the decretals down to that date from the time of Gregory's collection, and acquired its name from being intended as a supplement to Gregory's five books. In one important respect it differs from the latter. Instead of a case being stated with the Papal decision thereon, abstract rules of law are laid down, extracted originally, no doubt, from actual judgments. A series of eighty-eight *Regulæ Juris*, chiefly borrowed from Roman law, are appended to the work, having been added, it is said, by the civilian Dinus to procure its acceptance among the *legistæ* of Bologna. In citing from the *Liber Sextus* it is usual to give the number of the chapter, with the abbreviation "in vi^to^" or "in 6," the number of the book, and the number and rubric of the title—*e. g.*, c. 1. in vi^to^ de const. I., 2, or c. 1. de const. in 6, I. 2.

Liber Sextus.

Regulæ Juris.

Mode of citation.

(*c.*) The *Clementinæ*.—By direction of Pope Clement V. the canons of the Council of Vienne in 1311 (at which he presided, the Papal court having been transferred to Avignon), and his own decretals before and after that date, were collected and published in 1313. They were almost immediately withdrawn again for revision, and were promulgated in their present form by his successor Pope John XXII. in 1317, under the name of *Constitutiones Clementis Papæ V.* or *Clementinæ*. The mode of citation is either by the chapter, the title-rubric, the words "in Clementinis," and the number of book and title (*e.g.*, c. 1. de summa trin. in Clem. I. 1.), or by calling the chapter itself the Clementina, and adding its number, with the title-rubric, and numbers of book and title (*e.g.*, Clem. 1., de summa trin. I. 1).

Clementinæ.

Mode of citation.

(*d.*) The *Extravagantes*.—The Clementinæ were the last of the collections formally promulgated by the popes. In the 15th century the term *Corpus Juris Canonici* was applied to the body of law composed of the *Decretum* and the collections of Gregory, Boniface, and Clement, as appears from the canons of the councils of Constance and Basel. The more important of the decretals omitted from the Clementinæ or issued subsequently (distinguished from those in the *Corpus Juris Canonici* by the name "Extravagantes") were circulated or added in the manuscripts as a supplement to the *Corpus Juris*, and studied along with it at the universities. Two collections of them were printed by Jean Chappuis in his edition of the *Corpus Juris Canonici*, published at Paris in 1500. The first, which was entitled *Extravagantes Joannis XXII.*, comprised twenty constitutions of that pope, arranged in fourteen titles. The second collection was called *Extravagantes Communes*, and consisted of 73 decretals issued in the period from Boniface VIII. to Sixtus V. (1298–1484),

Extravagantes.

Extravagantes of John XXII.

Extravagantes Communes.

systematically arranged according to the traditional scheme of five books ("sed vacat liber quartus," devoted in previous compilations to the law of marriage), divided into titles and chapters. The following examples will explain the method of citing the first and second collections respectively:—c. un. Xvag. Io. xxii. 12, or (mentioning the rubric of the title) c. un. de pœnis in Extrav. Io. xxii. (12), and c. 2, Xvag. comm. III. 2, or (giving the title-rubric) c. 2, de præb. et dig. in Extrav. comm. III. 2. Neither collection was sanctioned as such; each decretal is independent, and authoritative *proprio vigore*. The two sets of Extravagantes being retained in subsequent editions have become by use and wont part of the *Corpus Juris Canonici*. They received a semi-official approval by being included in the edition revised by the *Correctores Romani* (a learned commission appointed by Pius IV. in 1653), and published as the authorized text by Pope Gregory XIII. in 1582.

Mode of citation.

Correctores Romani.

Corpus Juris Canonici as a whole.

The different portions of the *Corpus Juris Canonici* stand to each other in the relation of *lex prior* and *lex posterior*, so that in cases of contradiction the latest in date is preferred. The same rule is applied to the single *capita* or laws of the private collections (the *Decretum* and the *Extravagantes*), but not to those of the other books, which were published as official codes, and the different *capita* of which are all regarded as bearing the date of promulgation of the whole. A distinction is also made respecting the authority of the rubrics of the titles. Those found in the *Decretum*, irrespective of the fact that they are not the work of Gratian, have no sanction except that of usage; while in the decretals of Gregory, Boniface, and Clement the rubric (*rubrum*) has as much authority as the text (*nigrum*), both having been issued together. The *summaria*, or *summæ*, prefixed to the canons and chapters emanate from the glossators, and have no legislative authority. But they generally state the substance of the law correctly, and are useful for purposes of interpretation. The *Superscriptiones Capitulorum*, giving the source and date of a law, and in the case of each decretal, the person to whom it was addressed, are, so far as we know, in their original state, but are not to be depended upon in all cases. A few of Gregory's decretals, for instance, bear the dates 1235 and 1236, whereas we know they must have been pronounced prior to the promulgation of the collection in 1234. No decretal anterior to 1298 is of authority unless found in the *Decretum* or the collections of Gregory or Boniface. The *Clementinæ* and *Extravagantes*, on the contrary, are not exhaustive for the period they cover, and omission from them does not affect the credit of an otherwise genuine constitution. André (*Cours de Droit Canon*, 3me éd., 1860, vol. iii. p. 151) gives a list of the apocryphal laws in the *Decretum* and Gregory's *Decretals*. They are more numerous in the former, owing to Gratian's having selected his materials from the older compilations instead of the original sources, many of which were lost, and are of no authority except so far as adopted by subsequent church usage. But the few spurious decretals in Gregory's collection are of equal authority with the others, the whole having received the papal *imprimatur*. The constitutions in the *Liber Sextus*, *Clementinæ*, and *Extravagantes* are all genuine.

Rubrics.

Summaria.

Superscriptiones Capitulorum.

The *Liber Septimus Decretalium*, which appears in a supplement to some editions of the *Corpus Juris*, is a mere private collection formed by Peter Matthæus, a lawyer of Lyons, in 1590. The *Institutiones Juris Canonici* of J. P. Lancelottus of Perugia are of the same character, but they form a useful and trustworthy compendium and are of considerable authority. They were written, as the author tells us in his preface, to complete the parallel between the two *Corpora Juris*, civil and canon. The *Decretum* of the canonists corresponded to the *Pandects* of the civilians; the *Decretals* of Gregory to the *Code;* the *Liber Sextus*, *Clementinæ*, and *Extravagantes* to the *Novels*. At the Pope's suggestion Lancelot undertook to supply a text-book corresponding to the *Institutes* of Justinian. He completed and published it in 1563, but official confirmation never followed.

Liber Septimus.

Institutiones Lancelotti.

Editions. The latest and most correct edition of the *Corpus Juris Canonici* is by Æmilius L. Richter (2 vols. 4to, Leipsic, 1839), of which a second edition is in the press. But it has not superseded that of J. H. Boehmer (2 vols. 4to, Halle, 1747), which is rendered valuable by his notes and copious indices, and contains much useful supplementary matter, including the *Liber Septimus* and Lancelot's *Institutiones*.

III. Mediæval History.—From the 12th century Bologna University possessed two faculties of law—a civil and a canon. The members of the latter were called *doctores decretorum* (a degree which required six years' previous study), corresponding to the *doctores legum* of the civil law. Those who graduated in both faculties were doctors *utriusque juris*. The students were classed as *canonistæ* or *decretistæ* and *civilistæ* or *legistæ*. The system of tuition was oral (*lecturæ*) with minute study of the original authorities. Explanatory notes (*glossæ*) were added by many of the professors (hence called *glossatores*) to their copies of the text, written either on the margin or between the lines. These were transcribed along with the texts in the manuscripts circulating among the students. Gradually the glosses took the shape of a consecutive commentary (*apparatus*) in which the author incorporated what was most valuable in the notes of his predecessors. One of these always came to be accepted as of more authority than the rest, and on that account was entitled in the manuscripts *Glossa Ordinaria*, or simply *Glossa*. Such are the gloss on the *Decretum* by Joannes Teutonicus (1212), revised and supplemented by Bartholomæus Brixensis (of Brescia) in 1258, and that on Gregory's *Decretals* by Bernardus Parmensis (1266). The ordinary gloss of the *Liber Sextus* and Clementines is by Joannes Andreæ (1348), the author of the *Arbor Consanguinitatis et Affinitatis* since inserted in the *Decretum*. (The last edition of the *Corpus Juris Canonici*, with the gloss, was published in 1671, 3 vols. fol., Lyons, sumpt. Huguetan et Barbier.) Abridgments of the text, giving briefly the substance of the titles in their order, with cross references, were composed under the name of *Summæ* or *Distinctiones*. The more intricate doctrines were explained in writings called *Repetitiones* at greater length than was suitable to the lecture-room. The law was also expounded by means of real or fictitious cases, of which digests were compiled (*casus*) for use by those who took part in the disputations or moots, which were regularly held (*quæstiones*). These were conducted by different professors on different days, and hence were often named from the days of the week *Dominicales*, *Mercuriales*, *Veneriales*, &c. Collections were made of unsettled and controverted points (*Dissensiones Dominorum*) and of rules or maxims of law (*Brocarda*, *Brocardica*, *Paræmia*, or *Regulæ Juris*). In both faculties law was at this time cultivated in a thoroughly practical spirit, and their friendly rivalry and mutual influence were beneficial to both. The mode of study was similar in the other European schools, which were all modelled after those of Bologna or Paris.

Bologna University.

Glossators.

Apparatus.

Glossa Ordinaria.

Summæ. Repetitiones.

Casus. Quæstiones.

Dissensiones Dominorum. Brocarda.

The church was thus supplied by the universities with a well-educated class of lawyers for administering the business of the ecclesiastical courts—those institutions which contributed so much to the growth and renown of the canon law. Their development was gradual but steady. The primitive Christians, in pursuance of apostolic precept (1 Cor. vi. 1–6), submitted their disputes to the decision of their bishops, and it was enacted by several early councils that questions between churchmen should be settled by a spiritual tribunal. The episcopal jurisdiction was extended by Constantine to all matters which the contending parties agreed to submit to it. This so-called *Audientia Episcopalis* was confirmed by several later emperors, and the bishop's sentence was enforceable by the civil magistrate. By a law of Justinian, actions against the clergy were directed to be brought before the bishop in the first instance. In course of time the church-courts absorbed many departments of civil jurisdiction. All matters connected in the most distant way with the church or religious duties were deemed proper subjects for disposal by her tribunals. The clergy dispensed the sacraments, and their assistance was required on the occasion of baptisms, marriages, and deaths. Hence the *curiæ christianitatis* took cognizance of questions relating to legiti-

Ecclesiastical jurisdiction.

Audientia Episcopalis.

macy, marriage, and succession. They assumed jurisdiction over not only the clergy, but all who were under the obligation of religious vows (*e.g.*, Crusaders), as well as widows and orphans (*personæ miserabiles*) and minors. In the department of criminal law they were particularly active, punishing both ecclesiastical and religious offences, such as heresy, simony, blasphemy, sacrilege, and violation of personal and social morality (adultery, bigamy, fraud, perjury). For the administration of this extended judicial system the church had to enact her own rules of procedure, which were generally a great improvement on those prevailing in the civil courts. In fact it was by no means an evil at that period of European history that the administration of the law should fall into the hands of the clergy, who were the best educated men of their time, and had many of them been trained as lawyers in the schools of Bologna and Paris. The Teutonic and Gothic codes were very imperfect in most branches of the law, and the civil and criminal procedure of the native tribunals was far from settled. Their criminal law was little more than an elaborate system of fines, graduated according to the race or rank of the victim or the criminal. Evidence in our sense of the word was unknown, and innocence could only rely for protection on compurgation, ordeal, or judicial combat. Hence the people were, during several centuries, well content to resort to the church courts. The exemption of the clergy from civil jurisdiction was in accordance with the Teutonic principle that a man should be tried by his peers. And the laity were thankful to take shelter behind the church from the fines and exactions of the feudal courts, which were inflicted less in the interests of justice than for the profit of the overlord.

International law.

In the domain of public law the influence of the church was conspicuous. She may be said to have originated modern international law. The ancient Romans regarded all foreigners as *hostes*. Christianity inculcated the principle of the brotherhood of nations. The popes acted as arbitrators between prince and prince, and between prince and people. They protected the weak against the strong, and right against might. The principle grew up that international questions should be decided according to law and Christian morality, and that war, when inevitable, should be conducted according to recognized rules laid down in the interests of humanity. The system of church administration served as a model for that of the state, which in mediæval times was frequently controlled by ecclesiastics.

Constitutional law.

The constitutional duties of a sovereign to his people were boldly asserted by the church. Kings were taught that there were obligations for discharging which they were responsible to God, and that if these were neglected their subjects might be absolved from their allegiance. In after times the enemies of the church borrowed some of their most effective weapons from her own armory. The writers on the law of nature and of nations, who headed the rebellion against the encroachments of ecclesiastical jurisdiction, adopted many principles which are to be found in the *Corpus Juris Canonici*, where we may also trace the germs of some leading doctrines of the French Revolution.

The canon law suited the civilization of the Middle Ages. It was natural that a system, claiming to regulate the most important concerns of practical life, administered by courts which, though belonging to different nations, were under the control of one central authority, and developed under the direction of a succession of able legislators, such as Hildebrand and Innocent III., should take the lead in forming the character and reconciling the conflicting interests of the rising nationalities. The canon law was not so much an independent system of law as a method of selecting what was best from the existing systems, and transforming it, by the help of Christian morality and feeling, into one homogeneous, eclectic whole. Much of the Roman element in the common laws of Europe at the present day has descended indirectly through the canon law, though modern jurists are too apt to ignore this and express their obligations to the ancient sources alone.

The decline of the canon law kept pace with that of the church from which it sprang. The strife of popes and antipopes, the increased strength of national feeling prompting the prelates to take their sovereign's part in his quarrels with the papacy, the arrogance of the ecclesiastical courts, the Reformation, the French Revolution—in short, all those causes that weakened the church's power and influence, were prejudicial to the authority of the canon law. And now that every country in Europe possesses, if not a code, at all events a matured system of national law, the *Corpus Juris Canonici* possesses little more than an historical and scientific interest.

IV. Present Authority.—*Germany.*—The Canon Law is still the common law of both sections of the Christian church of Germany, and in purely religious and ecclesiastical questions affecting their internal affairs it is applicable, so far as not altered by modern church standards. Such are, for the Roman Catholics, the canons of the Tridentine (1545–1563) and Vatican (1869) councils, and the various concordats with the temporal power; for the Protestants, the evangelical confessions (Augsburg, &c.) and the *Conclusa Corporis Evangelicorum* (1653–1806). The relations of the different churches with the state are regulated exclusively by the law of the land. In a question of private law the canon law has no validity as an independent source. Till the end of last century both the civil and canon laws were by custom received as authoritative in Germany. They were applied universally in the civil courts, and the canon law as the *lex posterior* was preferred in case of conflict. These two systems, along with the feudal customs, were the three constituent elements of the common law or *Gemeines Recht*. The jurisdiction of the latter is now confined by the provisions of the modern codes to about one-third of Germany. Within that area the *Corpus Juris Canonici* may be quoted to aid in interpreting a doubtful point of common law. In other words, it is of historical, but not of legislative, authority.

Germany.

France.—The Constituent Assembly, after abolishing tithes and religious orders and secularizing church property, superseded the canon and all other laws for the government of the church by the *Constitution Civile du Clergè*, enacted in 1790. Finally, in 1793 the Convention suppressed altogether the Christian religion and its institutions. Since the restoration of the Church in the beginning of this century, both its internal government and external relations have been regulated exclusively by civil enactment, based on the concordat between Napoleon I. and Pope Pius VII. (1801), and the *Articles Organiques* which followed in 1802.

France.

England.—The Canon Law is of no intrinsic obligation in England. The English people have in all ages shown a firm determination that neither the national church nor the national law should be subject to the Papal legislation or jurisdiction. As early as 1138 Archbishop Theobald of Canterbury brought over Vacarius and other learned ecclesiastics from Italy to introduce the study of civil and canon law into England. The bishops and clergy vigorously supported the new system so favorable to their order; but the nobility and laity generally adhered to the old common law with great pertinacity. The contest was practically decided when in the 13th century the Court of Common Pleas was fixed at Westminster. This brought together the practitioners in municipal law who had been, while the court was ambulatory, dispersed throughout the kingdom, and shortly afterwards the victory of common law was made secure by the establishment of the Inns of Court and Chancery for the education of youth in municipal law.

England.

The system administered in the spiritual courts is known as "the king's ecclesiastical law." It is based on the canon law, a knowledge of which is highly useful to the English ecclesiastical lawyer. But only such portions of the canon law have been adopted as have been sanctioned by the national legatine and provincial constitutions, the statutes of the realm, and immemorial church usage.

The canon law, though not binding *proprio vigore*, is one of the sources of the common law of England. The rules for the descent of land, for instance, are borrowed wholly from that system. But England assimilated less of it than other countries, or than might have been adopted by herself with advantage. It was not that the English people considered the provisions of the canon law inferior to their own customs; they were as a rule entirely ignorant of it. But their struggles against appeals to Rome and other claims of ecclesiastical jurisdiction roused the feeling of the nation. They stoutly stood up for their common law, cumbrous and even barbarous in some respects as it was, not because they thought it perfect, but because they were resolved to manage their own concerns after their own fashion. At the parliament of Merton (1236) when the

bishops proposed that legitimation by subsequent marriage should be legalized, alleging that holy church (that is, the canon law) sanctioned such legitimation, all the earls and barons, we are told, with one voice answered, "Nolumus leges Angliæ mutari." This incident shows that even at that early date canon law was of no authority unless sanctioned by the law of the land, for the decretal (c. 6, X. qui filii sint legitimi, iv. 17) alluded to by the bishops was addressed by Pope Alexander III. to the bishop of Exeter in 1172, and was incorporated in the Decretals of Gregory promulgated in 1234, two years before the parliament of Merton.

Scotland. *Scotland.*—Several causes conduced to the provisions of the canon law being extensively adopted by the law of Scotland. During the 16th and 17th centuries canon law was publicly taught in the Scottish universities; and from a very early period it was the custom of the Scottish youth to resort for purposes of study to foreign countries, whence many of them returned doctors *in utroque jure*. A wide jurisdiction was exercised by the consistorial courts, from which for many centuries an appeal to Rome was competent, and at one time half of the senators of the College of Justice were necessarily clerical, while all were learned in both civil and canon law. Conveyancing, moreover, was in the hands of clerical notaries, who, till 1469, were, like those of Europe generally, appointed exclusively by the emperor and the Pope. But though one of the *fontes juris Scotiæ*, canon law never was of itself authoritative in Scotland. In the canons of her national provincial councils (at whose yearly meetings representatives attended on behalf of the king) that country possessed a canon law of her own, which was recognized by the parliament and the popes, and enforced in the courts of law. Much of it, no doubt, was borrowed from the *Corpus Juris Canonici*, the Tridentine standards, and the English provincial canons. But the portions so adopted derived their authority from the Scottish Church. The general canon law, unless where it has been acknowledged by Act of Parliament, or a decision of the courts, or sanctioned by the canons of a provincial council, is only received in Scotland according to equity and expediency.

ADDITIONAL AUTHORITIES.—HISTORY AND LITERATURE:—Doujat, *Histoire du Droit Canonique*, Paris, 1677; Bickell, *Geschichte des Kirchenrechts*, vol. i. (never completed), Giessen, 1843; Rosshirt, *Geschichte des Rechts im Mittelalter*, vol. i. *Kanonisches Recht*, Mainz, 1846. The best bibliographical history when completed will be—Maassen, *Geschichte der Quellen und der Literatur des Canonischen Rechts im Abendlande bis zum Ausgange des Mittelalters*, vol. i. 1870. The Vienna Academy of Sciences have voted funds from the Savigny foundation to enable the author to visit foreign libraries for the purposes of his work, which contains in consequence the best account of the various MSS. The first volume comes down to, without including, the False Decretals. Four additional volumes are expected. The glossators and the mediæval universities are treated of in Savigny, *Geschichte des Römischen Rechts im Mittelalter*, vol. iii. 2d ed. 1834. The history and system of the constitution of the church is handled with great learning and acumen by Thomassin, *Ancienne et Nouvelle Discipline de l'Eglise*, Lyons, 1678 (same work in Latin, but differently arranged, *Vetus et Nova Eccl. Disc.*, Paris, 1688, 3 vols. fol.). Consult also Wasserschleben's articles in Herzog's *Real-Encyclopädie* on *Kanonen und Decretalensammlungen*, *Kanonisches Recht*, *Glossen und Glossatoren*, and the text-books mentioned below. TEXT-BOOKS:—1. By Roman Catholic authors—Doviatius (Doujat), *Prænotionum Canonicarum Libri Quinque*, Paris, 1687, modern ed. by Schott, Mitav. et Lips. 1776, 2 vols. 8vo; Van Espen, *Jus Ecclesiasticum Universum*, last ed. Mogunt. 1791, 3 vols. 4to; Gibert, *Corpus Juris Canonici per Regulas Naturali Ordine Digestas Expositi*, Col. Allobr., 1725, 3 vols. fol.; Lancelottus, *Institutiones Juris Canonici*, last ed. cum adnot. Ziegleri et Thomasii, Hal. 1716, 4 vols. 4to (the first ed. having been published in 1563, a few months before the dissolution of the Council of Trent, contains the law of the *Corpus juris canonici* without the modifications introduced by that council); Devoti, *Institutionum Canonicarum libri iv.*, first ed. Rom. 1781, 4 vols., last ed. Leodii, 1860, 2 vols.; Phillips, *Kirchenrecht* (ecclesiastical law), Regensburg, 7 vols. 8vo, 1845–72 (not yet completed); Schulte, *Das Katholische Kirchenrecht*, Giessen, 1856–60, 2 vols. 8vo; Rosshirt, *Canonisches Recht*, Schaffhausen, 1857; Walter, *Lehrbuch des Kirchenrechts aller christlichen Confessionen*, 14th ed. Bonn, 1871. 2. By Protestant authors—Gisbertus Voëtius, *Politica Ecclesiastica*, Amsterdam, 1663–66, 4 vols. 4to; J. H. Boehmer, *Jus Ecclesiasticum Protestantium* (in the form of a commentary on Gregory's Decretals), 5th ed. Hal. 1756–63, 5 vols. 4to, and the same author's *Institutiones Juris Canonici*, 5th ed. Hal. 1770; Mejer, *Lehrbuch des Deutschen Kirchenrechts*, 3d ed. Göttingen, 1869; Richter, *Lehrbuch des katholischen und evangelischen Kirchenrechts*, 7th ed. by Dove, Leipsic, 1874. DICTIONARIES:—Durand de Maillene, *Dictionnaire Canonique*, last ed. 1786, 6 vols. 8vo;[1] Ferraris, *Prompta Bibliotheca Canonica, Juridica, &c.*, Abbé Migne's ed. 8 vols. 1866; André, *Cours Alphabétique et Méthodique de Droit Canon*, 3d ed. 6 vols. 8vo, Paris, 1860. Excellent articles on subjects relating to canon law are contained in Wetzer und Welte, *Kirchenlexicon oder Encyclopädie der katholischen Theologie*, Freiburg, 1847–56, 13 vols. 8vo, and Herzog, *Real-Encyclopädie für protestantische Theologie und Kirche*, 1854–68, 22 vols. 8vo. FALSE DECRETALS:—The latest criticism is by Hinschius, *Commentatio de Collectione Isidori Mercatoris* (prefixed to his ed. of the work, Lipsiæ, 1863), and art. *Pseudo-Isidor* by Wasserschleben in Herzog's *Real-Encyclopädie* (xii. 337), 1860, and by Hefele in Wetzer und Welte's *Kirchenlexicon* (viii. 849), 1852. The text-books of Phillips, Schulte, Walter, Richter, &c., give a *résumé* of the different views. The older authorities are—*Ecclesiastica Historia*, &c. (known as the Magdeburg Centuries, 13 vols. fol.), Basil. 1559–74, vol. ii. c. 7, and vol. iii. c. 7; F. Turrianus, *Adversus Magdeburgenses Centuriatores*, &c., Florent. 1572; Blondellus, *Pseudoisidorus et Turrianus Vapulantes*, Genev. 1628; Gallandius, *De Vetustis Canonum Collectionibus Sylloge* (2 vols. 4to), Mogunt. 1790, vol. i. p. 528, and vol. ii. p. 1 (dissertations by the brothers Ballerini and Car. Biascus); Knust, *De Fontibus et Consilio Pseudoisidorianæ Collectionis*, Götting. 1832; Rosshirt, *Zu den kirchenrechtlichen Quellen des ersten Jahrtausends und zu den Pseudoisidorischen Decretalen*, Heidelb. 1849. CANON LAW IN ENGLAND:—Sir Matthew Hale's *History of the Common Law*, chap. 2 (6th ed. by Runnington, 1820); Reeve's *Hist. of the English Law*, chaps. 25 and 26 (new ed. by Finlason, 1869, 3 vols.); Introductions to Blackstone's *Commentaries*; Burn's *Ecclesiastical Law* (9th ed. by Phillimore, 4 vols. 1842), and Phillimore's *Ecclesiastical Law of the Church of England* (2 vols. 1873); Bowyer's *Readings before the Society of the Middle Temple*, 1851, lectures 12 to 15; *The Queen* v. *Millis*, 1844, 10 Clark and Finnelly's House of Lords Reports, 534; *Martin* v. *Mackonochie* and *Flamank* v. *Simpson*, 1868, Law Reports 2 Admiralty and Ecclesiastical, 116; *The Queen* v. *the Archbishop of Canterbury*, 1848, 11 Adolphus and Ellis's Queen's Bench Reports, new series, 483; *Marshall* v. *the Bishop of Exeter*, 1860, 29 Law Journal, new series, Common Pleas, 354. CANON LAW IN SCOTLAND:—Lord Stair's *Institutions*, bk. i. tit. i. secs. 14 and 16; Fergusson's *Consistorial Law*, 1829, p. 2; Riddell's *Scottish Peerage and Consistorial Law*, 1842, vol. i. p. 449; Introduction to Frazer's *Law of Husband and Wife*, 2 vols. 1876; Mr. Joseph Robertson's preface to *Ecclesiæ Scoticanæ Statuta*, 2 vols. 4to, 1866 (Bannatyne Club); Bell's *Report of a Case of Legitimacy under a Putative Marriage*, 1825; Lord Medwyn's opinion in the Marnoch case (*Cruickshank* v. *Gordon*), 10th March, 1843–45; Dunlop's Court of Session Reports, 941. (W. F. H.)

CANONICAL, as an adjective, is found associated with many substantives, and always implies dependence, real or supposed, upon the canons of the church. Thus we read of "*canonical* obedience," as signifying the obedience recognized as due to a superior officer of the church from an inferior, as that due to a bishop from a presbyter. Perhaps the best known and most widely spread use of the term occurs in the case of *Canonical Hours*, otherwise called *Hours of Prayer*, which are certain stated times of the day, consigned in the East, and in the West before the Reformation, more especially by the Church of Rome, to offices of prayer and devotion. These were at first three only, and were supposed to be inherited from the Jewish Church (see Psalm lv. 17, Dan. vi. 10, and Acts iii. 1),—namely, the third, sixth, and ninth hours, corresponding to 9 A.M., noon, and 3 P.M. with us. They were increased to five, and subsequently to seven (see Psalm cxix. 164), and in time made obligatory on monastic and clerical bodies. The full list, recognized almost universally throughout Europe before 700 A.D., stands thus:—Matins (called also Matin Lauds, or simply Lauds), Prime, Terce, Sext, Nones, Evensong, Compline; in the Saxon canons of Ælfric, *Uhtsang*, *Primsang*, *Undersang*, *Middaysang*, *Nonsang*, *Æfensang*, *Nihtsang*. (See Du Cange, *Glossarium*, *s. v.* "Horæ Canonicæ;" Durandus, *De Off. Divin.*, lib. v.; Smith and Cheetham's *Dictionary of Christian Antiquities*, art. "Hours of Prayer.") Bishop Cosin, in the reign of Charles I., put forth an edition of the *Hours* (as books of devotion for the canonical hours are often called) for the use of such individuals or bodies of the English Church as might like to use them.

CANONIZATION, a ceremony in the Church of Rome,

[1] The authority of this and most other French writers on canon law is to be received with caution on matters having any connection with the Gallican Liberties.

by which persons deceased are ranked in the catalogue of the saints. This act is preceded by beatification; and after the merits of the individual have been duly tested and approved, the Pope decrees the canonization.

The term was not introduced till the 12th century. The first person who availed himself of it was Udalric, bishop of Constance, in his letter to Pope Calixtus II. relative to the canonization of Bishop Conrad. The Act, however, dates from a much more remote antiquity. The ceremony was originally only a commemoration of the martyrs, whose assistance was invoked in the name of the church militant to which they had belonged. Originally bishops decided whether or not the candidate had fairly vindicated his claim to the honor; but they only acted as the organ of public opinion. Orthodoxy was certainly considered of great importance, as may be seen from the fact of the exclusion of Origen and Tertullian, those great though erratic geniuses of the early church, from the title. As soon as the power of Rome was once more upon the ascendant in Europe, the popes naturally appropriated to themselves the important privilege of canonization. None but martyrs were at first admitted into the category of saints, but in course of time the privilege was extended to some of those pious men who, without having sealed their testimony with their blood, had evinced the sincerity of their belief by the purity of their practice. In later times, however, the Pope assumed the right of admitting into the sacred catalogue potentates whose claim seems to have largely consisted in their support of his temporal interests. Notable instances of this are the names of the emperor Henry I., canonized by Eugenius III., and Edward the Confessor of England, canonized by Alexander III.

So long as the right of according the honors of canonization was vested in the bishops, there was no public guarantee that it had been exercised with rigor or discretion. But when it passed into the hands of the popes, means were taken to prevent any but really meritorious persons from being enrolled in the holy category. Even then, however, a very simple ordeal sufficed. A few miracles reported to have happened at a tomb were enough to give its inmate a claim to have his name inscribed in the canon of the mass among the number of the happy. A Roman Catholic writer, the editor of Butler's *Lives of the Saints* (ed. 1866), states that "the proceedings of a beatification or canonization are long, rigorous, and expensive." It has been asserted that the discovery of the last-named feature of the process prevented the somewhat parsimonious Henry VII. of England from carrying out his desire for the canonization of King Henry VI.; Bacon, however (*History of Henry VII.*), inclines rather to the belief that the obstacle here was the pope's fear it would "diminish the estimation of that kind of honor" to give it to such "a simple man." At a later period, when the ceremony was only performed after a considerable lapse of time, reasons were always hard to be found why the saintly candidate should be rejected. In modern times the court of Rome has shown itself extremely averse to promiscuous canonization; and since the days of Benedict XIV., the promoter of the faith, popularly known as the *advocatus diaboli*, or devil's advocate, has exercised extreme severity in sifting the claims of aspirants. It is further necessary that a period of a hundred years should elapse between the death of the saint and his admission into the calendar. But the more pious men of every country in Europe have of late evinced so little ambition to secure this posthumous compliment, that it may now be considered to have gone fairly out of fashion. It is also probable that the far more stringent rules of evidence and the growth of physical science have tended to render proof of the supernatural much more difficult than it seemed to be to our mediæval forefathers. It may be observed that the Lutheran divines of the century after the Reformer's decease frequently refer to him as B. (*i.e.*, *Beatus*) Lutherus.

On the day of canonization the Pope and cardinals officiate in white; while St. Peter's church is illuminated and hung with rich tapestry, upon which the arms of the Pope, and of the prince or state requiring the canonization, are embroidered in gold and silver.

Beatification, which frequently precedes canonization, gives an inferior *status* to the deceased person, and appears rather to recommend him as a fit object for the *cultus* of his co-religionists than to enjoin it.

See Du Cange, *Glossarium*, *s. v.* "Canonizare," and the references there given to St. Augustine on St. John, the Bull of Pope John XV., and (for the ceremonies) to the *Ceremoniale Romanum*, lib. i. sect. 16. Compare Milman, *Lat. Christianity*, bk. xiv. chap. ii., and preface to Forbes's *Kalendar of Scottish Saints*, 1872. For the Roman Catholic statement of the case see Alban Butler's *Lives of the Saints*, preface to edition of 1866, and an *Essay on Beatification, Canonization, &c.*, by F. W. Faber (London, 1848). But the great authorities on the subject to which all Roman Catholics refer are the decrees of Pope Urban VIII., and a treatise on the entire subject by Pope Benedict XIV.

CANOPUS, or CANOBUS, in ancient geography, a town of Lower Egypt, on the Mediterranean, a hundred and twenty stadia, or fifteen miles to the east of Alexandria. It contained a very popular shrine of the god Serapis; and was the seat of the manufacture of henna, the scarlet dye with which women in the East color their nails. The town was notorious for its dissoluteness; and as Alexandria rose into eminence, it gradually declined. All that remains is a heap of ruins. Canopus, the pilot of Menelaus, is said to have died in Egypt, and to have given his name to the town.

CANOSA, or CANUSIUM, a city of Italy, in the province of Terra di Bari, and district of Barletta, situated on the slope of an eminence on the right bank of the Aufidus or Ofanto, about 15 miles from the sea, and 6 miles from the battlefield of Cannæ. Its most interesting buildings of modern date are a feudal castle on the top of the hill, and the church of St. Sabinus the patron saint of the city, with its mosque-like cupolas and ancient pulpit. In the neighborhood of the latter stands the tomb of Bohemond of Antioch, who died in 1102. The ruins of the old Roman city extend for a considerable distance beyond the modern town; large portions of its walls can still be traced; and there are extensive remains of an amphitheatre which was larger than that of Pompeii, and a gateway frequently described as a triumphal arch dedicated to Trajan. Various explorations have brought to light great numbers of vases, inscriptions, and miscellaneous antiquities, among which is a complete list of the members of the municipal senate. The vases, which have been principally derived from the sepulchres excavated in the tufa rock which were discovered about 1803, are large in size and somewhat coarse in workmanship. (See Millin, *Description des tombeaux de Canosa*, Paris, 1813.) Like several of the more important cities in this part of Italy, Canusium is said to have been founded by the Grecian hero Diomede; the origin of the city, however, can be traced with tolerable certainty to the Pelasgi. Canusium is first mentioned in history as assisting the Samnites in their wars against the Romans, by whom it was subdued for the first time 318 B.C. In the second Punic war the inhabitants gave shelter within their walls to the remnant of the Roman army, which retreated thither after the rout at Cannæ. In the second year of the social war in which Canusium joined the revolted allies, it was besieged unsuccessfully by the Romans. In the civil wars it suffered severely, but always contrived to preserve its municipal privileges, and was never colonized from Rome till the days of Marcus Aurelius. In the *Iter ad Brundusium* of Horace, its bread is described as gritty, and its water as extremely scanty. This last defect was remedied by Herodes Atticus, who constructed an aqueduct, of which the remains are still visible. In the tenth satire of the first book of Horace, the inhabitants are called *bilingues*, probably from their speaking Latin or Greek indifferently. Till a late period in the Middle Ages Canusium continued an important and flourishing city; but it suffered severely at the hands of Lombards and Saracens. In 1694, it was laid in ruins by an earthquake, and in 1851 it was considerably injured by a similar disturbance. The title of prince of Canosa was bestowed in 1712 on Tiberio Capece. Population, 14,900.

CANOVA, ANTONIO (1757–1822), one of the leading sculptors of modern times, was born on the 1st of November, 1757, at Passagno, an obscure village situated amid the recesses of the hills of Asolo, where these form the last undulations of the Venetian Alps, as they subside into the plains of Treviso. At three years of age Canova was deprived of both parents, his father dying and his mother remarrying. Their loss, however, was compensated by the tender solicitude and care of his paternal grandfather and grandmother, the latter of whom lived to experience in

her turn the kindest personal attention from her grandson, who, when he had the means, gave her an asylum in his house at Rome. The father and grandfather of our artist followed the occupation of stone-cutters or minor statuaries; and it is said that their family had for several ages supplied Passagno with members of that calling. As soon as Canova's hand could hold a pencil, he was initiated into the principles of drawing by his affectionate grandfather Pasino. The latter possessed some knowledge both of drawing and of architecture, designed well, and showed considerable taste in the execution of ornamental works. To his art he was greatly attached; and upon his young charge he looked as one who was to perpetuate, not only the family name, but also the family profession.

The early years of Canova were passed in study. The bias of his mind was to sculpture, and the facilities afforded for the gratification of this predilection in the workshop of his grandfather were eagerly improved. In his ninth year he executed two small shrines of Carrara marble, which are still extant. Soon after this period he appears to have been constantly employed under his grandfather. Amongst those who patronized the old man was the patrician family Falier of Venice, and by this means young Canova was first introduced to the senator of that name, who afterwards became his most zealous patron. Between the younger son, Giuseppe Falier, and the artist a friendship commenced which terminated only with life. From the interest which was excited in this family for Canova, the senator Falier was induced to receive him under his immediate protection. It has been related by an Italian writer, and since repeated by several biographers, that Canova was indebted to a trivial fortuitous circumstance,—the moulding of a lion in butter,—for the warm interest which Falier took in his welfare. The anecdote may or may not be true. By his kind patron Canova was placed under Bernardi, or, as he is generally called by filiation, Torretto, a sculptor of considerable eminence, who had taken up a temporary residence at Pagnano, a village in the vicinity of the senator's mansion. This took place whilst Canova was in his thirteenth year; and with Torretto he continued about two years, making in many respects considerable progress. This master returned to Venice, where he soon afterwards died; but by the high terms in which he spoke of his pupil to Falier, the latter was induced to bring the young artist to Venice, whither he accordingly went, and was placed under a nephew of Torretto. With this instructor he continued about a year, studying with the utmost assiduity. After the termination of this engagement he began to work on his own account, and received from his patron an order for a group on the subject of Orpheus and Eurydice. The first figure, which represents Eurydice in flames and smoke, in the act of leaving the infernal realms, was completed towards the close of his sixteenth year. It was highly esteemed by his patron and friends, and the artist was now considered qualified to appear before a public tribunal. The kindness of some monks supplied him with his first workshop, which was the vacant cell of a monastery. Here for nearly four years he labored with the greatest perseverance and industry. He was also regular in his attendance at the academy, where he carried off several prizes. But he relied far more on the study and imitation of nature. From his contemporaries he could learn nothing, for their style was vicious. From their works, therefore, he reverted to living models, as exhibited in every variety of situation. A large portion of his time was also devoted to anatomy, which science was regarded by him as "the secret of the art." He likewise frequented places of public amusement, where he carefully studied the expressions and attitudes of the performers. Not a day was allowed to pass without his making some visible advances in his profession. He formed a resolution, which was faithfully adhered to for several years, never to close his eyes at night without having produced some design. Whatever was likely to forward his advancement in sculpture he studied with ardor. On archæological pursuits he bestowed considerable attention. With ancient and modern history he rendered himself well acquainted, and he also began to acquire some of the Continental languages.

Three years had now elapsed without any production coming from his chisel. He began, however, to complete the group for his patron, and the Orpheus which followed evinced the great advance he had made. The work was universally applauded, and laid the foundation of his fame. Several groups succeeded this performance, amongst which was that of Dædalus and Icarus, the most celebrated work of his noviciate. The simplicity of style and the faithful imitation of nature which characterized them called forth the warmest admiration. His merits and reputation being now generally recognized, his thoughts began to turn from the shores of the Adriatic to the banks of the Tiber, for which he set out at the commencement of his twenty-fourth year.

Before his departure for Rome, his friends had applied to the Venetian senate for a pension, to enable him to pursue his studies without embarrassment. The application was ultimately successful. The stipend amounted to three hundred ducats (about £60 per annum), and was limited to three years. Canova had obtained letters of introduction to the Venetian ambassador, the Cavaliere Zulian, an enlightened and generous protector of the arts, and was received in the most hospitable manner. His arrival in Rome, 28th December, 1780, marks a new era in his life. It was here he was to perfect himself by a study of the most splendid relics of antiquity, and to put his talents to the severest test by a competition with the living masters of the art. The result was equal to the highest hopes cherished either by himself or by his friends. The work which first established his fame at Rome was Theseus vanquishing the Minotaur. The figures are of the heroic size. The victorious Theseus is represented as seated on the lifeless body of the monster. The exhaustion which visibly pervades his whole frame proves the terrible nature of the conflict in which he has been engaged. Simplicity and natural expression had hitherto characterized Canova's style; with these were now united more exalted conceptions of grandeur and of truth. The Theseus was regarded with rapturous admiration.

Canova's next undertaking was a monument in honor of Clement XIV.; but before he proceeded with it he deemed it necessary to request permission from the Venetian senate, whose servant he considered himself to be, in consideration of the pension. This he solicited in person, and it was granted. He returned immediately to Rome, and opened his celebrated studio in the Via del Babuino. He spent about two years of unremitting toil in arranging the design and composing the models for the tomb of the pontiff. After these were completed, other two years were employed in finishing the monument, and it was finally opened to public inspection in 1787. The work, in the opinion of enthusiastic *dilettanti*, stamped the author as the first artist of modern times. After five years of incessant labor, he completed another cenotaph to the memory of Clement XIII., which raised his fame still higher. Works now came rapidly from his chisel. Amongst those which belong to the period in question is Psyche, with a butterfly, which is placed on the left hand, and held by the wings with the right. This figure, which is intended as a personification of man's immaterial part, is considered as in almost every respect the most faultless and classical of Canova's works. In two different groups, and with opposite expression, the sculptor has represented Cupid with his bride; in the one they are standing, in the other recumbent. These and other works raised his reputation so high that the most flattering offers were sent him from the Russian court to induce him to remove to St. Petersburg, but these were declined. "Italy," says he, in writing of the occurrence to a friend, "Italy is my country—is the country and native soil of the arts. I cannot leave her; my infancy was nurtured here. If my poor talents can be useful in any other land, they must be of some utility to Italy; and ought not her claim to be preferred to all others?"

Numerous works were produced in the years 1795–97, of which several were repetitions of previous productions. It is only necessary to notice the celebrated group representing the Parting of Venus and Adonis. This famous production was sent to Naples. The French Revolution was now extending its shocks over Italy; and Canova sought obscurity and repose in his native Passagno. Thither he retired in 1798, and there he continued for about a year, principally employed in painting, of which art also he had some knowledge. He executed upwards of twenty paintings about this time. One of his productions is a picture representing the dead body of the Saviour just removed from the cross, surrounded by the three

Marys, the beloved disciple, Joseph of Arimathea, and, somewhat in the background, Nicodemus. Above appears the Father, with the mystic dove in the centre of a glory, and surrounded by a circle of cherubs. This composition, which was greatly applauded, he presented to the parochial church of his native place. Events in the political world having come to a temporary lull, he returned to Rome; but his health having been impaired from arduous application, he took a journey through a part of Germany, in company with his friend Prince Rezzonico. He returned from his travels much improved, and again commenced his labors with renewed vigor and enthusiasm.

Canova's sculptures have been distributed under three heads:—(1) Heroic compositions; (2) Compositions of grace and elegance; and (3) Sepulchral monuments and rilievos. In noticing the works which fall under each of these divisions, it will be impossible to maintain a strict chronological order, but perhaps a better idea of his productions may thus be obtained. Their vast number, however, prevents their being all enumerated.

Soon after his return appeared his Perseus with the Head of Medusa. The moment of representation is when the hero, flushed with conquest, displays the head of the "snaky Gorgon," whilst the right hand grasps a sword of singular device. By a public decree, this work was placed in one of the *stanze* of the Vatican hitherto reserved for the most precious works of antiquity; but it would be a mistake to say that it sustains this comparison, or that it rivals the earlier realization of the same subject in Italian art, that by Cellini. In 1802, at the personal request of Napoleon, Canova repaired to Paris to model a bust of the First Consul. The artist was entertained with munificence, and various honors were conferred upon him. The statue, which is colossal, was not finished till six years after. On the fall of the great Napoleon, Louis XVIII. presented this statue to the British Government, by whom it was afterwards given to the duke of Wellington. Palamedes, Creugas and Damoxenus, the Combat of Theseus and the Centaur, and Hercules and Lichas may close the class of heroic compositions, although the catalogue might be swelled by the enumeration of various others, such as Hector and Ajax, and the statues of Washington, King Ferdinand of Naples, and others. The group of Hercules and Lichas is considered as the most terrible conception of Canova's mind, and in its peculiar style as scarcely to be excelled.

Under the second head, namely, compositions of grace and elegance, the statue of Hebe takes the first place in point of date. Four times has the artist embodied in stone the goddess of youth, and each time with some variation. The only material improvement, however, is the substitution of a support more suitable to the simplicity of the art. Each of the statues is, in all its details, in expression, attitude, and delicacy of finish, strikingly elegant. The Dancing Nymphs maintain a character similar to that of the Hebe. The Graces and the Venus are more elevated. The Awakened Nymph is another work of uncommon beauty. The Mother of Napoleon, his consort Maria Louisa (as Concord), to model whom the author made a further journey to Paris in 1810, the Princess Esterhazy, and the muse Polymnia (Elisa Bonaparte) take their place in this class, as do the ideal heads, comprising Corinna, Sappho, Laura, Beatrice, and Helen of Troy.

The cenotaphs and funeral monuments fall next to be noticed. Of these the most splendid is the monument to the Archduchess Maria Christina of Austria, consisting of nine figures. Besides the two for the Roman Pontiffs already mentioned, there is one for Alfieri, another for Emo, a Venetian admiral, and a small model of a cenotaph for Nelson, besides a great variety of monumental rilievos.

The events which marked the life of the artist, during the first fifteen years of the period in which he was engaged on the above-mentioned works, are of so little importance as scarcely to merit notice. His mind was entirely absorbed in the labors of his studio, and, with the exception of his journeys to Paris, one to Vienna, and a few short intervals of absence in Florence and other parts of Italy, he never quitted Rome. In his own words, "his statues were the sole proofs of his civil existence." There was, however, another proof, which modesty forbade him to mention, an ever-active benevolence, especially towards artists. In 1815 he was commissioned by the Pope to superintend the transmission from Paris of those works of art which had formerly been conveyed thither under the direction of Napoleon. By his zeal and exertions, for there were many conflicting interests to reconcile, he adjusted the affair in a manner at once creditable to his judgment and fortunate for his country. In the autumn of this year he gratified a wish he had long entertained of visiting London, where he received the highest tokens of esteem. The artist for whom he showed particular sympathy and regard in London was Haydon, who might at the time be counted the sole representative of historical painting there, and whom he especially honored for his championship of the Elgin marbles, then recently transported to England, and ignorantly depreciated by polite connoisseurs. Canova returned to Rome in the beginning of 1816, with the ransomed spoils of his country's genius. Immediately after, he received several marks of distinction—by the hand of the Pope himself his name was inscribed in "the Golden Volume of the Capitol," and he received the title of marquis of Ischia, with an annual pension of 3000 crowns, about £625.

He now contemplated a great work, a colossal statue of Religion. The model filled Italy with admiration; the marble was procured, and the chisel of the sculptor ready to be applied to it, when the jealousy of churchmen as to the site, or some other cause, deprived the country of the projected work. The mind of Canova was inspired with the warmest sense of devotion, and though foiled in this instance he resolved to consecrate a shrine to the cause. In his native village he began to make preparations for erecting a temple which was to contain, not only the above statue, but other works of his own; within its precincts were to repose also the ashes of the founder. Accordingly, in prosecution of this design, he repaired to Passagno in 1819. At a sumptuous entertainment which he gave to his workmen, there occurred an incident which marks the kindliness of his character. When the festivities of the day had terminated, he requested the shepherdesses and peasant-girls of the adjacent hamlets to pass in review before him, and to each he made a present, expending on the occasion about £400. We need not therefore be surprised that a few years afterwards, when the remains of the donor came to be deposited in their last asylum, the grief which the surrounding peasantry evinced was in natural expression so intense and irrepressible as to eclipse the studied solemnity of more pompous mourning.

After the foundation-stone of this edifice had been laid, Canova returned to Rome; but every succeeding autumn he continued to visit Passagno, in order to direct the workmen, and encourage them with pecuniary rewards and medals. In the meantime the vast expenditure exhausted his resources, and compelled him to labor with unceasing assiduity when age and disease had set their seal upon his frame. During the period which intervened between commencing operations at Passagno and his decease, he executed or finished some of his most striking works. Amongst these were the group Mars and Venus, the colossal figure of Pius VI., the Pietà, the St. John, the recumbent Magdalen. The last performance which issued from his hand was a colossal bust of his friend the Count Cicognara. In May, 1822, he paid a visit to Naples to superintend the construction of wax moulds for an equestrian statue of the perjured Bourbon king Ferdinand. This journey materially injured his health, but he rallied again on his return to Rome. Towards the latter end of the year he paid his annual visit to the place of his birth, when he experienced a relapse. He proceeded to Venice, and expired there on the 13th of October, 1822, at the age of nearly sixty-five. His disease was one which had affected him from an early age, caused by the continual use of carving-tools, producing a depression of the ribs. The most distinguished funeral honors were paid to his remains, which were deposited in the temple at Passagno on the 25th of the same month.

Canova, in a certain sense, renovated the art of sculpture in Italy, and brought it back to that standard from which it had declined when the sense both of classical beauty and moderation, and of Titanic invention and human or superhuman energy as embodied by the unexampled genius of Michelangelo, had succumbed to the overloaded and flabby mannerisms of the 17th and 18th centuries. His finishing was refined, and he had a special method of giving a mellow and soft appearance to the marble. He-

formed his models of the same size as the work he designed was intended to be. The prominent defect of Canova's attractive and highly trained art is that which may be summed up in the word artificiality,—that quality, so characteristic of the modern mind, which seizes upon certain properties of conception and execution in the art of the past, and upon certain types of beauty or emotion in life, and makes a compound of the two—regulating both by the standard of taste prevalent in contemporary "high society," a standard which, referring to cultivation and refinement as its higher term, declines towards fashion as the lower. Of his moral character a generous and unwearied benevolence formed the most prominent feature. The greater part of the vast fortune realized by his works was distributed in acts of this description. He established prizes for artists and endowed all the academies of Rome. The aged and unfortunate were also the objects of his peculiar solicitude. His titles were numerous. He was enrolled amongst the nobility of several states, decorated with various orders of knighthood, and associated in the highest professional honors. (See the *Life of Canova* by Memes, one vol.; that by Missinini, four vols.; the *Biografia*, by the Count Cicognara; and *Opere Scelte di Antonio Canova*, by Anzelmi, Naples, 1842.) (W. M. R.)

CANSTATT, CANNSTADT, or KANSTATT, a town of Würtemberg, in the circle of the Neckar, about 2¼ miles N.E. of Stuttgart, in 48° 48′ 22″ N. lat. and 9° 12′ 49″ E. long. It is situated in the most fertile and populous part of the country, at a point where the high roads of the circle converge, and now forms one of the most flourishing towns in Germany. Its public buildings comprise a cathedral of the 15th century, dedicated to Uffo, a beautiful town-hall, the royal theatre, the market-house, and various educational institutions. The Wilhelma palace, built in 1842–51 as a summer residence for the late king William, is an elaborate example of the Saracenic style, and is surrounded by extensive and beautiful gardens. A very considerable industry is carried on in the town,—the most important branches being wool-spinning, dyeing, cotton-weaving, and the manufacture of steel and machines. The transit trade is still more important and various. A large temporary population is attracted to the town by the fame of its mineral springs. These are about forty in number, for the most part of tepid water, which is used both for drinking and bathing, and is said to be highly beneficial in dyspepsia and weakness of the nervous system. Besides the usual bathing establishments, there are several medical institutions for the treatment of special diseases. Sielberg, a hill in the neighborhood, upwards of 600 feet in height, is interesting for its caverns and the numerous fossils which it has preserved. Not far distant is the princely seat of Rosenstein (previously known as Kahlenstein), which was built in 1824–30; and on the neighboring height of the Rothenberg was formerly the ancestral castle of the house of Würtemberg. Canstatt is mentioned as early as the 8th century, under the name of Condistat, as the seat of a great court held by Charlemagne for the trial of the rebellious dukes of Alemannia and Bavaria. From Louis the Bavarian it received the same imperial rights and privileges as were enjoyed by the town of Esslingen. Down to the middle of the 15th century it remained the capital of Würtemberg; and as an important place of transport it has been frequently the object of military operations. In 1755, at the time of the great earthquake at Lisbon, part of the town-house subsided 3 feet. Population in 1871, 11,804.

CANSTEIN, KARL HILDEBRAND, COUNT OF (1667–1719), was born at Lindenberg, in 1667. He studied law at Frankfort, travelled in Italy and England, and served in one campaign; but his health failing, he was obliged to retire into private life. At Berlin he became acquainted with Spener and Francke, whose influence determined him to devote his energies and time to further the circulation of the Bible. For this he obtained a large amount of money by subscription, and established at Halle the Bible Society which is named after him. In 1712, with the aid of Francke, he issued a stereotype edition of the New Testament at about fourpence a copy, and next year a similar edition of the whole Bible. In 1722 editions in Polish and Bohemian appeared. Canstein is the author of a *Life of Spener*, a *Harmony of the Gospels*, and several theological works. He is, besides, one of those to whom the introduction of stereotype printing has been ascribed.

CANTABRIA, a district of Hispania Tarraconensis, lying on the south coast of the Bay of Biscay. By the more ancient geographers the name was applied to the entire country now occupied by the provinces of Asturias, Santander, Biscay, and Guipuzcoa. After the conquest of Spain by the Romans, the name of Cantabria was restricted to what is now the province of Santander and the eastern portion of Asturias.

The Cantabri were not improbably the remains of an ancient Iberian population, and were, according to some, the ancestors of the modern Basques. They were the most warlike of all the native Spanish tribes that the Romans had to encounter, and were never completely subdued. Together with the Astures, they offered for many ages a successful resistance to the Roman arms, and were only at last compelled to acknowledge the supremacy of Rome by Augustus. They revolted a few years after, but were defeated with great slaughter by Agrippa, 19 B.C. When, however, their losses had been somewhat repaired, they again declared war; and they were only kept in check by the most vigorous exertions of the Emperor Tiberius. Their indomitable spirit is frequently alluded to in the ancient classics; among others Horace alludes to the "*Cantabrum indoctum juga ferre nostra.*" Cantabria under the Roman empire comprehended five principal tribes,—the Pleutauri, the Varduli, the Autrigones, the Conisci or Concani (who fed on the blood of their horses,—"*lætum equino sanguine Concanum*"), and the Tuisi. There were numerous towns and villages distributed throughout the country, of which the most important was Juliobriga.

CANTACUZENUS, JOHANNES, emperor of the East, celebrated as a statesman, general, and historian, was born at Constantinople, of an ancient and opulent family, and under the reign of the elder Andronicus held the high office of Great Domestic. In the disputes that ensued between that emperor and his grandson, Cantacuzenus espoused the cause of the latter; and when Andronicus III., on the abdication of his grandfather, ascended the throne (1328) he was entrusted with the supreme administration of affairs, in which capacity he displayed considerable vigor and ability. On the death of the emperor in 1341, Cantacuzenus was left regent and guardian of his son John Palæologus, who was but nine years of age. Whether he would have continued faithful to his trust is uncertain; but being suspected by the empress, and the object of the hostility of a powerful party at court, he rebelled, and got himself crowned emperor in one of the provincial towns, while his opponents, with the young emperor John, maintained themselves at Constantinople. The civil war which ensued lasted six years; and as the rival parties were obliged to call in the aid of the Servians and Turks, and to engage mercenaries of every description, the empire was reduced to a state of incredible confusion, and nearly ruined. At the outset Cantacuzenus was so hard pressed that he was obliged to flee into Servia. An alliance with Servia enabled him to make head against his enemies for some time; but his inconstant allies soon left him to join the other side, or to pursue their own private ends. It was with the help of the Turks that he brought the war to a termination. He formed an alliance with Orchan, the Ottoman Sultan of Broussa, on the disgraceful conditions of sending his daughter to the harem of the Turk, and of allowing his army to make slaves of the Greek subjects. In 1346 he entered Constantinople in triumph, and forced his opponents to an arrangement by which he became joint emperor with John Palæologus, retaining the administrative power in his own hands during the minority of his colleague. It is impossible to give a connected view of the government of Cantacuzenus. The empire, already broken up into disconnected fragments, and reduced to the narrowest limits, was assailed on every side by open enemies or treacherous friends. There were wars with the Genoese, who had a colony at Galata and had money transactions with the court, and with the Servians, who at that time were establishing an extensive empire on the north-western frontiers,—carried on in every case without energy and without happy result; and there was a hazardous alliance with the Turks, who made their first permanent settlement in Europe, at Callipolis, in Thrace, towards the end of the reign of Cantacuzenus (1354). It would be wrong to blame him, however, for introducing those enemies of Christendom into Europe, as they had been in the habit of interposing in the unhappy struggles of the Greek empire. No individual energy could

have saved a moribund state from destruction at the hands of its more vigorous neighbors. Yet Cantacuzenus was far too ready to employ them in his European quarrels; and as he had not money to pay them, this gave them a ready pretext for seizing upon a European town. The financial burdens imposed by Cantacuzenus had long been displeasing to his subjects, and there had always been a strong faction in favor of John Palæologus. Hence, when the latter entered Constantinople in the end of 1354, his success was easy. Cantacuzenus retired to a monastery, where he occupied himself in literary labors. He wrote a history of his own life and times, which has been incorporated in the series of Byzantine historians. Cantacuzenus was not without ability, and had some literary merit and even eloquence, but with a considerable share of the Byzantine vices,—timidity, duplicity, and falsity.

CANTAGALLO, a town of Brazil, in the province of Rio de Janeiro, about 80 miles N. E. of the city of that name, on a small tributary of the Parahyba, with a station on the railway from Rio de Janeiro to Campos. It was formerly the seat of important gold mines; but, since these were worked out, it has depended almost wholly on agriculture. Population about 4200.

CANTAL, a department in central France, lying between 44° 37′ and 45° 26′ N. lat., and between 2° 3′ and 3° 18′ E. long., bounded N. by the department of Puy-de-Dôme, and E. by Haute-Loire and Lozère, S. by Aveyron and Lozère, and W. by Corrèze and Lot. Its area is 2208 square miles; and its population in 1872 was 231,867.

It is formed of the ancient province of Upper Auvergne, and received its name from the Plomb-du-Cantal, the central peak of a bare and rugged chain which traverses the whole department. Near the Plomb, which attains a height of above 6090 feet, are the Col-de-Cabre and other peaks belonging to the same system, evidently of volcanic origin. The slopes of the higher mountains are steep and bare. The more elevated valleys are thinly peopled, and in summer afford pasture for the flocks and herds which migrate thither from the low countries. Most of the streams of the department have their sources in this central ridge, and fall by a short and rapid course into the rivers which traverse the extensive valleys on either side. The principal rivers are the Alagnon, which is a tributary of the Allier; the Celle and Truyère, which are tributaries of the Lot; and the Cère and Rue, which are tributaries of the Dordogne. The climate of the department varies considerably in the different localities. In the alluvial plain between Murat and Saint Flour, and in the S. W., in the arrondissement of Aurillac, it is generally mild and dry; but in the northern and central portions the winters are long and severe, and the hurricanes peculiarly violent. The internal resources of the department are considerable; but the difficulty of land-carriage prevents them being sufficiently developed. The hills and valleys abound with game, and the streams with fish. Cantal produces a vast variety of aromatic and medicinal plants; and its mineral products include coal, copper, lead, iron, antimony, granite, and slate. Several mines of coal and one of antimony are worked, but generally these natural sources of wealth are neglected. The cold and damp of the climate, which are great obstacles to the cultivation of corn, favor the growth of the pastures. Cattle and horses are accordingly reared with profit, while butter and cheese (including the famous Roquefort cheese) are made in large quantities. The wool of the district also is of a superior quality. The inhabitants are rude and uncultivated, accustomed to live on the scantiest fare, and plying the meanest handicrafts for a considerable part of the year in their migrations to Paris and through the provinces. The principal articles of food are rye, buckwheat, and chestnuts. Cantal is divided into four arrondissements,—Aurillac, Mauriac, Murat, and Saint Flour. Its capital is Aurillac.

CANTARINI, Simone (1612–1648), called Simone da Pesaro, a painter and etcher, was born at Oropezza near Pesaro in 1612. He was a disciple of Guido, and a fellow-student of Domenichino and Albano. The irritability of his temper and his vanity were extreme; and it is said that his death, which took place at Verona in 1648, was occasioned by chagrin at his failure in a portrait of the duke of Mantua. Others relate that he was poisoned by a Mantuan painter whom he had injured. His pictures, though masterly and spirited, are deficient in originality. Some of his works have been mistaken for examples of Guido, to whom, indeed, he is considered superior in the extremities of the figures. Among his principal paintings are St. Anthony, at Cagli; the Magdalene, at Pesaro; the Transfiguration, in the Brera Gallery, Milan; the Portrait of Guido, in the Bologna Gallery; and St. Romuald in the Casa Paolucci. His most celebrated etching is Jupiter, Neptune, and Pluto, honoring the arms of Cardinal Borghese.

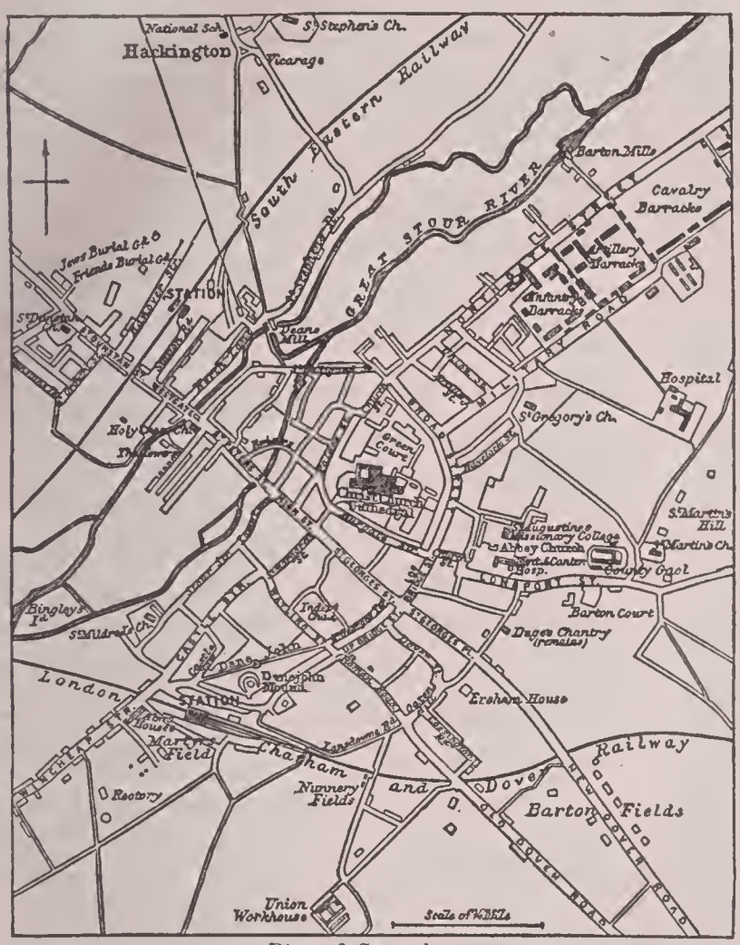
CANTEMIR, Antiochus (1700–1744), the father of Russian poetry, was the youngest son of Demetrius Cantemir, noticed below. Under the ablest professors, whom Peter the Great had invited to St. Petersburg, he studied mathematics, physics, history, moral philosophy, and polite literature. When quite young he was elected a member of the Academy of St. Petersburg; and he wrote some satires at twenty, which helped greatly to fix Russian versification and develop Russian poetry. At thirty years of age he was nominated minister to the court of Great Britain; and there, as well as in France, whither he went in 1736 as minister-plenipotentiary, he was equally admired as a statesman and as a man of letters. His conduct in relation to the different revolutions which agitated Russia during his absence procured him the confidence and esteem of three successive princes. He died at Paris in 1744. Besides a Russian translation of Anacreon and the epistles of Horace, he wrote original satires, odes, and fables, and translated Fontenelle's *Plurality of Worlds* and Algarotti's *Dialogues on Light and Colors*. The Abbé Guasco wrote his life in French, and translated his satires into that language.

CANTEMIR, Demetrius, son of a prince of Moldavia, was born in 1673, and died in 1723. On his father's death, though not permitted to succeed to the throne of Moldavia, he continued faithfully to serve the Turks, distinguishing himself in many campaigns, and acquiring the Oriental as well as the European languages, of which he became a great master. In 1710 he was at last appointed prince of Moldavia, in order to aid in resisting the threatened invasion of Peter the Great. Convinced of the approaching ruin of the Turks, Cantemir joined the Czar, and shared in the campaign of 1711 on the Pruth, which proved so humiliating to Russia. On the conclusion of peace, Peter, who had refused to give up his ally to the victorious Turks, took him with him to Russia, where he lived till his death, assisting the Czar in his wars, and in great favor with him. He wrote several works, the most important being a history of the growth and decay of the Ottoman empire.

CANTERBURY, a city and borough in the county of Kent, distant from London 55 miles E.S.E., and situated in 51° 17′ N. lat., 1° 15′ E. long. It is approached from London by the South-Eastern and the London-Chatham-and-Dover railways; and a line, six miles in length, connects it with Whitstable, a small harbor on the north coast of Kent, which is its port for trade purposes. The corporation (from which the mayor is chosen) is elected from three wards, the Dane-John, Westgate, and Northgate wards, and consists of eighteen councillors and six aldermen. Here are held the quarter sessions for East Kent, the petty sessions for the Home Division of St. Augustine, besides those of the city itself, and the county court of the surrounding district. The High Court of Justice has also district registries at Canterbury for the probate and bankruptcy divisions.

Canterbury contains a cathedral church, the seat of an archbishop, who is primate of all England and metropolitan, and provincial of the dioceses south of Trent,—his own diocese comprising the greater part of Kent and a small piece of Surrey. The cathedral staff consists of a dean, six canons, twenty-four honorary canons, an auditor, six preachers, four minor canons, and subordinate officers, and attached to it is a school founded by Henry VIII., and called the king's school, comprising a foundation for two masters and fifty scholars, with a few exhibitions also. The cathedral library contains about 9000 volumes, and is rich in ancient charters and registers of the monastery. Besides the cathedral there are fifteen parish churches, and places of worship for Roman Catholics, Jews, Unitarians, Independents, Baptists, Wesleyans, Lady Huntingdon's congregation, and the Society of Friends. In the crypt of the cathedral there is also a church founded by Queen Elizabeth for French Protestant refugees, and still used by a small French congregation. A college for the education of missionary clergy of the Church of England

was founded by Royal Charter in 1848 on the ruins of St. Augustine's abbey; and on St. Thomas Hill in the suburbs is the boys' school of the Clergy Orphan Corporation. The principal public buildings are the Guild Hall, the Corn Exchange with market-place below, the Museum, the Kent and Canterbury Hospital, an institution for upwards of 100 patients, and the jail, which is for the eastern division of the county, with the county court-hall adjoining. The city contains barracks for horse, foot, and artillery,—that for cavalry being used for depôts of regiments on foreign service, and that for infantry as the brigade depôt of the 3d regiment (Buffs) and the East Kent regiment, and as the headquarters of the East Kent militia. The trade of



Plan of Canterbury.

Canterbury comprises good markets for hops and corn, but has no other specialty. There are some pleasant public gardens known as the Dane-John Walks. The suburbs and neighborhood are favorite spots for residence.

Canterbury returns two members to Parliament, the constituency being 2794 (revision 1875). The population in 1871 was 20,962, and the number of houses 4102.

Canterbury occupies the site of the Roman *Durovernum*, a city established upon that ford of the River Stour at which roads from the three Kentish harbor-fortresses, *Rutupiæ*, *Dubræ*, and *Lemanæ* (now Richborough, Dover, and Lymne) became united into the one great military way through Britain, known in later days as Watling Street. From this ford the city apparently derived its name, the first syllable of which is the Celtic *dwr*, "water." The Romans do not seem, at least towards the end of their occupation, to have made it a military centre, or given it a permanent garrison; but, as a halting-place for troops on the march, and commercially, as lying in the direct path of all the Continental traffic of Britain, its importance at this date must have been considerable. The city reappears, under its new name of Cantwarabyrig (since shortened to the present word), as the capital of Ethelbert, the fourth Saxon king of Kent, during the latter part of whose reign it became in a manner the metropolis of England,—the office of Bretwalda, or overlord, of the island to the Humber being held by Ethelbert. It was in this reign (in 596) and under these circumstances that Augustine and his fellow-missionaries arrived from Rome, and their settlement by Ethelbert in his capital became the origin of its position, held ever since, as the metropolis of the English Church. Its history from this time becomes chiefly ecclesiastical. Here lived and ruled Augustine and the succeeding archbishops, and here under their auspices, from the time of Ethelbert and Augustine downwards, arose two of the principal monasteries of England, the abbey of St. Augustine and the priory of Christ Church,—the latter ruled by a prior only, as acknowledging the archbishop for its abbot. These were long rivals in importance and wealth, in which the abbey held for several centuries the advantage, as possessing the shrines of the earlier archbishops, the chief saints of the English Church, till the pre-eminence of the priory in turn became decidedly established by the murder of Archbishop Becket (1170) in its cathedral church, his canonization as St. Thomas of Canterbury, and the resort of the Christian world on pilgrimage to his shrine. Miracles were almost immediately said to be worked at his grave in the crypt, and at the well in which his garments had been washed; and from the time when Henry II. did his penance for the murder in the church, and the battle of Alnwick was gained over the Scots a few days afterwards—it was supposed as a result—the fame of the martyr's power and the popularity of his worship became an established thing in England. On the rebuilding of the cathedral after a fire, in 1175, a magnificent shrine was erected for him in a new chapel built for the purpose, which became thronged for three centuries by pilgrims and worshippers of all classes, from kings and emperors downwards. Henceforward the interests of the city became bound up in those of the cathedral, and were shown in the large number of hostels for the accommodation of the pilgrims, and of shops containing wares especially suited to their tastes. A pilgrimage to Canterbury became not only a pious exercise, but a fashionable summer excursion; and the poet Chaucer, writing in the 14th century, has given us an admirable picture of such pilgrimages, with the manners and behavior of a party of pilgrims, leisurely enjoying the journey, and telling stories to each other on the road. Our very language still contains two words originating in these customs,—a "canterbury," or a "canterbury tale," a phrase used for a fiction,—and a "canter," which is a short form for a "canterbury gallop," an allusion to the easy pace at which these pilgrimages were performed. The largely ecclesiastical character of the city may still be seen in the numerous remains of buildings connected with the church with which its streets abound to the present day. The shrine with its vast collected wealth was destroyed, and every reminiscence connected with it as far as possible effaced, by King Henry VIII.'s commissioners in 1538.

In secular history Canterbury has been less remarkable. The castle was taken by Louis, son of Philip Augustus of France, during his incursion into England in 1215. Here, in the cathedral, Edward I. was married in 1299 to his second queen, Margaret of France, and Charles I. to Henrietta Maria in 1625. Hence started the Kentish rebels under Wat Tyler on their march to London in 1381, taking with them as prisoner Archbishop Sudbury, whom they beheaded later on Tower Hill,—in this point curiously repeating the action of the Danes during their invasion of 1011, who seized Archbishop Elphege from this cathedral, and shortly afterwards put him to death at Blackheath. The "Canterbury Christmas," that of 1647, is known for the resistance offered here to the attempt to carry out the decree of Parliament against the observance of the day. Out of the rising that ensued grew the "Kentish Petition" for the release of Charles I., supported, in the following summer, by an armed gathering of the gentry and yeomanry of the county, which was scattered by General Fairfax in the battle of Maidstone.

The cathedral stands on the site of a Roman church given by King Ethelbert, together with his own palace adjoining, to Augustine and his monks. This early church and its adjacent buildings were destroyed and entirely rebuilt by Archbishop Lanfranc in 1070, and the choir was again rebuilt on a larger scale by his successor Archbishop Anselm, whose work, in turn, on being restored after the fire of 1172, was then considerably enlarged, especially by the addition of a chapel and corona, both dedicated to St. Thomas, at its eastern end. In this state substantially the choir remains to the present day. Lan-

franc's nave survived till the 14th century, when it was rebuilt, with the exception of one western tower, taken down in 1834. The central tower was not completed till about 1500. The most interesting parts remaining in the present church are—(1) the site of the murder of Becket in the north-west transept, which still shows the mark of the altar erected in its commemoration, though a prevalent story of a stone in the pavement from which his blood-stain has been cut out, is a modern fiction; (2) the site of the shrine itself, shown by the rough flooring in the centre of its chapel, King Henry's commissioners having destroyed the very pavement on which it stood; (3) a few remaining windows of rich 12th century glass, unique in England and scarcely equalled on the Continent; (4) monuments of the Black Prince, of Henry IV. and his queen, and of several of the archbishops from Peckham to Pole; (5) fine remains of Norman fresco-painting in the apse of St. Gabriel in the crypt; and (6) the choir itself, built through the ten years succeeding 1174, an interesting specimen of the gradual transition from the Norman style progressing in England at the latter end of the 12th century, and showing especially the first introduction of that Southern-French variety of detail which gained a place in the new style now known as Early English. Many of the monastic buildings still remain, as the cloisters, the chapter-house, the treasury, the two entrance gateways, and the lavatory tower now used as a baptistery; and scattered in the precincts are relics of the infirmary, the dormitory, the prior's house, and three sets of buildings for hospitality to three different grades of pilgrims—all showing great beauty of architecture. The chapter buildings, added in the last few years, are not so praiseworthy.

Of St. Augustine's Abbey the remains are fewer; but a beautiful gateway of the 14th century, the abbot's hall, and some remains of the great church, attest its former magnificence. Of the other religious foundations of the city, no remains exist of St. Gregory's priory or St. Sepulchre's nunnery, but interesting parts are left of the Grey or Franciscan Friars, the White or Augustinian, and the Black or Dominican Friars (the latter the first friary of this order established in England); also of the hospitals of St. John, Northgate; St. Nicholas, Harbledown; St. Thomas, Eastbridge; St. Lawrence; and that of the Poor Priests,—of which the first three still remain in use as almshouses. Of the fifteen parish churches which exist the most remarkable is St. Martin's, the church frequented by Bertha the queen of Ethelbert before Augustine's arrival, and thus the earliest seat of English Christianity. In this church Ethelbert must have been baptized, and the existing font has been supposed of that age; rude and archaic, however, as it is, it is not earlier than a Norman date, though Saxon masonry still exists in the church walls.

Among the secular remains there are large portions of the city walls, mostly of the 15th century, but connected in parts with an earthen bank of a very much earlier date, and in one spot with a conical mound called the Dane-John or Donjon, probably of Celtic origin. The Norman keep of the castle, one of Bishop Gundulph's works, still exists, but in a very mutilated condition, as well as a fine gateway tower, the west gate of the city, built about the year 1380 by Archbishop Sudbury. The Guild Hall is of old work, but has been refaced with modern brick; and part remains of the Chequers Inn for pilgrims, built by Prior Chillenden about the year 1400, and mentioned by Chaucer in his *Canterbury Tales;* but much of this was burnt down in 1865.

There are slight remains also of the archbishop's palace, built on the very ground originally given by King Ethelbert before his conversion, and then known as Staplegate; but the archbishops have ceased to reside in Canterbury since the 17th century.

The following is a list of archbishops of Canterbury to the present day:—

1. Augustine, 597 to 605.
2. Laurentius, 605 to 619.
3. Mellitus, 619 to 624.
4. Justus, 624 to 630.
5. Honorius, 631 to 653.
6. Deusdedit, 655 to 664.
7. Theodore, 668 to 690.
8. Berhtuald, 693 to 731.
9. Tætwine, 731 to 734.
10. Nothelm, 735 to 741.
11. Cuthbert, 741 to 758.
12. Bregowine, 759 to 762.
13. Jænberht, 763 to 790.
14. Æthelheard, 790 to 803.
15. Wulfred, 803 to 829.
16. Fleogild, 829 to 830.
17. Ceolnoth, 830 to 870.
18. Æthelred, 870 to 889.
19. Plegemund, 891 to 923.
20. Æthelm, 923 to 925.
21. Wulfelm, 928 to 941.
22. Odo, 941 to 958.
23. Alsine, 958 to 959.
24. Dunstan, 959 to 988.
25. Æthelgar, 988 to 989.
26. Sigeric, 990 to 995.
27. Ælfric, 995 to 1006.
28. Ælfeah, or Elphege, 1006 to 1012.
29. Lyfing, 1013 to 1020.
30. Æthelnoth, 1020 to 1038.
31. Eadsige, 1038 to 1050.
32. Robert, 1050 to 1052.
33. Stigand, 1052 to 1070.
34. Lanfranc, 1070 to 1089.
35. Anselm, 1093 to 1109.
36. Ralph de Turbine, 1114 to 1122.
37. William de Curbellio, 1123 to 1136.
38. Theobald, 1139 to 1161.
39. Thomas Becket, 1162 to 1170.
40. Richard, 1174 to 1184.
41. Baldwin, 1185 to 1190.
42. Reginald Fitz-Joceline, 1191.
43. Hubert Walter, 1193 to 1205.
44. Stephen Langton, 1207 to 1228.
45. Richard Wethershed, 1229 to 1231.
46. Edmund de Abbendon, 1233 to 1240.
47. Boniface of Savoy, 1245 to 1270.
48. Robert Kilwarby, 1272 to 1278.
49. John Peckham, 1279 to 1292.
50. Robert Winchelsey, 1293 to 1313.
51. Walter Reynolds, 1313 to 1327.
52. Simon de Meopham, 1327 to 1333.
53. John Stratford, 1333 to 1348.
54. John de Ufford, 1348 to 1349.
55. Thomas Bradwardin, 1349.
56. Simon Islip, 1349 to 1366.
57. Simon Langham, 1366 to 1368.
58. William Wittlesey, 1368 to 1374.
59. Simon Sudbury, 1375 to 1381.
60. William Courtenay, 1381 to 1396.
61. Thomas Arundel, 1396 to 1414.
62. Henry Chicheley, 1414 to 1443.
63. John Stafford, 1443 to 1452.
64. John Kemp, 1452 to 1454.
65. Thomas Bourchier, 1454 to 1486.
66. John Morton, 1486 to 1500.
67. Henry Dene, 1501 to 1503.
68. William Warham, 1503 to 1532.
69. Thomas Cranmer, 1533 to 1556.
70. Reginald Pole, 1556 to 1558.
71. Matthew Parker, 1559 to 1575.
72. Edmund Grindal, 1575 to 1583.
73. John Whitgift, 1583 to 1604.
74. Richard Bancroft, 1604 to 1610.
75. George Abbot, 1611 to 1633.
76. William Laud, 1633 to 1645.
77. William Juxon, 1660 to 1663.
78. Gilbert Sheldon, 1663 to 1677.
79. William Sancroft, 1677 to 1691.
80. John Tillotson, 1691 to 1694.
81. Thomas Tenison, 1694 to 1715.
82. William Wake, 1715 to 1737.
83. John Potter, 1737 to 1747.
84. Thomas Herring, 1747 to 1757.
85. Matthew Hutton, 1757 to 1758.
86. Thomas Secker, 1758 to 1768.
87. Frederick Cornwallis, 1768 to 1783.
88. John Moore, 1783 to 1805.
89. Charles Manners Sutton, 1805 to 1828.
90. William Howley, 1828 to 1848.
91. John Bird Sumner, 1848 to 1862.
92. John Longley, 1862 to 1868.
93. Archibald Campbell Tait, 1868. (T. G. G. F.)

CANTERBURY, a province of New Zealand, occupying the central portion of the Middle Island on the eastern side of the great dividing range of the Southern Alps. It is bounded on the E. by the sea, and on the N., W., and S. by the provinces of Nelson, Westland, and Otago respectively. The area of Canterbury is about 8,693,000 acres. Physically, the province may be divided into two longitudinal sections, from north to south. Of these the more westerly, which is considerably the larger, is mountainous, sloping eastward into downs, while the other consists of a plain, covering an area of 2,500,000 acres. To these two main divisions must be added Banks Peninsula, an isolated hilly district on the eastern edge of the plain, jutting into the sea, and with an area of 250,000 acres. Thus the surface of the province is of the most diversified character, varying from the snow-clad peaks of the Southern Alps, which culminate in Mount Cook (13,200 feet), the highest mountain in New Zealand, to the dead level of the plain on which Christchurch stands, only a few feet above the sea. In lakes Canterbury gives place to Otago and Auckland, though Lakes Ohau and Coleridge are large sheets of water, situated amid scenery of the most beautiful description. The rivers of Canterbury are short and rapid, running with a direct course to the sea, and quite useless for purposes of navigation. Apart from the Hurunui and Waitangi, which divide Canterbury on the north-east and south-east from Nelson and Otago respectively, and hence

belong equally to those provinces, the principal rivers of Canterbury are the Ashley, Waimakariri, Rakaia, Ashburton, and Rangitata. They are all very liable to sudden and disastrous floods. The coast is poorly supplied with good harbors, that of Akaroa, in Banks Peninsula, being the only one safe in all kinds of weather. The harbor of Lyttleton is spacious, but exposed to easterly winds. The capital of Canterbury is Christchurch, and the other principal settlements are Lyttleton and Akaroa already mentioned, Kaiapoi a few miles north of Christchurch, and Timaru, 110 miles south of the latter place.

The downs and great plain of Canterbury are devoid of forests, but the mountain regions and Banks Peninsula yield abundance of excellent timber. The principal trees are the totara (*Podocarpus Totara*), rimu or red pine (*Dacrydium cupressinum*), and kahikatea or white pine (*Podocarpus dacrydioides*). Coal well adapted for household and industrial purposes, though not of the first quality, is found in the Malvern Hills, to the west of Christchurch, and beds of clay ironstone exist in various localities, but are not yet worked. Gold is found in the south-western angle of the province, near the Otago border, though not in sufficient quantity to tempt many to search for it. The wealth of Canterbury consists in its flocks and its yield of agricultural produce. In 1874 the province contained 2,965,000 sheep and 79,000 cattle. The number of agricultural holdings was 3969, and the total area of land under crops of all kinds, including cultivated grass, was about 390,000 acres, of which 112,000 acres were under cereals. The imports of Canterbury in 1874 amounted to £1,568,826, and the exports to £1,103,531, —by far the greater proportion of the latter consisting of wool, wheat, and oats. The export of phormium fibre (New Zealand flax), from which much was at one time expected, has greatly declined, but on the other hand the export of preserved meats is rapidly rising in importance. The population of the province on 31st December, 1874, was 71,316. Besides possessing many good roads, Canterbury is fast being opened up by railways. The first of these, from Lyttleton to Christchurch, a distance of eight miles, was tunnelled at great expense through the hills at the back of the former town. The line has since been continued on both sides of Christchurch—as far south as the River Rangitata, and as far north as the River Ashley, while branch lines have been, or are being, constructed to the settlements of Southbridge, Malvern, and Oxford. The first railway having been of the 5-feet 3-inch gauge, the main line is for the most part of that width, while the branches are of the narrow gauge of 3 feet 6 inches, which is almost universally adopted in other parts of the colony.

The educational system of Canterbury is comprehensive and efficient. In addition to the New Zealand University (an examining institution, supported by the colony as a whole, but having its headquarters at Christchurch), there are in the capital several educational institutions of high standing. Spread over the province there are also, in addition to schools maintained by private enterprise, many Government schools. The number of these on 31st March, 1875, was 93. They were conducted by 288 teachers and attended by 12,000 scholars.

Canterbury was founded in December, 1850, by an association headed by men of influential position in England, and connected with the national church. It was indeed sought for a time to prevent persons not members of the Church of England from settling in Canterbury, but the attempt was a failure. In 1867 the portion of the province west of the Southern Alps was formed into a separate province, under the name of Westland. Further particulars regarding the history of Canterbury will be found under the heading New Zealand.

CANTHARIDES, or Spanish Flies, are the common blister-beetles (*Cantharis vesicatoria* or *Lytta vesicatoria*) of European pharmacy. They are bright iridescent golden-green or bluish-colored insects, with the breast finely punctured and pubescent, head and thorax with a longitudinal channel, and elytra with two slightly elevated lines. The insect is from half-an-inch to an inch in length, and from one to two lines broad, the female being broader in the abdomen and altogether larger than the male. It is a native of the South of Europe, being found in Spain, France, Germany, Italy, Hungary, and the South of Russia, and it is also obtained in Siberia. The Spanish fly is also occasionally found in the South of England. The insects feed upon ash, lilac, privet, and jasmine leaves, and are found more rarely on elder, rose, apple, and poplar trees. Their presence is made known by a powerful disagreeable odor, which penetrates to a considerable distance; and people sitting under trees on which the insects were feeding have been known to be injuriously affected by their presence. They are collected for use at late evening or early morning, while in a dull bedewed condition, by shaking them off the trees or shrubs into cloths spread on the ground; and they are killed by dipping them into hot water or vinegar, or by exposing them for some time over the vapor of vinegar. They are then dried and put up for preservation in glass-stoppered bottles; and they require to be very carefully guarded against mites and various other minute insects to the attacks of which they are peculiarly liable. Mr. H. Pocklington has discovered by means of spectroscopic observations that the green color of the elytra, &c., is due to the presence of chlorophyll; and he has demonstrated that the variations of the spectral bands are sufficient, after the lapse of many years, to indicate with some certainty the kind of leaves on which the insects were feeding shortly before they were killed. Cantharides owe their value to the presence of a peculiar chemical principle, to which the name cantharidin has been given. It is most abundant in large full-grown insects, while in very young specimens no cantharidin at all has been found. From about one-fourth to rather more than one-half per cent. of cantharidin has been obtained from different samples; and it has been ascertained that the hard parts of the insect contain about six times more of the active principle than the soft parts. Cantharidin crystallizes in colorless four-sided prisms; in solution or prepared with lard it produces very powerful vesication, and taken internally it is a violent irritant poison. Spanish flies are most largely used as an external application, being but rarely taken internally. They are applied as a topical stimulant for indolent ulcers, as rubefacients, and especially for blistering in inflammatory diseases. Taken internally in the form of tincture, they have been used in dropsy, in paralysis of the bladder, and for producing aphrodisiacal effects. They have also been employed in lepra and other skin diseases; and they have had a reputation in hydrophobia and other nervous disorders which they do not deserve.

A very large number of other insects belonging to the family *Cantharidæ* possess blistering properties owing to their containing cantharidin. Of these the most remarkable is the Telini fly of India (*Mylabris cichorii*), the range of which extends from Italy and Greece through Egypt and Central Asia as far as China. It is very rich in cantharidin, yielding fully twice as much as ordinary cantharides. Several green-colored beetles are, on account of their color, used as adulterants to cantharides, but they are very easily detected by examination with the eye, or, if powdered, with the microscope.

CANTICLES. The book of Canticles, or the Song of Solomon, is called in Hebrew *The Song of Songs* (that is, *the choicest of songs*), or, according to the full title which stands as the first verse of the book, *The choicest of the songs of Solomon*. In the Western versions the book holds the third place among the so-called Solomonic writings, following Proverbs and Ecclesiastes. In Hebrew Bibles it stands among the *Megilloth*, the five books of the Hagiographa which have a prominent place in the Synagogue service. In printed Bibles and in German MSS. it is the first of these because it is read at the Passover, which is the first great feast of the sacred year of the Jews. Spanish MSS., however, place it second among the *Megilloth*, giving the precedence to Ruth.

No part of the Bible has called forth a greater diversity of opinions than the Song of Solomon, and that for two reasons. In the first place, the book holds so unique a position in the Old Testament, that the general analogy of Hebrew literature is a very inadequate key to the verbal difficulties, the artistic structure, and the general conception and purpose of the poem. In point of language it is most nearly akin to parts of the Bible which, like the song of Deborah, belong to Northern Israel, agreeing with these not only in individual traits but in the general characteristic that the departures from ordinary Hebrew are almost always in the direction of Aramaic. Many forms unique in Biblical Hebrew are at once explained by the Aramaic dialects, but not a few are still obscure. The

philological difficulties of the book are, however, less fundamental than those which lie in the unique character of the Song of Solomon in point of artistic form, and in the whole atmosphere of thought and feeling in which it moves. Even in these respects it is not absolutely isolated. Parallels to the peculiar imagery may be found in the book of Hosea, in a few passages of the earlier chapters of Proverbs, and above all in the 45th Psalm; but such links of union to the general mass of the Old Testament literature are too slight to be of material assistance in the solution of the literary problem of the book. Here, again, as in the lexical difficulties already referred to, we are tempted or compelled to argue from the distant and insecure analogy of other Eastern literatures, or are thrown back upon traditions of uncertain origin and ambiguous authority.

The power of tradition has been the second great source of confusion of opinion about the Song of Solomon. To tradition we owe the title, which apparently indicates Solomon as the author and not merely as the subject of the book. The authority of titles in the Old Testament (see BIBLE) is often questionable, and in the present case it is certain on linguistic grounds that the title is not from the hand that wrote the poem; while to admit that it gives a correct account of the authorship is to cut away at one stroke all the most certain threads of connection between the book and our historical knowledge of the Old Testament people and literature. We have already noted that, when judged by comparison with other parts of the Bible and by its Aramaic texture, the dialect points to a northern origin of the poem. It is to Northern Israel, moreover, that the whole local coloring and scenery belong; so that even those commentators who still make Solomon the hero and author of the book are compelled to represent him as laying aside his kingly pomp to wander with a peasant girl through the gardens and forests of Galilee. The untenableness of this last attempt to rescue the authority of the title will appear as we proceed.

To tradition, again, we owe the still powerful prejudice in favor of an allegorical interpretation, that is, of the view that from verse to verse the Song sets forth the history of a spiritual and not merely of an earthly love. To apply such an exegesis to Canticles is to violate one of the first principles of reasonable interpretation. True allegories are never without internal marks of their allegorical design. The language of symbol is not so perfect that a long chain of spiritual ideas can be developed without the use of a single spiritual word or phrase; and even were this possible it would be false art in the allegorist to hide away his sacred thoughts behind a screen of sensuous and erotic imagery, so complete and beautiful in itself as to give no suggestion that it is only the vehicle of a deeper sense. Apart from tradition no one, in the present state of exegesis, would dream of allegorizing poetry which in its natural sense is so full of purpose and meaning, so apt in sentiment, and so perfect in imagery as the lyrics of Canticles. We are not at liberty to seek for allegory except where the natural sense is incomplete. This is not the case in the Song of Solomon. On the contrary, every form of the allegorical interpretation which has been devised carries its own condemnation in the fact that it takes away from the artistic unity of the poem and breaks natural sequences of thought.[1] The allegorical interpretation of the Song of Solomon had its rise in the very same conditions which forced a deeper sense, now universally discarded, upon so many other parts of scripture. Yet strangely enough there is no evidence that the Jews of Alexandria extended to the book their favorite methods of interpretation. The arguments which have been adduced to prove that the LXX. translation implies an allegorical exegesis are inadequate; and Philo does not mention the book at all. Nor is there any allusion to Canticles in the New Testament. The first trace of an allegorical view identifying Israel with the spouse appears to be in the Fourth Book of Ezra, near the close of the 1st Christian century (v. 24, 26; vii. 26). Up to this time the canonicity of the Canticles was not unquestioned; and the final decision as to the sanctity of the book, so energetically carried through by R. Akiba, when he declared that "the whole world is not worth the day on which the Song of Songs was given to Israel; for all the scriptures (or Hagiographa) are holy, but the Canticles most holy," must be understood as being at the same time a victory of the allegorical interpretation over the last remains of a view which regarded the poem as simply erotic.[2]

The form in which the allegorical theory became fixed in the synagogue is contained in the Midrash *Chazita* and in the Targum, which is a commentary rather than a translation. The spouse is Israel, her royal lover the divine king, and the poem is explained as tracing the great events of the people's history from the Exodus to the Messianic glory and final restoration.[3]

The authority of Origen, who, according to Jerome, surpassed himself in his commentary of ten volumes on this book, established the allegorical theory in the Christian church in the two main forms in which it has since prevailed. The bridegroom is Christ, the bride either the church or the believing soul. The latter conception is, of course, that which lends itself most readily to purposes of mystical edification, and which has made Canticles the manual in all ages of a wide-spread type of religious contemplation. But the other view, which identifies the bride with the church, must be regarded as the standard of orthodox exegesis. Of course the allegorical principle admitted of very various modifications, and readily adapted itself to new religious developments, such as the rise of Mariolatry. Within the limits of the orthodox traditions the allegory took various colors, according as its mystical or its prophetical aspect was insisted on. Among mediæval commentators of the former class S. Bernard holds a pre-eminent place; while the second class is represented by Nicolaus de Lyra, who, himself a converted Jew, modified the Jewish interpretation so as to find in the book an account of the *processus ecclesiæ* under the Old and New Testaments. The prophetic exegesis reached its culminating point in the post-Reformation period, when Cocceius found in the Canticles a complete conspectus of church history. But the relaxation of traditional authority opened the door to still stranger vagaries of interpretation. Luther was tempted to understand the book of the political relations of Solomon and his people. Others detected the loves of Solomon and Wisdom—a view which found a supporter in Rosenmüller even in the present century; alchemists thought of Solomon's researches in their art; and Puffendorf, by the aid of Egyptian hieroglyphics, referred the whole to the grave of Christ.

The history of the literal interpretation begins with the great "commentator" of the Syrian Church, Theodorus of Mopsuestia (died 429), who condemned equally the attempt to find in the book a prophecy of the blessings given to the church, and the idea even at that time expressed in some quarters that the book is immoral. Theodorus regarded the Canticles as a poem written by Solomon in answer to the complaints of his people about his Egyptian marriage; and this was one of the heresies charged upon him after his death, which led to his condemnation at the second council of Constantinople (553 A.D.). A literal interpretation was not again attempted till in 1544 Chateillon (Castellio or Castalion) lost his regency at Geneva for proposing to expel the book from the canon as impure. Grotius (*Annot. in V. T.*, 1644) took up a more moderate position. Without denying the possibility of a secondary reference designed by Solomon to give his poem a more permanent value, he regards the Canticles as primarily an ἁρματύς (conjugal prattle) between Solomon and Pharaoh's daughter. The distinction of a primary and secondary sense gradually became current not only among the Remonstrants, but in England (Lightfoot, Lowth) and even in Catholic circles (Bossuet, 1693). In the actual understanding of the book in its literal sense no great progress was made. Solomon was still viewed as the author, and for the most part the

[1] An argument for the allegorical interpretation has been often drawn from Mahometan mysticism,—from the poems of Hafiz, and the songs still sung by dervishes. See Jones, *Poëseos Asiaticæ Com.*, pt. iii. cap. 9; Rosenmüller's remarks on Lowth's *Prælectio* xxxi., and Lane's *Modern Egyptians*, ch. xxiv. But there is no true analogy between the Old Testament and the pantheistic mysticism of Islam, and there is every reason to believe that, where the allegory takes a form really analogous to Canticles, the original sense of these songs was purely erotic.

[2] The chief passages of Jewish writings referring to this dispute are Mishna *Jadaim* iii. 5 and Tosifta *Sanhedrin* xii. For other passages see Grätz's *Commentary*, p. 115, and in control of his criticism the introduction to the commentary of Delitzsch.

[3] The text of the Targum in the Polyglotts and in Buxtorf's Rabbinic Bible is not complete. The complete text is given in the Venice editions, and in Lagarde's *Hagiographa Chaldaice*, Lipsiæ, 1873. The Polyglotts add a Latin version.

idea that the poem is a dramatic epithalamium was borrowed from Origen and the allegorists, and applied to the marriage of Pharaoh's daughter. To reconcile this idea with the fact that the Song is full of peasant life, a most artificial style of composition had to be assumed. In Bossuet's once celebrated theory, to which Lowth also inclined, the epithalamium is made to extend over seven days, and each morning the bridegroom, who is fictitiously represented as a shepherd, rises early to pursue his rustic toil, leaving his bride alone till the evening. The seventh day is the Sabbath, when the bride and bridegroom appear together (ch. viii.). From Grotius to Lowth the idea of a typical reference designed by Solomon himself appears as a mere excrescence on the natural interpretation, but as an excrescence which could not be removed without perilling the place of Canticles in the canon, which, indeed, was again assailed by Whiston in 1723. But in his notes on Lowth's lectures, J. D. Michaelis, who regarded the poem as a description of the enduring happiness of true wedded love long after marriage, proposed to drop the allegory altogether, and to rest the canonicity of the book, as of those parts of Proverbs which treat of conjugal affection, on the moral picture it presents (1758). The hints which Michaelis offered for the interpretation of the book on this principle showed a singular want of delicacy; but the moralizing rationalism of the period was not to be shocked by any impropriety which was atoned for by the "important moral tendency" of the book as a whole; and the principle laid down by the critic of Göttingen was carried out in a variety of hypotheses, each, as Herder complained, more improper than the other. A real step, however, was made in 1771 by J. T. Jacobi, who distinguished the husband of the Shulamite from Solomon, and representing the latter as a baffled tempter, prepared the way for the theory now most current among critics.

Then came Herder's exquisite little treatise on *Solomon's Songs of Love, the Oldest and Sweetest of the East* (1778). Herder possessed that delicacy of taste and sympathetic poetical genius which the school of Michaelis altogether lacked. Delighting in the Canticles as the transparently natural expression of innocent and tender love, he was indignant at an exegesis which, in a supposed apologetical interest, was content to establish a didactic object for the book by the aid of hypotheses which sullied the purity and profaned the sanctity of the utterances of genuine human affection. If the songs of Canticles were allowed to speak for themselves, they would need no theory to explain their meaning, no apology to justify their morality, no fiction of a typical or didactic purpose to commend them as pure, lovely, and worthy of a place in a holy book. Is not true love itself holy? for love is the fountain of all man's bliss, and all love, like goodness and truth, is at root one. Herder justifies these views in a sort of æsthetical commentary, which triumphantly vindicates the naïve innocence and genuine delicacy of the love which the book displays. But his sympathy with the sentiment of the Canticles was truer than his eye for details; and the idea that the poem is simply a sequence of independent songs without inner unity, grouped so as to display various phases and stages of love in a natural order, culminating in the placid joys of wedded life, was in some respects a retrograde step.

Since Herder there has been no attempt of any intrinsic value to rehabilitate the allegorical theory, or the theory of a second sense consciously followed by the author. Even those commentators who, like Delitzsch (1851 and 1875) or his followers Zöckler (1868) and Kingsbury (in the *Speaker's Commentary*, 1873), assume that Canticles owes its place in the canon to the typical importance of Solomon in the history of salvation do not venture to make this idea an element in the exegesis.

In determining the literal sense recent scholars have followed three main courses. The theory of Herder, which refuses to acknowledge any continuity in the book, was accepted by Eichhorn on the part of scholars, and with some hesitation by Goethe on the part of the poets. Commentaries based on this view are those of Döpke (1829), Magnus (1842), Noyes (1846); and it has also enjoyed the critical authority of De Wette and Diestel. A second view which is at present dominant recognizes in the poem a more or less pronounced dramatic character, and following Jacobi distinguishes the shepherd, the true love of the Shulamite, from King Solomon, who is made to play an ignominious part. Propounded in the last century by Stäudlin (1792) and Ammon (1795), this view was energetically carried out by Umbreit (1820), and above all by Ewald, whose acuteness gave the theory a new development, while his commanding influence among Hebrew scholars acquired for it general recognition. Ewald assumed a very simple dramatic structure, and did not in his first publication (1826) venture to suppose that the poem had ever been acted on a stage. His less cautious followers have been generally tempted to dispose of difficulties by introducing more complicated action and additional interlocutors (so, for example, Hitzig, 1855; Ginsburg, 1857; Renan, 1860); while Böttcher (1850) did his best to reduce the dramatic exposition to absurdity by introducing the complexities and stage effects of a modern operetta into a drama of the 10th century before Christ. The third view is that of Delitzsch and his followers, who also plead for a dramatic form—though without supposing that the piece was ever acted—but adhere to the traditional notion that Solomon is the author, who celebrates his love to a peasant maiden, whom he made his wife, and in whose company the proud monarch learned to appreciate the sweetness of a true affection and a simple rustic life.

In comparing these various views with what is found in the book itself, the unity of the poem has first to be considered. A certain external unity, not merely in the general tone and color of the language and in the repetition of similar sentences by way of refrain, but also in the order of the matter, is not denied by the followers of Herder, who, however, maintain that the constituent lyrics were originally distinct poems, and that they owe all appearance of continuity to the arrangement and interpolations of an editor. The correctness of this view would be positively demonstrated if its adherents were able, without arbitrary treatment of the text, to digest the Canticles into a series of lyrics, each complete in itself and independent of the rest. But no commentator has hitherto done this in a satisfactory way, and the most ingenious attempts—especially that of Magnus—involve the assumption that the editor often displaced part of a song, sacrificing the unity of the original lyrics to an artificial composition of the whole. It is plain that, if assumptions of this kind are to be made at all, they may also be used in favor of a theory of original unity marred by subsequent misconception.

Have, then, the supporters of the continuity of the poem come nearer to a positive proof of their position? Our starting-point, in looking at this question, is the fact that the composition takes for the most part the form of dialogue. Even if the book is to be broken up into distinct lyrics, it must be granted that several of these pieces have an amœbean structure. Is it possible to show that throughout the book the same persons reappear in these lyrical dialogues? And, again, since the scene of the dialogue certainly varies in different parts of the book between the city of Jerusalem and the open country of Northern Israel, is it possible to find in the poem itself a thread of narrative sufficient to account for the change of place? The centre of attraction is throughout a female figure, and the unity of this figure is the chief test of the unity of the book. In the long canto, i. 1–ii. 7, the heroine appears in a royal palace (i. 4) among the daughters of Jerusalem, who are thus presumably ladies of the court of Zion. At i. 9, an additional interlocutor is introduced, who is plainly a king, and apparently Solomon (i. 9, 12). He has just risen from table, and praises the charms of the heroine with the air of a judge of beauty, but without warmth. He addresses her simply as "my friend" (not as English version, "my love"). The heroine on the contrary is passionately in love, but nothing can be plainer than that the object of her affection is not the king. She is not at home in the palace, for she explains (i. 6) that she has spent her life as a peasant girl in the care of vineyards. Her beloved whom she knows not where to find (i. 7), but who lies constantly on her heart and is cherished in her bosom like a spray of the sweet henna flowers which Oriental ladies delight to wear (i. 13, 14), is like herself a peasant—a shepherd lad (i. 7)—with whom she was wont to sit in the fresh greenwood under the mighty boughs of the cedars (i. 16, 17). Even before the king's entrance the ladies of the court are impatient at so silly an affection, and advise her, "if she is really so witless," to begone and rejoin her plebeian lover (i. 8). The idea that from i. 12 onwards the heroine exchanges compliments with the king

is inconsistent with what precedes, and psychologically impossible in view of ii. 5, 6, where her self-control, strung to the highest pitch as she meets the compliments of the king with reminiscences of her absent lover, breaks down in a fit of half-delirious sickness. The only words directed to the king are those of i. 12, which, if past tenses are substituted for the presents of the English version, contain a pointed rebuff. Finally, ii. 7 is, on the plainest translation, a charge not to arouse love till it please. The moral of the scene is the spontaneity of true affection.[1]

Nothing can be plainer than that the motive of this piece is dramatical and not lyrical. It is a complete scene, but not a complete poem, and if it is not a fragment, we must expect to find the denouement at the close of the book. Now, at viii. 5, a female figure advances leaning upon her beloved, with whom she claims inseparable union, —"for love is strong as death, its passion inflexible as the grave, its fire a divine flame which no waters can quench or floods drown. Yea, if a man would give all his wealth for love he would only be contemned." This is obviously the sentiment of ii. 7, and the suitor, whose wealth is despised, must almost of necessity be identified with the king of chapter i., if, as seems reasonable, we place viii. 11, 12 in the mouth of the same speaker—"King Solomon has vineyards which bring him a princely revenue, and enrich even the farmers. Let him and them keep their wealth; my vineyard is before me" (*i.e.*, I possess it in present fruition). The last expression is plainly to be connected with i. 6. But this happiness has not been reached without a struggle. The speaker has proved herself an impregnable fortress (ver. 10), and, armed only with her own beauty and innocence, has been in his eyes as one that found peace. The English version is quite arbitrary in rendering *favor* for *peace*. The sense is that, like a virgin fortress, she has compelled her assailant to leave her in peace. To these marks of identity with the heroine of ch. i. are to be added that she appears here as dwelling in gardens, there as a keeper of vineyards (i. 6, and viii. 13), and that as there it was her brethren that prescribed her duties, so here she apparently quotes words in which her brothers, while she was still a child, speculated as to her future conduct and its reward (viii. 8, 9).

If this analysis of the commencement and close of the book is correct, it is certain that the poem is in a sense dramatic, that is, that it uses dialogue and monologue to develop a story. The heroine appears in the opening scene in a difficult and painful situation, from which in the last chapter she is happily extricated. But the dramatic progress which the poem exhibits scarcely involves a plot in the usual sense of that word. The words of viii. 9, 10 clearly indicate that the deliverance of the heroine is due to no combination of favoring circumstances, but to her own inflexible fidelity and virtue. In accordance with this her *rôle* throughout the poem is simply a steadfast adherence to the position which she takes up in the opening scene, where she is represented as concentrating her thoughts on her absent lover with all that stubborn force of will which is characteristic of the Hebrews, and as frustrating the advances of the king by the mere naïve intensity of pre-occupied affection. This conception of the principal part in the poem implies a very elementary amount of dramatic skill. But it is just the conception which the analogy of Hebrew poetry in general, and especially of the book of Job, leads us to expect. The characters of Job and his friends are carefully discriminated. But there is no action and reaction between the speakers. Each adheres to his own vein of thought almost untouched by what the others say, and the skill of the author appears only in the variety of poetical developments in which the fundamental idea of each character expresses itself. The reader who, with this analogy to guide him, runs through the parts of Canticles which must be assigned to a female speaker, cannot fail to see that the *rôle* indicated at the beginning and close of the book is carried out with perfect consistency.

The constant direction of the maiden's mind to her true love is partly expressed in dialogue with the ladies of the court (the daughters of Jerusalem), who have no dramatic individuality, and whose only functions in the economy of the piece is to give the heroine opportunity for a more varied expression of her feelings. In i. 8 we found them contemptuous. In chapter iii. they appear to be still indifferent; for when the heroine relates a dream in which the dull pain of separation and the uneasy consciousness of confinement and danger in the unsympathetic city disappear for a moment in imagined reunion with her lover, they are either altogether silent or reply only by taking up a festal part song describing the marriage procession of King Solomon (iii. 6–11), which stands in jarring contrast to the feelings of the maiden.[2] A second dream (v. 2–8), more weird and melancholy, and constructed with that singular psychological felicity which characterizes the dreams of the Old Testament, gains more sympathy, and the heroine is encouraged to describe her beloved at large (v. 10–vi. 3). The structure of these dialogues is so simple, and their purpose is so strictly limited to the exhibition of the character and affection of the maiden, that it is only natural to find them supplemented by a free use of pure monologue, in which the heroine recalls the happiness of past days, or expresses her rising hope of reunion with her shepherd, and restoration to the simple joys of her rustic life. The vivid reminiscence of ii. 8–17 takes the form of a dialogue within the main dialogue of the poem, a picture within a picture—the picture of her beloved as he stood at her window in the early spring time, and of her own merry heart as she laughingly answered him in the song with which watchers of the vineyards frighten away the foxes. It is, of course, a fault of perspective that this reminiscence is as sharp in outline and as strong in color as the main action. But no one can expect perspective in such early art, and recollection of the past is clearly enough separated from present reality by ii. 16, 17.[3] The last monologue (vii. 10–viii. 3), in which the hope of immediate return with her lover is tempered by maidenly shame, and a maiden's desire for her mother's counsel, is of special value for a right appreciation of the psychology of the love which the poem celebrates, and completes a picture of this flower of the northern valleys,[4] which is not only firm in outline but delicate in touch. The subordinate action which supports the portraiture of the maiden of Galilee is by no means easy to understand. It may be regarded as certain that, in iv. 1–7, the king is again introduced, and describes the personal charms of the heroine. His language is still that of cold admiration, suitable enough to the character of Solomon, and strongly contrasted with the beautiful and passionate outburst which follows (iv. 8–v. 1), and which suits no lips but those of the true lover. The latter passage offers great difficulties on any theory which finds a strict drama in Canticles. To suppose that the shepherd appears in Jerusalem at so early a point in the action is not plausible, and it seems equally violent to assume with Ewald that the whole passage is to be put in the mouth of the heroine rehearsing words of her beloved. Perhaps the plan of the poem did not forbid the author to place a song of the absent shepherd in juxtaposition with the words of Solomon so as to bring out the contrast between mere sensual admiration and genuine passion. But the passage presents on any theory difficulties of detail which no critic has satisfactorily removed.

We come next to chapter vi., which again sings the praises of the heroine, and takes occasion in this connection to introduce, with the same want of perspective as we observed in ch. ii., a dialogue descriptive of Solomon's first meeting with the maiden. We learn that she was an inhabitant of Shulem or Shunem in Issachar, whom the king and his train surprised in a garden on the occasion of a royal progress through the north. Her beauty drew from the ladies of the court a cry of admiration. The maiden shrinks back with the reply—"I was gone down into my garden to see its growth. . . . I know not

[1] In comparing these remarks with the text, the English reader must remember that the authorized version is influenced in its renderings by a theory of the book. The translation of ii. 7 is quite false. The second half of i. 13 is simply "which rests upon my heart;" i. 4 should probably run, "Draw me after thee, let us flee;" i. 9 "to my horses."

[2] Ewald and others make this song a distinct scene in the action of the poem, supposing that the author here exhibits the honorable form of espousal by which Solomon thought to vanquish the scruples of the damsel. This view, however, seems to introduce a complication foreign to the plan of the book.

[3] "My beloved is mine, and I am his, who feedeth his flock among lilies. Before the day cool and the shadows fly, . . . thee hither, my love, . . . over the mountains of separation."

[4] The rose (narcissus) of Sharon (ii. 1) must be placed in the Hebrew Sharon between Tabor and the Lake of Tiberias.—*Onom. Sacra*, ed. Lagarde, pp. 154, 296.

how my soul had brought me among the chariots of princes;" but she is commanded to turn and let herself be seen in spite of her bashful protest,—"Why do ye gaze on the Shulamite as at a dance of Mahanaim (a spectacle)."[1] Now the person in whose mouth this relation is placed must be an eye-witness of the scene, and so none other than the king. But in spite of the verbal repetition of several of the figures of ch. iv., which, if not due to corruption of the text, is probably a mere artifice to express the identity of the speaker in the two passages, the tone in which the king now addresses the Shulamite is quite changed. She is not only beautiful but terrible, her eyes trouble him, and he cannot endure their gaze. She is unique among women, the choice and only one of her mother. In this change of language Ewald and others recognize only a greater intensity of sensuous admiration, and accordingly assume that the king continues, in vii. 1–9, to describe the charms of the maiden, and to express his sensual desires in the shameless language of a voluptuary. But how can the king hold such language to a woman whose eyes he is afraid to face, and whom he addresses in chapter vi. with unmistakably respectful admiration? Moreover, the figure described in chapter vii. appears to be displayed in the dance; and, like the daughter of Herodias in the gospels, she is a lady of princely lineage. Again, if the last words of the king are a fresh attack expressed in language which under the circumstances is positively brutal, the maiden's immediate outburst of joyful hope (vii. 10) is singularly out of place, and the turning-point of the story is left an absolute blank. The unity of action can only be maintained by ignoring vii. 1–9, and taking the words of Solomon in chapter vi. in their obvious sense as implying that the king at length recognizes in the maiden qualities of soul unknown in the harem, a character which compels respect, as well as a beauty that inflames desire. The change of feeling which was wrought in the daughters of Jerusalem in the previous scene now extends to Solomon himself, and thus the glad utterances of vii. 10, *seq.*, have a sufficient motive, and the denouement is no longer violent and unprepared.

It is remarkable that the only passage which can hardly be freed from a charge of sensuality hangs so entirely loose from the proper action of the poem. Some critics (especially Hitzig) have seen similar phenomena in other parts of the book, and have thought themselves able to show that a sort of by-play exhibiting the sensual love of the harem runs through the whole action of the piece. The various hypotheses by which this idea has been carried out are all far too arbitrary to carry conviction, and an unprejudiced analysis justifies the persuasion that the dramatic structure of the book is of the very simplest kind, hardly rising above amœbean lyric, and affording no room for elaborate by-play or other complications. The *nodus* of the action is fully given in chapter i., the final issue in chapter viii. The solution lies entirely in the character and constancy of the heroine, which prevail, in the simplest possible way, first over the ladies of the court and then over the king. There is nothing extravagant in the progress of the action; for though the king has never before conceived the idea that any woman could refuse a place in his harem, his admiration does not reach the pitch of passion, and his sensuousness nowhere degenerates into grossness, except in the imagination of commentators, who have been apt to detect a *double entendre* in every passage they did not understand.

A more legitimate explanation of difficulties seems, at least in some cases, to lie in the state of the text. When even Ewald finds a voluptuous idea in iv. 6, it ought to be observed that the words in question, which seriously interrupt the sense, were no part of the original LXX., or of the text of Theodotion, but were subsequently added from the version of Aquila, which substantially represents the Massoretic text. Yet the false reading has established itself so firmly in MSS. of the LXX. that our knowledge of the interpolation is almost accidental, and we have no certainty that other interpolations of the same kind have not been made without our knowledge. In these circumstances the argument drawn from the versions for the purity of the Hebrew text has no great value. On the other hand the *a priori* probability of interpolations and corruptions is very great in a poem like Canticles, passages from which were used among the Jews as amatory songs at least till the close of the 1st Christian century.[2] Of course the supremacy of the allegorical exegesis fixed the text, but naturally tended to fix it in its longest and presumably most interpolated form. Thus it is not inconceivable that the sensual passage in chapter vii., which, if genuine, can only be an interlude of some unexplained kind, is nothing more than the insertion of an early reader *à propos* of the mention of the dance of Mahanaim.

Whatever difficulties still remain in the Canticles, it is at least no arbitrary construction which has convinced the majority of critics that an internal dramatic unity runs through the book, and that Solomon is not the true love of the Shulamite. The assertion of Delitzsch that the shepherd is a mere imaginary *Doppelgänger* of Solomon is even more violent than the opposite attempt of Grätz to eliminate the king altogether and reduce the dramatic action to a narrative of idyllic love told by the Shulamite (*Das Salomonische Hohelied*, Vienna, 1871). And it is a special merit of the current theory that it at once places the authorship and purpose of the book in a strong historical light. A poem in the northern dialect, with a northern heroine and scenery, contrasting the pure simplicity of Galilee with the corrupt splendor of the court of Solomon, is clearly the embodiment of one phase of the feeling which separated the ten tribes from the house of David. The kingdom of Solomon was an innovation on old traditions partly for good and partly for evil. But novelties of progress and novelties of corruption were alike distasteful to the north, which had long been proud of its loyalty to the principles of the good old times.[3] The conservative revolution of Jeroboam was in great measure the work of the prophets, and must therefore have carried with it the religious and moral convictions of the people. An important element in these convictions, which still claims our fullest sympathy, is powerfully set forth in the Canticles, and the deletion of the book from the canon, providentially averted by the allegorical theory, would leave us without a most necessary complement to the Judean view of the conduct of the ten tribes which we get in the historical books. Written in a spirit of protest against the court of Zion, and probably based on recollection of an actual occurrence, the poem cannot be dated long after the death of Solomon. The mention of Tirzah in vi. 4 points to the brief period when that city was the capital of the dynasty of Baasha, for Tirzah seems never to have recovered the siege and conflagration in which Zimri perished. Thus the book must have been written about the middle of the 10th century B.C. The attempt of Grätz to bring down the date to the Grecian period (about 230 B.C.) is ingenious but nothing more.

Literature.—The leading commentators have been already mentioned. A copious *Elenchus interpretum* is given in Rosenmüller's *Scholia*. More recent works are enumerated by Grätz and Zöckler, and Green's translation of Zöckler adds a list of English and American expositors. Specimens of the exegesis of various periods are given in the elaborate introduction to Dr. Ginsburg's commentary. While the thoroughly perverse theory of Delitzsch and Zöckler is represented in English by translations, and by Mr. Kingsbury in the Speaker's Commentary, the admirable exposition of Ewald in his *Dichter des alten Bundes* (2d ed., 1867) remains untranslated. This is the more to be regretted, that Renan's French translation and *Étude*, and Dr. Ginsburg's English commentary, represent extreme forms of the modern theory. Réville's sketch of the book, of which an English translation appeared in 1873, is slight, but less artificial. The student of the original cannot dispense with Ewald, Hitzig, Delitzsch, and Magnus. (W. R. S.)

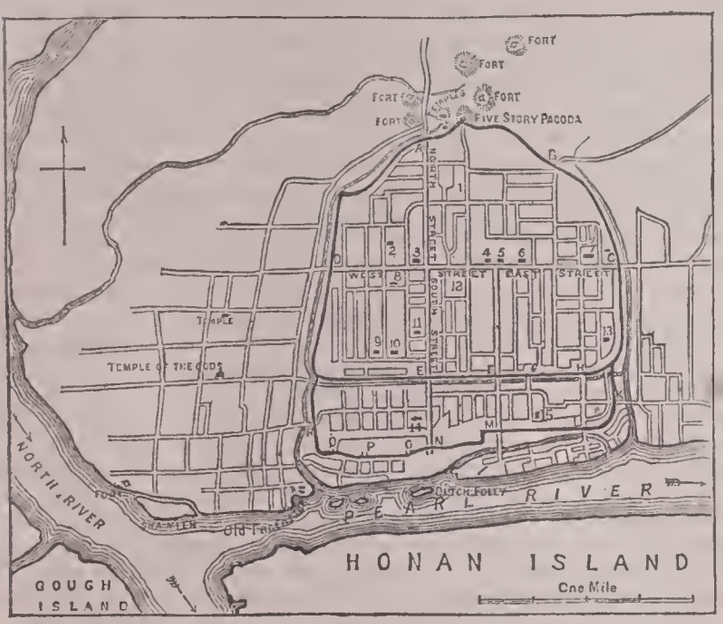
CANTON, or more correctly KWANG-CHOW FOO, is a large and populous commercial city of China, in the province of Kwang-tung, situated on the eastern bank of the Pearl River, which at Canton is somewhat broader than the Thames at London Bridge, and is navigable 300 miles farther into the interior. The Pearl River has an additional course of 80 miles to the sea, the first part of which lies through a rich alluvial plain. Beyond this rises a range of hills terminating in abrupt escarpments along the course of the river. The bold shore thus formed compresses the stream at this point into a narrow pass, to which the

[1] The purport of these verses was divined by Ewald.

[2] The analogy of Arabic literature is instructive. *Cf.* Nöldeke's *Beiträge zur Kenntniss der Poesie der Araber* (1864), pp. vi. *sqq.*

[3] *Cf.* Wellhausen on 2 Sam. xx. 18, 19, where the Hebrew text must be corrected by the LXX.

Chinese have given the name of Hu-mun, or Tiger's mouth. This the Portuguese translated into Boca Tigre, whence the designation of "the Boque," by which it is commonly known among Europeans. When viewed from the hills on the north, Canton appears to be little more than an expanse of reddish roofs relieved by a few large trees,—two pagodas shooting up within the walls, and a five-storied tower near the northern gate, being the most conspicuous objects. These hills rise 1200 feet above the river. Little or no vegetation is seen on them; and their acclivities, covered for miles with graves and tombs, serve as the necropolis of this vast city. Three or four forts are built on the points nearest the northern walls. Facing the city on the opposite side of the river is the suburb and island of Honan. The part of Canton enclosed by walls is about six miles in circumference, and has a partition wall running east and west, and dividing the city into two unequal parts. The northern and larger division is called the old, and the southern the new city. Including the suburbs the city has a circuit of nearly ten miles. The houses stretch along the river for four miles, and the banks are almost entirely concealed by boats and rafts. The walls of the city are of brick on a foundation of sandstone and granite, are 20 feet thick, and rise to an average height of 25 feet. On the north side the wall rises to include a hill which it there meets with, and on the other three sides the city is surrounded by a ditch, which is filled by the rising tide, when, for a time, the revolting mass of filth that lies in its bed is concealed from view. There are twelve outer gates—four of which are in the partition wall, and two water gates, through which boats pass from east to west across the new city. The gates are all shut at night, and in the day time a guard is stationed at them to preserve order. The streets, amounting in all to upwards of 600, are long, straight, and very narrow. They are mostly paved and are not as dirty as those of some of the other cities in the empire; in fact, considering the habits of the people and the inattention of Government to these matters, Canton may be said to be a well-governed and comparatively cleanly city. The houses are in general small, seldom consisting of more than two stories, the ground floor serving as a shop in which goods are exhibited for sale, and the rest of the house, with the court behind, being used as a warehouse. Here are to be found the productions of every quarter of the globe; and the merchants are in general extremely attentive and civil. The Chinese are remarkably expert men of business, and are generally of the most assiduous habits.



Plan of Canton.

1. Parade Ground.
2. Pagoda.
3. British Consulate.
4. Prefect's Yamun.
5. Treasurer's Yamun.
6. City Temple.
7. Confucian College.
8. Mosque.
9. Governor's Yamun.
10. Temple of the Five Genii.
11. Confucian College.
12. Rice Controller's Yamun.
13. Examination Hall.
14. Cathedral.
15. Emperor's Temple.

A to R, Gates

The temples and public buildings of Canton are numerous, but none of them present features worthy of special remark. There are two pagodas near the west gate of the old city, and 124 temples, pavilions, halls, and other religious edifices within the city. One of the pagodas called the *Kwangtah*, or Plain Pagoda, is a Mahometan mosque, which was erected by the Arabian voyagers who were in the habit of visiting Canton about ten centuries ago. It rises in an angular tapering tower to the height of 160 feet. The other is an octagonal pagoda of nine stories, 170 feet in height, and was first erected more than thirteen centuries ago. A Buddhist temple at Honan, opposite the foreign factories, and named in Chinese *Hai-chwang-sze*, or the Temple of the Ocean Banner, is one of the largest in Canton. Its grounds, which cover about seven acres, are surrounded by a wall, and are divided into courts, gardens, and a burial-ground, where are deposited the ashes of priests, whose bodies are burned. There are about 175 priests connected with this establishment. Besides the *Hai-chwang-sze*, the most noteworthy temples in and about the city are those of the Five Hundred Gods, and of Longevity, both in the western suburbs; the Tartar City Temple, and the Temple of the Five Genii. The number of priests and nuns in Canton is not exactly known, but they probably exceed 2000 nine-tenths of whom are Buddhists. The temples are gloomy-looking edifices. The areas in front of them are usually occupied by hucksters, beggars, and idlers, who are occasionally driven off to make room for the matsheds in which the theatrical performances got up by the wealthy inhabitants are acted. The principal hall, where the idol sits enshrined, is lighted only in front, and the inner apartments are inhabited by a class of men almost as senseless as the idols they serve.

The residences of the high officers of government are all within the walls of the old city. The residence of the governor-general used to be in the south-west corner of the new city, but it was utterly destroyed by the bombardment in 1856. The site remained desolate until 1860, when it was taken possession of by the French authorities, who have erected a Roman Catholic Cathedral upon it. The residence of the commander-in-chief is in the old city, and is said to be one of the best houses in Canton. There are four prisons in the city, all large edifices. For the space of four or five miles opposite Canton, boats and vessels are ranged parallel to each other in such close order that it resembles a floating city; and these marine dwellings are occupied by numerous families who reside almost constantly on the water. In the middle of the river lie the Chinese junks, some of them of from 600 to 1000 tons burden, which trade to the north and to the Strait Settlements. The various guilds and associations among the people and the merchants from other provinces have public halls, each for its own particular use. The number of these buildings is not less than 150. Canton was long the only seat of British trade with China, and was no doubt fixed upon by the Chinese Government for the European trade, as being the most distant from the capital Peking.

Formerly only a limited number of merchants, called the *hong* or security merchants, were allowed to trade with foreigners. They were commonly men of large property, and were famed for integrity in their transactions. All foreign cargoes passed through the hands of these merchants, and by them also the return cargoes were furnished. They became security for the payment of customs duties, and it was criminal for any other merchant to engage in the trade with foreigners.

Accounts are kept at Canton, in common with the rest of China, in *taels, mace, candarines,* and *cash,*—ten cash being one candarine, ten candarines one mace, ten mace one tael, which last is converted into English money at about 6s. 8d. The coin called cash is of base metal, cast, not coined, and very brittle. It is of small value, and varies in the market from 750 to 1000 cash for a tael. Its chief use is in making small payments among the lower classes. Spanish and other silver coins are current, and are estimated by their weight,—every merchant carrying scales and weights with him. All the dollars that pass through the hands of the hong merchants bear their stamp; and when they lose their weight in the course of circulation they are cut in pieces for small change. The duties are paid to Government in sycee, or pure silver, which is

taken by weight. In delivering a cargo, English weights and scales are used, which are afterwards reduced to Chinese catties and peculs. A pecul weighs 133⅓ lb avoirdupois, and a catty 1⅓ lb. Gold and silver are also weighed by the tael and catty, 100 taels being reckoned equal to 120 oz. 16 dwt. troy.

The foreign trade at Canton was materially damaged by the opening of Shanghai and the ports on the Yangtsze, but it is yet of very considerable importance, as the subjoined table of the total value of the foreign trade with Canton between the years 1861 and 1874 inclusive is sufficient to show:—

Year.	Total Value of Imports.	Total Value of Exports.	Total Value.
	Dollars.	Dollars.	Dollars.
1861	12,977,353	15,811,512	28,788,865
1862	10,580,928	17,742,590	28,323,518
1863	9,505,285	16,083,062	25,588,347
1864	8,192,795	13,659,177	21,851,972
1865	10,556,602	18,054,557	28,611,159
1866	14,171,101	18,832,622	33,003,723
1867	14,090,581	18,403,154	32,493,735
1868	12,991,266	18,491,156	31,482,422
1869	11,487,679	20,010,626	31,498,305
1870	12,053,394	19,857,543	31,910,937
1871	15,661,889	23,612,439	39,274,328
1872	16,802,553	25,691,712	42,494,265
	Shanghai Taels.	Shanghai Taels.	Shanghai Taels.
1873	9,843,819	16,156,437	26,900,256
1874	9,499,447	16,640,525	26,139,972

Although it is in the same parallel of latitude as Calcutta, the climate of Canton is much cooler, and is considered superior to that of most places situated between the tropics. The extreme range of the thermometer is from 38° to 100° Fahr., though these extremes are rarely reached. In ordinary years the winter minimum is about 42°, and the maximum in summer 96°. From May to October the hot season is considered to last during the rest of the year the weather is cool. In shallow vessels ice sometimes forms at Canton; and so rarely is snow seen that when in February, 1835, a fall to the depth of two inches occurred, the citizens hardly knew its proper name. Most of the rain falls during May and June, but the amount is nothing in comparison with that which falls during a rainy season in Calcutta. July, August, and September are the regular monsoon months, the wind coming from the south-west with frequent showers, which allay the heat. In the succeeding months the northerly winds commence, with some interruptions at first, but from October to January the temperature is agreeable, the sky clear, and the air invigorating. Few large cities are more generally healthy than Canton, and epidemics rarely prevail there.

Provisions and refreshments of all sorts are abundant, and in general are excellent in quality and moderate in price. It is a singular fact, that the Chinese make no use of milk, either in its natural state, or in the form of butter or cheese. Among the delicacies of a Chinese market are to be seen horse-flesh, dogs, cats, hawks, owls, and edible birds'-nests. The business between foreigners and natives at Canton is generally transacted in a jargon known as "Pigeon English," the Chinese being extremely ready in acquiring a sufficient smattering of English words to render themselves intelligible.

The intercourse between China and Europe by the way of the Cape of Good Hope began in 1517, when Emmanuel, king of Portugal, sent an ambassador, accompanied by a fleet of eight ships, to Peking, on which occasion the sanction of the emperor to establish a trade at Canton was obtained. It was in 1596, in the reign of Queen Elizabeth, that the English first attempted to open an intercourse with China, but ineffectually, for the two ships which were despatched on this mission were lost in the outward voyage, and it was not till about 1634 that English ships visited Canton. Unfortunately at this time a misunderstanding having occurred with the Chinese authorities owing to the treachery of the Portuguese, a rupture and a battle took place, and it was with difficulty that peace was again restored. In 1673 China was again visited by an English ship which was subsequently refused admission into Japan, and in 1677 a factory was established at Amoy. But during an irruption of the Tatars three years later this building was destroyed, and it was not till 1685 that the emperor permitted any trade with Europeans at that port. Upon the union of the two East India Companies in London, an imperial edict was issued, restricting the foreign commerce to the port of Canton.

Tea was first imported in England about the year 1667, and in 1689 a customs duty of 5s. per lb was for the first time imposed. From this date to 1834 the East India Company held a monopoly of the trade at Canton, and during this period the prosperity of the port increased and multiplied, notwithstanding the obstructions which were constantly thrown in the way of the "Barbarians" by the Chinese Government. The termination of the Company's monopoly brought no alteration in the conduct of the native authorities, whose oppressions became before long so unbearable, that in 1839 war was declared on the part of Great Britain. In 1841, while the forces under Sir Hugh (afterwards Lord) Gough were preparing to capture Canton, Capt. Elliott entered into negotiations with the Chinese, and consented to receive a pecuniary ransom in lieu of occupying the city. Meanwhile the war was carried on in central China, and finally resulted in the conclusion of the Nanking Treaty in August, 1842, under the terms of which four additional ports, viz., Shanghai, Ningpo, Fuh-chow Foo, and Amoy, were thrown open to foreign trade, and foreigners were granted permission to enter the city of Canton, from which they had hitherto been excluded. This latter provision of the treaty, however, the Chinese refused to carry out; and after endless disputes about this and other improper acts of the Chinese Government, war was again declared in 1856, the immediate cause of which was an insult offered to the British flag by the capture of certain Chinese on board the "Arrow," a small craft trading under English colors. The outbreak of hostilities was followed by the pillage and destruction of the foreign "factories," in December, 1856, by a Chinese mob, and twelve months later Canton was taken by assault by a force under Sir Charles Straubenzee, which had been sent out from England for the purpose. From this time until October, 1861, the city was occupied by an English and French garrison, and the administration of affairs was entrusted to an allied commission, consisting of two English officers and one French officer, acting under the English general. Since the withdrawal of this garrison, the city of Canton has been freely open to foreigners of all nationalities, and the English consul at the present time has his residence in the Yamun formerly occupied by the allied commissioners, within the city walls.

On the conclusion of peace it became necessary to provide a foreign settlement for the merchants whose "factories" had been destroyed, and after some consultation it was determined to fill in and appropriate as the British settlement an extensive mud flat lying to the westward of the old factory site, and known as Sha-mien, or "The Sand Flats." This site having been leased, it was converted into an artificial island by building a massive embankment of granite in an irregular oval form. Between the northern face of the site and the Chinese suburb, a canal of 100 feet in width was constructed, thus forming an island of about 2850 feet in length and 950 feet in greatest breadth. The expense of making this settlement was 325,000 Mexican dollars, four-fifths of which were defrayed by the British Government, and one-fifth by the French Government. The British portion of the new settlement was laid out in eighty-two lots; and so bright appeared the prospect of trade at the time of their sale that 9000 dollars and upwards was paid in more than one instance for a lot, with a river frontage, measuring 12,645 square feet. The depression in trade, however, which soon followed acted as a bar to building, and it was not until the British consulate was erected in 1865 that the merchants began to occupy the settlement in any numbers. The British consulate occupies six lots, with an area of 75,870 square feet in the centre of the site, overlooking the river, and is enclosed with a substantial wall. A ground-rent of 15,000 cash (about £3) per *mow* (a third of an acre) is annually paid by the owners of lots to the Chinese Government.

The Sha-mien settlement possesses many advantages. It is close to the western suburb of Canton, where reside all the wholesale dealers as well as the principal merchants and brokers; it faces the broad channel known as the Macao Passage, up which the cool breezes in summer are wafted almost uninterruptedly, and the river opposite to it

affords a safe and commodious anchorage for steamers up to 1000 tons burden. Steamers only are allowed to come up to Canton, sailing vessels being restricted to the anchorage at Whampoa. See CHINA. (R. K. D.)

CANTON, a city of the United States, in Stark county, Ohio, about 118 miles north-east of Columbus, on the Nimiskillen Creek. It forms the centre of a large agricultural district, and carries on a thriving trade. Coal and limestone are abundant in the neighborhood, and the creek affords a good supply of water power. There are several iron foundries and woollen factories in the town, as well as establishments for the manufacture of reaping-machines. Besides daily papers, two monthly periodicals are published. Population in 1870, 8660.

CANTON, JOHN (1718–1772), an able natural philosopher, was born at Stroud, Gloucestershire, in 1718. At the age of nineteen, he was articled for five years as clerk to the master of an academy in Spital Square, London, with whom at the end of that time he entered into partnership. In 1746, the science of electricity, which seems early to have engaged Canton's attention, gained a very important addition by the discovery of the principle of the Leyden jar. This event turned the thoughts of most of the philosophers of Europe to that branch of natural philosophy; and Canton, who was one of the first to repeat and pursue the experiment by which the discovery had been made, found his labor rewarded by many valuable discoveries. In 1750 he read a paper before the Royal Society on a method of making artificial magnets, which procured him election as a member of the Society, and the award of its gold medal. The same year he was complimented with the degree of M.A. by the University of Aberdeen; and in 1751 he was chosen one of the council of the Royal Society. Canton was the first in England to verify Franklin's hypothesis of the identity of lightning and electricity, having in 1752 succeeded in attracting the electric fire from the clouds during a thunderstorm. In consequence he prepared a paper, which was read the next year before the Royal Society, on *Electrical Experiments, with an Attempt to Account for their several Phenomena*, in which, among other things, he mentions that he had discovered that some clouds are in a positive and some in a negative state of electricity. About the same time Franklin made a similar discovery in America; and these circumstances gave rise to a lasting friendship between the two philosophers. In 1762 and 1764 he published experiments in refutation of the decision of the Florentine academy, at that time generally accepted, that water is incompressible. These and many other investigations were carried on without any intermission of his work as a schoolmaster, and his too sedentary life brought on dropsy, of which he died on March 22, 1772.

CANTU, or CANTURIO, a town of Italy, in the province of Como, about five miles south of the city of that name, in 45° 44′ 24″ N. lat. and 9° 7′ 49″ E. long. It is surrounded with walls, and possesses a parish church with a very fine tower, a town hall, a hospital, and a theatre. In the neighborhood are iron mines that were wrought in the 10th century. Population, 7429.

CANUSIUM. See CANOSA.

CANUTE, or CNUT (about 995–1035), was the son of Sweyn or Swend, king of Denmark and England. Though only nineteen years of age at his father's death, he was elected by the Danish armament to the English throne (1014). But the English, only recently subdued by Sweyn, did not acquiesce in this disposal of the crown, recalled their old king Ethelred from Normandy, and obliged Canute to withdraw from the country. In the summer of 1015 Canute returned at the head of a vast Danish armament, and had compelled the submission of most of England when Ethelred died, and his son Edmund Ironside became the representative of the old English royal line. In the double election which ensued, Edmund was supported almost solely by London; the Witan of the rest of England decided upon Canute, who had proved himself too formidable a candidate to be set aside. Nevertheless, in five pitched battles fought during the year 1016, Canute found in Edmund more than an equal rival,—a rival, too, that grew more dangerous, as he was recognized to be the champion of the pure English nationality. At length, in the sixth battle, at Assandun in the same year, the English army, weakened and disconcerted by the desertion of Edric, the traitorous earl of Mercia, was completely overthrown. A division of the kingdom was arranged between the two competitors, but Edmund dying soon after, not without suspicion of treachery, even on Canute's part, the latter became sole ruler of England.

His first care on attaining to undivided power was to remove all who might disturb its tranquillity. The sons of Edmund Ironside were sent out of the kingdom, and Edwy his brother was put to death; while Edric of Mercia soon met the fate he deserved, and many other leading men were banished or slain. The sternness of Canute's early measures was, however, more the effect of policy than of a cruel disposition, for in a little time he showed himself a just and beneficent ruler. After exacting a danegeld for the payment of his Danish host, he sent it home with the exception of forty ships and of the household troops that attended on himself. Henceforward he put off the character of conqueror, and governed England like a native Englishman, enforcing the old English laws or enacting wise new ones, repressing disorder, and in every way attending to the interests of his subjects. He was careful of the interests of the church, though it had always been one of the great centres of resistance to Danish invasions, and was not afraid to raise Englishmen, such as Earl Godwin, to the highest posts in his government. A letter written to his English subjects from Rome, to which he had made a pilgrimage, is the best commentary on the motives which directed his reign; he is determined to make amends for the faults of his early years, to persevere in a just and pious government, to repress extortion, and in every way to promote the welfare of his subjects. The internal state of the kingdom was one of unprecedented peace and order, during which it recovered from the ravages and misgovernment of the generation preceding; and he left a happy memory of himself among the people. The well-known story of the rebuke he gave to his flattering courtiers, which rests on excellent authority, is a proof of this; and the well-known song he composed, when rowing near the monastery of Ely, is not only an example of his genial popular sympathies, but entitles him to a place among the creators of English poetry.

He was far more than king of England, however; he was the ruler of a vast northern empire, composed of five or six monarchies, though the old historians differ in the enumeration of them. He succeeded to the usual overlordship over Wales and Scotland, asserting it in the latter case by force of arms. Shortly after his secure installation on the English throne, he superseded his brother Harold on that of Denmark; he repelled an attack of the Wends on his dominions there, and in those early times obtained a rectification of the Danish frontier from the emperor of Germany. Though at first unsuccessful in an invasion of Norway, he added that kingdom to his empire in 1028. He was now one of the most powerful and respected rulers of Christendom. He died at Shaftesbury in 1035, in the fortieth year of his age, and the twentieth of his reign. The best proof of his energy and ability is that the heterogeneous and geographically disconnected empire, which he governed so well, fell to pieces immediately after his death. (Freeman's *History of the Norman Conquest*, vol. i.; Palgrave's *History of the Anglo-Saxons;* Green's *Short History of the English People.*)

CANVAS, a name applied to several kinds of stout cloth, made of hemp or linen fibres, and used for the sails of vessels, the ground of oil paintings, and various other purposes. Originally canvas was made solely from hemp, whence the name, which is corrupted from *Cannabis*, the classical and scientific name for the hemp plant. Being most extensively employed as sail-cloth, the term came to designate the sails of a ship generally, for which, however, although hempen canvas is still used, linen or mixed fibres are now more generally preferred.

CAOUTCHOUC. See INDIA-RUBBER.

CAPE BRETON, an island of British America, to the north-east of Nova Scotia, from which it is separated by a strait about fifteen miles long and a mile wide, known as the Gut of Canceau or Canso. It lies between 45° 27′ and 47° 3′ N. lat., and between 59° 47′ and 61° 32′ W. long.; its length from north to south is about 110 miles, its width about 87 miles, and its area 2,650,000 acres. Except on the north-west, the coast is much broken; and the island is nearly divided into two by the large irregular lakes of Bras d'Or, which communicate with the sea by two chan-

nels on the north-east. The most important bays are Aspee, St. Anne's, Sydney, Mira, Louisbourg, Gabarus, St. Peter's, and Mabou; and the principal rivers are the Denys, the Margarie, the Baddeck, the Wagamatcook, the Mabou, and the Grand. There are several fresh-water lakes, of which Lake Ainslie in the west is the most extensive. The surface of the island is broken in several places by ranges of hills of moderate elevation, and the northern promontory consists of a plateau, which in some parts has a height above the sea of 1200 feet. The prevailing rocks belong to the carboniferous formations, interrupted here and there by igneous or metamorphic upheavals. About the half of the surface is said to be capable of cultivation; but in 1861 there were only 198,550 acres cleared and under tillage. In winter the thermometer sometimes falls to 32° and generally to 20° below zero; while in summer it rises to 96° in the shade, and the mean temperature is about 60°. The commercial resources of the island consist chiefly in its timber, its agricultural productions, its minerals, and its fisheries. Nearly covered with forest at the time of its discovery, it still exports pine, oak, beech, maple, birch, and ash. Oats, wheat, turnips, and potatoes are extensively cultivated; horses, cattle, and sheep are reared in considerable numbers; and cheese and butter form important items in its produce. Coal, limestone, and gypsum are worked, and excellent iron ore and slate are also to be found. Salt-springs of some value exist in different parts. The coal mines, which are chiefly situated towards the south-east, have been worked from an early period. The Bras d'Or Lakes and the neighboring seas supply an abundance of salmon, cod, mackerel, herring, shad, and white-fish, and the fisheries employ about 3000 men. The number of schools in 1861 was 212; and in the same year there were 104 churches. The principal sects are the Roman Catholic Church, which had then 33,386 adherents, and the Presbyterians of the Lower Provinces with 19,982. The inhabitants are now mainly of Scottish descent, with a certain proportion of Acadians and Irish. A few hundred Micmac Indians, who are principally employed in making fish-barrels and butter-firkins, are still to be found. By the census of 1871 the total population amounted to 75,483, of whom 5264 were inhabitants of Sydney. In 1861 and 1851 the numbers were respectively 63,083 and 27,580.

Cape Breton was probably discovered by Sebastian Cabot, and its name is understood to have been bestowed in remembrance of Cap Bréton, near Bayonne, by the Basque sailors who early began to frequent the coast. In 1629 James Stewart, fourth Lord Ochiltree, settled a small colony at Baleine, on the east side of the island; but he was soon after taken prisoner with all his party by Captain Daniell of the French Company, who caused a fort to be erected at Great Cibou (now St. Anne's Harbor). By the peace of St. Germain in 1632, Cape Breton was formally assigned to France; and in 1654 it formed part of the territory granted by patent to M. Denys, who made several small settlements on the island, which, however, had only a very temporary success. When by the treaty of Utrecht (1713) the French were deprived of Nova Scotia and Newfoundland, they were still left in possession of Cape Breton, and their right to erect fortifications for its defence was formally acknowledged. They accordingly transferred the inhabitants of Plaisance in Newfoundland to the settlement of Havre à l'Anglois, which soon after, under the name of Louisbourg, became not only the capital of Cape Breton (or Ile Royale, as it was then called), but also the most important military post in that district of French America. When war broke out in 1744 between France and England, the New England colonists determined to attack the island; and in the following year they succeeded in capturing Louisbourg. By the treaty of Aix-la-Chapelle, the town was restored to France; but in the war that was declared in 1756, it again yielded to the assault of a British force, this time commanded by Admiral Boscawen. On the conclusion of hostilities the island was ceded to England by the treaty of Paris; and on October 7, 1763, it was united by royal proclamation to the government of Nova Scotia. All the troops were withdrawn from Louisbourg in 1768; and when the island was separated from Nova Scotia in 1784, a new capital was founded at the mouth of the Spanish River by Governor Desbarres, and received its name Sydney in honor of Lord Sydney (Sir Thomas Townshend), then secretary of state for the colonies. There was immediately a considerable influx of settlers to the island, which received another important accession by the immigration of Scotch Highlanders from 1800 to 1828. In 1820, in spite of strong opposition, it was again annexed to Nova Scotia. It now sends five members to the Canadian House of Commons.

See Denys, *Description géogr. et hist. des Côtes de l'Amérique septentrionale*, 1672; Pichon, *Lettres et Mémoires du Cap Bréton*, 1760; Richard Brown, *A History of the Island of Cape Breton* 1869, and *The Coal Fields of Cape Breton*, 1873.

CAPE COAST CASTLE, or Cabo Corso, a town of Western Africa, the capital of the British settlements on the Gold Coast, is situated in Upper Guinea, about 70 miles to the W. of Acra, in 5° 5′ 24″ N. lat. and 1° 13′ 38″ W. long. It occupies a low bank of gneiss and micaceous slate, which runs out into the sea and protects the harbor from the violence of the surf. Besides the principal fortress there are two outposts,—Fort Victoria on the west and Fort William on the east. With the exception of the European residences and the houses of the wealthier natives, which are built of brick, the whole of the town is composed of "swish" or mud huts, thatched with rushes, and having the walls white-washed. The population consists mainly of negroes of the Fanti tribe, but there are also a number of mulattoes and a colony of Kroomen. The earliest European settlement on the spot was that of the Portuguese in 1610. In 1652 the Swedes erected the fort of Karlsborg, which was captured by the Danes in 1658, by the Dutch in 1659, and by the English in 1664. Since the last date the post has remained in English possession, in spite of the French attack in 1757 and various assaults by the native tribes. In 1827 the public establishments were withdrawn, and the forts were handed over to the mercantile companies; but in 1844 the Government resumed its possession. The population is estimated at about 10,000.

CAPE COLONY is a large tract of country which forms the most southern part of the continent of Africa, a colony of Great Britain since 1806, named from the Cape of Good Hope, a small promontory on its south-west coast, from the neighborhood of which the Dutch settlers of 1652 spread out over the land. It lies for the most part between 28° and 34° 50′ S. lat., and 16° 30′ and 29° 50′ E. long. West and south are the Atlantic and Indian Oceans; the Orange River forms the boundary of the colony proper on the north, separating it from Great Namaqua Land, the Kalahari desert, and the Orange River Free State; eastward its limit runs from the Tees River, a headstream of the Orange, along the Storm Berg and down the Kei River from its most easterly source-stream to its mouth, which line separates the colony from Free Kaffre Land, and includes within it the divisions of British Kaffraria added to the colony in 1865. Besides this chief area the colony includes various recently added irregular provinces; these are—the agency of *Basuto Land*, annexed in 1871, consisting of the high valleys of the source-streams of the Orange River, sloping down inward from the Drakenberg mountains, which separate this territory from the colony of Natal; *Herschel*, a native district immediately south of Basuto Land; the magistracy of *Nomansland*, including Griqua Land East, a native territory of Northern Kaffraria on the seaward slope of the Drakenberg south-west of Natal; *St. John's Territory*, or the upper basin of the St. John's or Umzimvubo River on the slopes of the Drakenberg in central Kaffraria; *Fingo Land* and the *Idutywa Reserve*, or the Transkeian territories of southern Kaffraria, bounded by the Bashee River; and *Tambookie Land*, between the Bashee and the Umtata. These latter districts were incorporated with the colony in 1875. It is certain that in a few years the whole of what is now Free Kaffre Land will become British territory,[1] when the Cape Colony will be conterminous throughout with Natal on the north-east; and preliminary steps have already been taken for the extension of the western boundary of the colony to include the immense but thinly inhabited region of Great Namaqua Land, which stretches north of the lower Orange River to Walfisch Bay in 23° S.

Plate I.

Limits.

The lieutenant-governorship of *Griqua Land West*, better known as the district of the South African diamond fields, which lies north of the Orange River and west of the Free State, annexed to the British empire in 1871, is strictly a separate dependency of the Crown, but is so intimately connected with the Cape Colony as to be necessarily described along with it.

The extreme breadth of the colony from north to south is about 500 miles, and its length from east to west about 800, its area comprising 230,000 square miles.

Physical features.

The country rises from the sea by a series of terraces, of which the supporting walls are nearly parallel chains of rugged mountains, in-

[1] [In 1889 there were under the British Penal Code the East Griqualand group of Port St. John, Nomansland, and the Gatberg; the Tembuland group; the Transkeian group of Fingoland, Idutywa, and Gcalekaland; and Pondoland; comprising about 17,000 sq. m. and 620,000 people.—Am. Ed.]

terseeted by deep ravines, rising to a eentral and highest range, whieh divides the drainage of the coastal streams from that of the inner tributaries of the Orange River in the north. The eentral range follows a eurve almost identical with that of the eoast, at a general distanee of about 100 miles from the oeean; from the borders of Natal westward it is known in different portions as the Kahlamba or Drakenberg, the Storm Berg, Zuur Berg, Sneeuw Berg, Winter Berg, Nieuweveld, and Roggeveld. In height its summits appear to average nearly 6000 feet, the highest points being Cathkin peak, 10,300 feet, in the extreme north-east eorner of the eolony; Compass Berg, in the Sneeuw Berg, 8300 feet; and Bulbhouders Bank, in the Nieuweveld Range, which is 7300 feet above the sea. North of this dividing range the inner eountry slopes gradually to the Orange River, eentral Bushmanland being a plateau of from 3000 to 4000 feet above the sea. The numerous outer ranges, whieh form the margins of the terraees that fall towards the ocean, are separated from the central range throughout the greater part of the colony by the arid plateau known as the Great Karroo, nearly 300 miles in length and 60 miles in width north to south, and at an elevation of about 3000 feet above the sea; their general direction is always that of the eoast, and they are cut aeross at intervals by rugged gorges or "kloofs" through whieh the periodical torrents of the coastal watershed escape to the sea. Two chief ranges may be distinguished, an inner and an outer,—the former having the names of Zwarte Berg, Witte Berg, and Cedar Berg, along a great part of its length, the latter being most prominent in the Outeniqua, Zondereinde, Drakenstein, and Olifant Bergen, rising from the south and west eoasts. Some points of the inner coast range exeeed 7000 feet in altitude, and the outer line appears to average about 4000 feet. In Namaqua Land, in the north-west of the eolony, the eentral and outer ranges, approaehing one another and deereasing eonsiderably in height, continue in an irregular series of ehains to the lower Orange River. Within the central range, in Bushmanland, the most remarkable elevations are the chains of isolated flat-topped hills whieh rise direetly from the plains of the Fraserburg and Vietoria west distriets known as the Karree and Praam Bergen. The Tafel Berg or Table Mountain, the well-known landmark of the coast, and the nueleus of the peninsula of the Cape of Good Hope, rises to 3582 feet. Though the mountains of the colony and the plateaus between them present bold and picturesque outlines of sharply-defined ranges and vast level plains, the landseape, exeepting in the coastal districts, is bare and uninviting, and deficient in water and tree-growth.

Soil. Nearly two-thirds of the surfaee of Cape Colony consists of vast arid plains, covered, however, with shallow beds of the richest soil, whieh only requires the fertilizing power of water to render it available for pasture or agrieulture. After the periodieal rains, the plateau of the "Karroo" and the great plains of Bushmanland present the appearanee of vast fields of grass, but the summer sun reduees them again to a barren and burnt-up aspeet. The pastoral lands or "velds," which extend chiefly around the outer slopes and in the east, are distinguished according to the nature of the grass or sedge which they produce as "sweet" or "sour." Shallow sheets of water termed "vleis" aeeumulate at many places in the flat lands of the interior after rains; and in the dry seasons these spots, where the soil is not excessively saline, are covered with rich grass and afford favorite grazing land for cattle. Only in the extreme southern coastland of the colony is there a soil and moisture-supply suited to forest growth, and the first requisite of every settlement in the interior is the formation of a "dam" or reservoir for the colleetion and saving of a water-supply. Out of an area of upwards of 40 millions of aeres of oeeupied lands, according to the census returns of 1865, only 460,000 aeres were then under eultivation.

Geology and minerals. Geologieal knowledge of the vast territory of the colony is as yet imperfect, though sufficient data have been eollected to enable the general features of the strueture of the land to be mapped (A. G. Bain, *Memoirs on the Geology of the Cape;* Dunn's *Geological Map of the Cape;* Griesbach and Stow in the *Quarterly Journal of the Geological Society*, &c.). The following are some of the more striking general features. The whole basis formation of the western province is considered to be granite, lower but more recent than the clay-slate whieh rests upon it. A remarkable band of porphyritie rock has been traeed along the whole of the eountry between British Kaffraria and the Bokkeveld Mountains in the west, a distanee of more than 600 miles. A series of sandstone roeks form the ehains of the Zwarte and Lange Bergen. The "Karroo beds," the name given to formations whieh eover that plateau and the eountry northward to beyond the Orange River, are believed from the abundanee of fossil wood and fresh-water shells to be of laeustrine origin, and eontain reptile remains of most remarkable charaeter, unknown elsewhere. In the eastern provinee, one of the most interesting features of the geology is that of the beds of water-worn pebbles, many hundreds of feet above the present sea-level; indeed there appears to be no doubt that a proeess of upheaval is still in progress along the whole South Afriean eoast, where modern raised beaehes, eoral reefs, and oyster banks may everywhere be seen. Slight shoeks of earthquake have been experieneed at various times in the south-western region of the colony. There are reeords of these in 1739, 1766, 1809, 1811, and 1844. Namaqua Land, north as well as south of the Orange River, is a region eomposed of the older roeks, gneiss and sehists, and is famous for its eopper deposits. These appear to have been known as early as 1683, and have attraeted attention at various subsequent periods, but it was not till 1863 that any well-direeted efforts were made for the extraetion of the eopper; at the present time the famous mine of Ookeip in the distriet of Springbokfontein yields an average of 7000 tons of ore each year. Copper is also known to exist in the Amapondo eountry of Kaffraria. Silver has also been diseovered in Namaqua Land, but has not yet been sueeessfully worked. Coal seams are known both in the Storm Berg in the extreme east and in the eentral distriet of Beaufort, but not in easily workable situations.

The diseovery of diamonds north of the Orange River, an event which gave great impetus to all affairs of the eolony, was made in 1867, and in the following years people from all parts of the world floeked to the fields. These lie in the eastern portion of the territory known as Griqua Land West, whieh, as a eonsequenee of the diseovery, was annexed to the British empire in 1871. The mining has now beeome a settled industry, with its aeeompaniment of a fixed population and rapidly-growing towns. The fields extend between the lower Vaal River and its tributary the Modder; in this region the diamond-produeing roek is found in fragments mingled with the detritus of other rocks, oeeupying various depressions known as "pans," or in the deep torrent beds of the rivers. The diggings are thus distinguished as the *wet*, whieh lie ehiefly along the lower Vaal river, and have been almost abandoned, and the *dry* mines, about Kimberley, Du Toits pan, and Bulfontein, farther south. One of the largest diamonds at first discovered in this region weighed 83 carats, and realized £11,000; several much larger ones have since been found, one of more than 200 earats. Iron ores, hematite, and magnetite abound also in this region; the deficieney of fuel alone prevents the working of mines of great richness.

Rivers. We have seen that the great water-parting mountain ehain of the colony passes through the centre of the eountry in a curve parallel to the coast line, from the inner border of Natal to near the western Atlantic eoast, forming an outward watershed to the sea of about 100 miles in width, and an inner shed to the Orange River. The streams of the outer shed are eonstant only in the extreme east of the country; towards the south-west and on the Atlantic eoast land their supply is irregular. All partake of the charaeter of mountain torrents,—having numerous falls, flowing in deeply-cut ehannels, and being low and feeble (in some eases dry) for the greater part of the year, but swollen and rapid in rainy weather. From east round to west the chief are the Kei, Great Fish, Zondag, Gamtoos, Gauritz, Breede, Berg, and Olifant; of these only two are navigable for a short distanee,—the Breede for small vessels for 30 or 40 miles from its mouth, and the Berg for a few miles from St. Helena Bay, on the Atlantic eoast. The Orange River, or Gariep, to which the inner shed of the eolony drains, rises in the Drakenberg on the border of Natal in the extreme north-east of the colony, and flows westward for about 900 miles to the Atlantie. Its basin ineludes an area of upwards of 400,000 square miles, but the greater portion of this

belongs to the arid deserts of the Kalahari and of Bushmanland. Below its confluence (in about 24° E. long.) with its chief affluent, the Vaal, from the north-east, it has no permanently flowing tributary, receiving only the occasional supplies of the torrent channels which are cut deep in the plateaus and filled only after thunder showers,—so that its volume decreases very much in its passage westward. Its upper valleys are very rugged and have been little explored; the region about the confluence of the Vaal is low and alluvial; but from this to the sea the river is hemmed in by steep and precipitous cliffs, and broken by immense walls of rock which cause formidable cataracts: of these the fall named Aukurubies (in 20° 40′ E. long.), 150 feet in height, is the greatest. The Orange is not navigable excepting for boats for a few miles above its mouth, which is barred.

Lakes are unknown in Cape Colony. Springs are frequent, and in sandstone districts afford excellent water, but in the Karroo country they are generally brackish. Hot or mineral springs occur in several districts.

Coasts and harbors.

The southern coastland of the colony is generally bold and rocky, the mountains often approaching the shore; the Atlantic coast, on the other hand, is for the most part low and sandy. The great ocean currents—viz., the Mozambique current which sweeps down round the south of the Cape Colony, and is deflected there over the great bank of Agulhas, the submarine apex of the continent, and the South Atlantic current flowing northward past the Cape peninsula—give rise to many local and minor currents in opposing directions close to the coast, forming great obstacles to navigation.

The coast is indented by various bays and inlets; few of these, however, afford convenient harbors, and the only one which is naturally safe in all winds is that of Saldanha Bay on the Atlantic. From eastward round to west, the chief points at which commerce reaches the coast are—the port of East London, at the mouth of the Buffalo River in British Kaffraria, in which extensive harbor works are being constructed; Port Alfred, or the Kowie mouth, which estuary has also been rendered more commodious by engineering operations; Port Elizabeth, in Algoa Bay, the second port of the colony in point of trade, but with many natural disadvantages; Plettenberg Bay, of importance in coasting trade; the Knysna, a land-locked estuary in 23° E.; Mossel Bay; False Bay, a wide gulf formed by the peninsula of the Cape of Good Hope, and containing within it the well-sheltered naval station of Simon's Bay; Table Bay, the harbor of Cape Town, which has been rendered safe by the construction of a great breakwater and docks; Saldanha Bay, little visited, but one of the finest natural harbors in the world; and Port Nolloth, the copper port of Namaqua Land, and the terminus of a railway from the mines. Angra Pequeña Bay, in 26° 40′ S., a British possession on the barren Atlantic coast north of Cape Colony, was formerly visited in obtaining cattle, while the now nearly exhausted guano deposits of Ichaboe and Possession Islands, north and south of it, were being worked. Walfisch Bay, in 22° 50′ S., up to which point it is anticipated that the colonial territory will shortly be extended, is an inlet on a desolate waterless coast, affording secure anchorage, and formerly much visited by American whaling ships. Lighthouses are maintained at various ports and headlands on the coast.

Climate and meteorology.

In general character the climate of the Cape Colony is dry, highly salubrious, and milder than that of England; the atmosphere is clear and buoyant. So extensive, however, is the country, and so diversified in aspect and elevation, that there are naturally many varieties of climate within its limits. As far as moisture is concerned there is a gradual diminution from east to west across the country; the prevailing winds in the interior are from eastward, and the moisture they draw from the Indian Ocean being expended in great part on the eastern slopes and mountain ranges, the western interior districts are left almost rainless. In the eastern divisions heavy rains and thunderstorms moderate the intense heat of summer, and keep the face of the country fresh and green. The winters are cold, but the air is then clear and agreeable. At Graham's Town the average annual temperature is 63°, ranging from upwards of 100° to a minimum of 35°, and the annual rainfall is about 33 inches. The south-western margin of the country outside the edge of the great Karroo plateau is for eight months of the year supplied with rain showers by westerly ocean winds. In summer (December, January, February) the dry south-east trade winds blow with great violence. The mean temperature of the year at the Cape of Good Hope is about 62°, attaining a maximum of 100° and a minimum of 34°, the average annual rainfall being 24 inches. At Worcester, on the inner border of this region, the yearly rainfall decreases to 12 inches.

The low coast region in the extreme west is subject to great droughts and extreme range of daily temperature; though it seldom rains there, dense fogs arise at dawn. The climate of the great Karroo plateau, which is about 3000 feet above the sea, is also characterized by severe droughts, by excessive heats during the day in summer, by cold nights, and by sharp cold in winter. Within the water-parting mountains the plains stretching to the Orange River, though also subject to long periods of drought, have a salubrious climate, which is clear and bracing in winter; while in summer the violent thunderstorms, which occur on an average every three or four days along the mountain ranges, render the air cool and pleasant, filling the water-channels and "vleis," and reviving vegetation. Hot, dry winds from the northern deserts sometimes prevail for two or three days at a time in the central and eastern districts of the interior. Snow seldom falls in the coast region, but in the higher mountain tracts it lies for three or four months in the year. The summit of Table Mountain is occasionally sprinkled with snow for a day or two. Hail-storms are rare, but are of great violence after long droughts. The phenomenon of the mirage is common, both on the coast and in the heated plains of the interior.

Ophthalmia and rheumatism are perhaps the only diseases of the colony which are at all prevalent; low fevers are common on the flat western coastlands.

Vegetation.

Though much of the land of the colony is dry and barren, the flora of the more fertile portions is remarkable and varied. We have seen that the forests are confined to the outward slopes of the extreme margins of the colony,—the only patches of wood deserving the name being found in the Cedar Berg in the west, on two sides of Table Mountain, on the Outeniqua mountains facing the south coast, on the Olifants Hoek near Port Elizabeth, in the vicinity of King William's Town in British Kaffraria, and in the district of the Katberg or Stockenstroom farther inland. The inner slopes of Griqua Land East are also wooded. These patches of forest contain a great variety of useful woods, affording excellent timber; among the commonest trees are the yellow wood, which is also one of the largest, belonging to the yew species; black iron wood; heavy, close-grained, and durable stinkhout; melkhout, a white wood used for wheelwork; nieshout; and the assegai or Cape lancewood.

In no other country do bulbous plants and heaths exhibit so many beautiful varieties; of the latter several hundred varieties are described. Of pod-bearing plants there are upwards of eighty genera; Cape "everlasting" flowers (generally species of *Helichrysum*) are in great numbers. Several species of aloe are indigenous to the Cape, and form a considerable article of export. The so-called American aloe has also been naturalized. The castor-oil plant and many other plants of great value in medicine are indigenous in great abundance. Among Cape plants which are remarkable in their appearance and structure may be noted the cactus-like Euphorbiæ or spurge plants, the *Stapelia* or carrion flower, and the elephant's foot or Hottentot's bread, a plant of the same order as the yam. Hooks, thorns, and prickles are characteristic of many South African plants. There are few indigenous fruits; the kei apple is the fruit of a small tree or shrub found in Kaffraria and the eastern districts, where also the wild and Kaffre plums are common; hard pears, gourds, watermelons, and species of almond, chestnut, and lemon are also native. Almost all the fruits of northern and southern Europe have been introduced, and grow in abundance. It is doubtful whether or not a species of vine is indigenous to the Cape, but the cuttings of French vines introduced by the Huguenots who emigrated to the colony on the revocation of the Edict of Nantes, between 1685 and 1688, have given rise to an extensive culture in the south-western divisions of the colony, the grapes being among the finest in the world. The Cape wines, the export of which has revived of late years, are chiefly those known as Constantia, Pontac, Steen, and Hanepoot.

Of the cereals, wheat is grown throughout the colony, but chiefly in the low marginal division of the south-west and in the eastern midland districts; barley and oats are general. Rye gives its name to the Roggeveld in the west, and is chiefly grown there and in the lower hills of Namaqua Land; maize and millet are cultivated in all moist situations of the north-east of the colony. Rice might be extensively cultivated, and flourishes on the inundated banks of the Olifants River in the west; the growth of potatoes has been much extended; melons, cucumbers, beans, and pease are grown universally where there is water. Cotton has been introduced experimentally in some districts; the cultivation of tobacco is widespread, that of the division of George, grown in the valley of the eastern Olifants River, being most reputed.

Animals. The larger and more important of the wild animals which once gave the Cape Colony the character of the great hunting-ground of the world have retreated before advancing civilization, and few are now found within the frontier. The lion is only to be met with now in the northern districts of Bushmanland and in the extreme north-eastern portion of the colony, and rarely in British Kaffraria. The elephant, which also abounded at the time of the first Dutch settlement, is now almost extinct in the colony, a few only existing in the forests between Knysna and the Zondag River in the extreme south. The rhinoceros and giraffe have been driven far outside the frontier. Hippopotami are only found in the coast rivers of British Kaffraria and in the lower Orange River. The buffalo remains only perhaps in the Knysna forests and in the thickets of Great Fish River. The Cape leopard, the hyena, the aard wolf or *Proteles*, and the jackal alone keep their ground, and are still common in the colony. Quaggas and zebras are met with in large herds in the plains of the Vaal, and sometimes extend into the colony as far as the divisions of Cradock and Graaf Reinet, where the gnu, hartebeeste, and brindled gnu are also seen. Of the many varieties of South African antelope the larger kinds—the eland, koodoo, and sable and roan antelopes—are now banished from the colony, though the smaller varieties are found along the coast region, and migratory herds of springbok invade the plains of Bushmanland and Little Namaqua Land at certain seasons. Ostriches, once numerous, are still thinly scattered over the colony, though the supply of feathers is now mainly derived from regions north of the Orange River. Ostrich farming and artificial incubation, carried on in the northern, western, and eastern divisions, have, however, become of late years one of the most profitable industries of the Cape, the feathers being worth from £30 to £60 per lb.

Birds of prey, including the bearded vulture, aasvogel, and several varieties of eagles, hawks, and falcons, are numerous; cranes, storks, flamingoes, and pelicans are in large variety; partridges and pheasants, guinea fowl, and quails abound. The bustard is found in several kinds, as well as ducks, wild geese, and plovers.

Upwards of forty varieties of edible fishes are caught in the seas surrounding the Cape Colony, the waters of which also teem with whales, seals, and sharks. Reptiles are exceedingly numerous; among the venomous snakes are the cobra di capello and the puff adder; large toads and frogs are also common, as are scorpions, tarantula spiders, hornets, and stinging ants.

Sheep, cattle, and dogs of an inferior breed were possessed by the natives on the discovery of the country. Horses, asses, goats, and cattle, introduced by the earlier colonists, were found to thrive well. The merino breed of sheep is now rapidly taking the place of the big-tailed sheep of the Dutch settlers; and some of the central divisions have immense sheep farms, producing the wool which is the great staple of the country's export trade. The angora goat is now extensively farmed, the hair being largely exported. Cows of the finest breeds have also been imported; the introduction of the English horse does not, however, appear to have been successful, the older, heavier Spanish breed being better adapted to the wants of the country.

The numbers of live stock in the Cape Colony and its native districts are estimated thus for 1875:—

Sheep	11,500,000
Draught Oxen	500,000
Other horned Cattle	900,000
Horses	257,000
Mules and Asses	29,500
Angora Goats	1,000,000
Common Goats	2,300,000
Pigs	120,000
Ostriches	22,250

History. The Cape of Good Hope was discovered by Bartholomew Diaz, the Portuguese navigator, in 1486. He first landed at Algoa Bay, having, after exploring the west coast, been driven out to sea by a storm. Thus accidentally doubling the Cape, he saw it on his way back, and gave it the name of the Cape of Storms (Cabo Tormentoso).

The king of Portugal, however, gave it the more auspicious name it now bears, as its discovery afforded a hope of a new and easier way of reaching India, the great object of all the maritime expeditions of that age.

The great navigator Vasco de Gama doubled the Cape in 1497, and carried the Portuguese flag into the Indian seas. His countrymen, however, attracted by the riches of the East, made no permanent settlement at the Cape, although they frequently touched there on the voyage to India. But the Dutch, who, on the decline of the Portuguese power, established themselves in the East, early saw the importance of the place as a station where their vessels might take in water and provisions. They did not, however, colonize it till 1652, when the Dutch East India Company directed Jan Van Riebeeck, with a small party of colonists, to form a settlement there. The country was at that time inhabited by a people called Quæquæ, but to whom the Dutch seem to have given the name of Hottentots. The Riebeeck settlers had at first great difficulties and hardships to endure, and their territory did not extend beyond a few miles round the site of the present Cape Town, where they first fixed their abode. They gradually, however, extended their limits by driving the natives back or reducing them to serfdom. These colonists, although under Dutch authority, were not wholly of that nation, but consisted partly of persons of various nations, especially Germans and Flemings, with a few Poles and Portuguese. They were for the most part people of low station or indifferent character; there was, however, a small number of a higher class, from whom was selected a council to assist the governor. About the year 1686 the European population was increased by a number of the French refugees who left their country on the revocation of the Edict of Nantes. Our limits forbid our attempting to trace the history of the Cape Colony during the lengthened period it remained under the Dutch Government. We may, however, mention some of its prominent incidents, the effects of which are visible in the colony to this hour.

1*st*, The Dutch, partly by so-called contracts, partly by force, gradually deprived the Hottentots of their country. 2*d*, They reduced to slavery a large part of that unfortunate people whom they did not destroy. 3*d*, They introduced a number of Malays and negroes as slaves. 4*th*, They established that narrow and tyrannical system of policy which they adopted in other colonies, prescribing to the farmers the nature of the crops they were to grow, demanding from them a large part of their produce, and harassing them with other exactions tending to discourage industry and enterprise. There is no doubt that to this mischievous policy is due the origin of those unsettled habits, that dislike to orderly government, and that desire to escape from its control, which characterize a considerable part of the so-called Dutch boers of the present day,—qualities utterly at variance with the character of the Dutch in their native country, which were strongly manifested at the Cape, long before they came under British rule and under those influences to which some exclusively attribute the insubordination of those men. The attempts of the boers to escape from the Dutch power, and so form an independent government beyond the borders of the colony, especially in the district since called Graaf-Reinet, are strikingly similar to their proceedings at a later date under the British Government. 5*th*, The Gamtoos River formed the boundary between the Hottentot and Kaffre races, and was early adopted by the Dutch as their eastern limit; but about the year 1740 they began to pass this river, and came into collision with the Kaffres, and in 1780 they extended their frontier to the Great Fish River.

In 1795 the colonists, having imbibed the revolutionary principles then prevailing in Europe, attempted to throw off the yoke of the Dutch, upon which the British sent a

CAPE COLONY

18
20
22
24
26
28
30
32
34
Longitude East 24 of Greenwich
British Miles
Great Bushmanland
Little Bushmanland
Bushmen or San
Namaqualand
Hardeveld
Karroo
Bush
Trekveld
Orange Free State
Basutoland
Griqua Land West
Griqua Town (Hay)
Hay
Barkly
Herbert
Hopetown
Kimberley
Beaufort West
Victoria West
Richmond
Carnarvon
Fraser
Middelburg
Colesberg
Aliwal North
Smithfield
Fauresmith
Bloemfontein
Winburg
Harrismith
Ladybrand
Wodehouse
Albert
Willowmore
Graaff Reinet
Aberdeen
Somerset East
Cradock
Queenstown
Barkly East
Wodehouse
Malmesbury
Worcester
Robertson
Caledon
Swellendam
George
Uniondale
Knysna
Humansdorp
Port Elizabeth
Alexandria
Bathurst
Albany
Peddie
Victoria East
Kentani
Umtata
Tambookie
Transkei
Kei R.
Great Fish R.
Orange R.
Vaal R.
Modder R.
Riet R.
Caledon R.
Olifants R.
Breede R.
Gamka R.
Touws R.
Doorn R.
Zwartkops R.
Sundays R.
Great Brak R.
Keiskamma R.
Buffalo R.
Kabousie R.
Bushman R.
Cape of Good Hope
False Bay
Table Bay
Saldanha Bay
Algoa Bay
Cape Town
Port Elizabeth
Kimberley
Hopetown
Griquatown
Prieska
Upington
Calvinia
Namaqualand
Port Nolloth
Springbokfontein
Copper Mine
Vioolsdrift
Kenhardt
Prieska
Carnarvon
Victoria West
Beaufort West
Prince Albert
Oudtshoorn
George
Knysna
Humansdorp
Port Elizabeth
Uitenhage
Graaff Reinet
Aberdeen
Cradock
Somerset East
Queenstown
Barkly East
Wodehouse
Aliwal North
Smithfield
Fauresmith
Bloemfontein
Winburg
Harrismith
Ladybrand
Basutoland
Malmesbury
Worcester
Robertson
Caledon
Swellendam
Cape Town
Table Bay
Saldanha Bay
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Algoa Bay
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Albany
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Kei R.
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Caledon R.
Olifants R.
Breede R.
Gamka R.
Touws R.
Doorn R.
Zwartkops R.
Sundays R.
Great Brak R.
Keiskamma R.
Buffalo R.
Kabousie R.
Bushman R.
Atlantic Ocean
Indian Ocean
Nelsons Fontein
Harigelonja
Bloemhof (Diamonds)
Hoopstad
Mareyberg
Daniels Kuil
Platberg
Hebron
Campbell
Kimberley
Du Toits Pan
Jacobsdaal
Belmont
Langford
Ramah
Hope Town
Faures Nath
Bethlehem
Harrismith
Ladybrand
Thaba Nchu
Moroko's
Mequatling
Ebenezer
Smithfield
Philippolis
Colesberg
Jackals Fontein
Burghersdorp
Barkly
Lehana
Dordrecht
Cradock
Graaff Reinet
Aberdeen
Somerset East
Queenstown
Barkly East
Wodehouse
Alexandria
Bathurst
Albany
Peddie
Victoria East
Kentani
Umtata
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Kei R.
Great Fish R.
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Breede R.
Gamka R.
Touws R.
Doorn R.
Zwartkops R.
Sundays R.
Great Brak R.
Keiskamma R.
Buffalo R.
Kabousie R.
Bushman R.
Atlantic Ocean
Indian Ocean

fleet to support the authority of the Prince of Orange, and took possession of the country in his name. As, however, it was evident that Holland would not be able to hold it, and that at a general peace it would be made over to England, it was ruled by British governors till the year 1802, when, at the peace of Amiens, it was again restored to Holland. In 1806, on the renewal of the war, it was again taken by the British under Sir David Baird, and has since remained in their possession, having been finally ceded by the king of the Netherlands at the peace of 1815. At this time the limit of the colony was formed by the Great Fish River and the line of the mountains south of Bushmanland to the Buffels River and the Atlantic, the area being about 120,000 square miles, and the population little over 60,000. A summary may be given of the chief events which have taken place since 1806:

1*st*, *The Kaffre Wars.*—The first of these wars took place in 1811–12, and the second in 1819, when the boundary of the colony was extended to the Keiskamma. The third occurred in 1835, under Sir Benjamin D'Urban, when the boundary was advanced to the Kei; but on the recall of that officer the country between the Kei and Keiskamma rivers was restored to the Kaffres. The fourth Kaffre war took place in 1846, and after being conducted by governors Maitland and Pottinger, it was terminated by Sir Harry Smith in 1848. The fifth war broke out at the end of 1850, and after being for some time carried on by Governor Sir H. Smith, it was conducted in 1852 by Governor Cathcart, and brought to a conclusion only in March, 1853. During its progress an armed police had been organized for the protection of the frontier, and British Kaffraria was subsequently formed into a Crown colony, reserved at first for occupation by Kaffres. A somewhat more detailed account of these wars will be found under the heading KAFFRARIA.

2*d*, In 1820, British emigrants, to the number of 5000, arrived at Algoa Bay, and laid the foundation of the settlements on the eastern frontier which have since become the most thriving part of the colony, including the important towns of Graham's Town and Port Elizabeth.

3*d*, In 1834 the great measure of slave emancipation took effect in the Cape Colony. It has been of immense service in raising the character and condition of the Hottentots and other races before held in bondage, though many of the vices begotten by the state of slavery still adhere to them. This measure gave great offence to the Dutch boers of the colony, and completed their already existing disaffection to the British rule.

In 1835–6 a large number of these people resolved to free themselves from the British Government by removing with their families beyond the limits of the colony. With this object they sold their farms, mostly at a great sacrifice, and crossed the Orange River into territories inhabited chiefly by tribes of the Kaffre race. After meeting with great hardships and varied success in their contests with the natives, a part of their number, under one Peter Retief, crossed the Drakenberg Mountains and took possession of the district of Natal, where they established a republican government, and maintained their ground against powerful nations of Zulu Kaffres till 1842, when they were forced to yield to the authority of the British Government, which took possession of Natal.

The boers beyond the Orange River and west of the Drakenberg still, however, retained a sort of independence till 1848, when, in consequence of the lawless state of the country, and the solicitation of part of the inhabitants, the governor, Sir Harry Smith, declared the supremacy of the Crown over the territory, which was thenceforth called the Orange River Sovereignty. Shortly after this, in consequence, it was alleged, of certain acts of the British Government in Natal, Andrew Pretorius, an intelligent boer of that district, crossed the Drakenberg Mountains with his followers, and after being joined on the western side by large numbers of disaffected boers, raised the standard of rebellion. Upon this the governor, Sir H. Smith, crossed the Orange River at the head of a detachment of troops, and encountered and defeated the rebels in a short but brilliant skirmish at Boem Plaats. After this Pretorius and the most disaffected part of the boers retreated to beyond the Vaal River (the northern limit of the sovereignty), where they established a government of their own. They were subsequently, in 1852, absolved from their allegiance to the British Crown by treaty with the governors and her Majesty's commissioners for settling frontier affairs.

In 1853–54, in consequence of the troubled state of the Orange River Sovereignty, and the difficulty of maintaining with becoming dignity the authority of her Majesty there, it was resolved to abandon the country to the settlers, mostly Dutch boers. This was carried into effect by a special commissioner, Sir George Clerk, sent from England for the purpose; and the country, under the name of the Orange Free State, is constituted a republic, with a president at its head, assisted or controlled by an assembly called the Volksraad (people's council) elected by nearly universal suffrage.

4*th*, *The Convict Agitation.*—After the British Government had felt itself compelled to discontinue the sending of convicts to New South Wales and Van Diemen's Land, the subject of transportation became one of great difficulty, the more so that an unusually large number of prisoners was then on its hands in consequence of the prosecutions arising out of the disturbed state of Ireland. Under these circumstances an Order in Council was passed in 1848, under authority of the Act of 5 Geo. IV., authorizing the secretary of state to send certain convicts to such colonies as he might think proper. A circular was sent by Earl Grey, then colonial secretary, to the governor of the Cape (among other colonial governors), requesting him to ascertain the feelings of the colonists regarding the reception of a certain class of convicts. Unfortunately, owing to some misunderstanding, a vessel, the "Neptune," was despatched to the Cape before the opinion of the colonists had been received, having on board 289 convicts, among whom were John Mitchell, the Irish rebel, and his colleagues. When the news reached the Cape that this vessel was on her way, the people of the colony became violently excited; and goaded to fury by the inflammatory articles in the local newspapers, and guided by a few demagogues, they established what was called the *Anti-Convict Association*, by which they bound themselves by a pledge to cease from all intercourse of every kind with persons in any way connected "with the landing, supplying, or employing convicts." On the 19th of September, 1849, the "Neptune" arrived in Simon's Bay; and when the intelligence reached Cape Town, the people assembled in masses, and their behavior was violent and outrageous in the extreme. The governor, after adopting several resolutions, and again abandoning them under the pressure of popular agitation, agreed not to land the convicts, but to keep them on board ship in Simon's Bay till he received orders to send them elsewhere. Even this concession did not satisfy any but a small number of more moderate men. The mass of the population, under the guidance or domination of a few agitators, continued to do all in their power to prevent the convicts and all the officers of the Government from obtaining supplies. When the Home Government became aware of the state of affairs it immediately sent orders directing the "Neptune" to proceed to Van Diemen's Land, and the agitation ceased. This agitation did not, however, pass away without important results, since it led to another movement, the object of which was to obtain a free representative government for the colony. This concession, which had been previously promised by Lord Grey, was granted by her Majesty's Government, and, in 1853, a constitution was established of almost unexampled liberality.

5*th*, In 1857 an almost incredible delusion arose in the Amaxosa tribe of British Kaffraria. It was predicted among them that, on condition of a complete sacrifice of their lives and property, a resurrection would take place on a certain day, in which all the dead warriors and great men of the nation would arise in new strength; and acting upon this faith nearly a third of the tribe, or about 50,000, perished in a national suicide. The tracts thus depopulated were afterwards peopled by European settlers, among whom were many of the German legion which had served with the English army in the Crimea, and a body of upwards of 2000 industrious North German emigrants, who proved to be a valuable acquisition to the colony.

6*th*, Public works in the colony marked an era in the opening, in November, 1863, of the railway from Cape Town to Wellington, begun in 1859, and, in 1860, of the great breakwater in Table Bay, long needed on that perilous coast. In 1865 the province of British Kaffraria was incorporated with the colony, under the title of the Electoral Divisions of King William's Town and East London. In the same year several important modifications of the constitution were adopted.

7*th*, The discovery of diamonds in the districts north of the Orange River in 1867 drew the attention of the whole world to the colony, and gave new life and impetus to every branch of industry, leading to the annexation of the large territory of Griqua Land West to the British Crown. The Basutos, a division of the Bechwana Kaffres, occupying the upper valleys of the Orange River, had subsisted under a semi-protectorate of the British Government from 1848 to 1854; but having been left to their own resources on the abandonment of the Orange Sovereignty, they fell into a long exhaustive warfare with the boers of the Free State. On the urgent petition of their chief Moshesh, they were proclaimed British subjects in 1868, and their territory became part of the colony by Act of Government of 1871.

8*th*, More recently, in 1874 and 1875, large areas of southern and northern Kaffraria, the Transkei territories of the Fingo and Tambookie tribes, and the territory of Griqua Land East on the southern border of Natal, have also come under British rule by the free consent of their inhabitants. At the present moment attention is strongly directed towards the consolidation of the European states of South Africa, and the introduction of greater unity in their hitherto conflicting systems of govern-

ment, with a view to the more complete development of their great natural resources.

A sum of five millions sterling voted by the Government is now (1876) being expended in the construction of four trunk lines of railway:—one extending the already existing line from Cape Town, two from Port Elizabeth, and one from East London. The telegraphic wire now connects Cape Town with Port Elizabeth, Grahamstown, King William's Town, East London, Queenstown, Beaufort West, Graaf Reinet, Cradock, Colesberg, and Kimberley in the diamond fields. Five steamers now run between England and the Cape each month.

Divisions and chief towns.

Until the year 1873, the colony was divided for the purposes of administration and election of members for the Legislative Council into two provinces, a western and an eastern; but with the growth of the colony these were found to be inconveniently large, and by an Act of Government, which became law in 1874, the country was portioned out into seven *provinces;* at about the same time some new *divisions* were formed within them by the reduction of those already existing. Space does not admit of a special description of each of these divisions; the following table, however, shows their approximate area and the increase of their population from the date of the first census in 1865 to that of 1875. The *native districts* recently added to the eastern side of the colony are governed by Government agents and resident magistrates, who are under the direction of the secretary for native affairs in Cape Town.

Provinces, Divisions, and Native Districts.	Area[1] in square miles.	Population. Census 1865.	Population. Census 1875.
WESTERN PROVINCE:			
Cape Town	10	28,457	32,907
Green Point		908	1,426
Robben Island		458	552
Cape Division	598	20,241	22,859
Stellenbosch	457	8,917	10,541
Paarl	646	15,583	18,114
NORTH-WESTERN PROVINCE:			
Malmesbury	2,037	14,572	18,214
Piquetberg	1,675	6,037	8,218
Worcester	5,975	7,704	9,801
Tulbagh	5,328	8,695	9,943
Clanwilliam	7,420	7,041	8,404
Calvinia	20,017	8,521	7,452
Namaqua Land	18,200	10,071	12,351
SOUTH-WESTERN PROVINCE:			
Caledon	2,150	9,900	11,303
Bredasdorp	1,485	4,169	4,285
Swellendam	1,941	9,964	10,005
Robertson	2,283	6,155	7,986
Riversdale	2,855	10,665	12,725
Oudtshoorn	1,922	12,077	15,129
George	2,779	10,658	11,766
Mossel Bay	761	4,276	5,059
Knysna	1,008	2,471	3,188
MIDLAND PROVINCE:			
Beaufort West	11,417	5,828	8,314
Prince Albert	3,512	5,983	6,187
Victoria West	10,656	8,656	13,251
Fraserburg	27,666	8,293	8,996
Richmond	4,090	6,090	7,607
Hope Town	2,702	4,349	6,144
Murraysburg	3,044	2,940	3,778
Graaf Reinet	4,567	14,695	16,774
SOUTH-EASTERN PROVINCE:			
Albany	2,037	16,264	16,441
Bathurst	419	4,867	5,803
Port Elizabeth	236	11,633	14,450
Uitenhage	5,823	18,148	21,467
Humansdorp	2,702	7,876	7,298
Alexandria	1,180	6,655	6,020
Victoria East	419	8,292	7,970
Peddie	572	18,796	16,538
NORTH-EASTERN PROVINCE:			
Fort Beaufort	837	13,341	15,657
Stockenstroom	125	5,647	6,499
Somerset East	3,253	10,593	10,858
Bedford	1,393	8,350	8,636
Cradock	4,758	12,228	11,313
Albert	3,045	9,802	11,522
Middelburg	2,664	4,645	5,938
Colesberg	6,850	8,115	10,187
Carry forward	183,514	429,626	489,786

[1] The areas of the divisions are adapted from those calculated at Gotha for Dr. Behm's *Bevölkerung der Erde*, which are nearer the truth than the approximation given by the Cape surveyor-general. The areas of the native districts have been specially ascertained from a map supplied by the secretary for native affairs in 1875.

Provinces, Divisions, and Native Districts.	Area in square miles.	Population. Census 1865.	Population. Census 1875.
Brought forward	183,514	429,626	489,786
EASTERN PROVINCE:			
East London[2]	1,707	3,040	15,466
King William's Town[2]	1,756	66,737	108,041
Queenstown	3,882	44,555	50,711
Aliwal North	5,024	22,200	8,107
Wodehouse			26,570[3]
Herschel			22,664
	195,883	566,158	721,345
BASUTO LAND	8,750	40,000(?)	140,000
NOMANSLAND (including Griqua Land East)	3,380	.....	50,000[4]
ST. JOHN'S TERRITORY—			
(Pondomise, Lehana, &c., Kaffres)	2,740	.....	19,998
TRANSKEIAN TERRITORY—			
Fingo Land	1,050	.....	43,971
Tambookie Country	1,500	.....	70,078[5]
Idutywa Reserve	400	.....	18,000
CAPE COLONY	213,705	.....	1,063,482
GRIQUA LAND WEST	16,630	.....	50,000

Population.

The returns of population classified according to race have not yet been received for the census of 1875. In 1865 the Europeans of the colony numbered 187,400 or about 33 per cent. of the whole. The white or dominant population is composed of colonial Dutch, who are most numerous in the western divisions; of Anglo-Saxons, who are in a majority in the east; and, in smaller proportions, of Germans, descendants of French emigrants, and Portuguese. English, which is the language of the legislation, is used in the seaports and eastern border towns, but Dutch is still commonly used in many parts of the western and midland provinces. Of thirty newspapers published in the colony twenty-five are English.

The major part of the population of the colony, however, consists of Hottentots, Malays, Negroes, and Kaffres. The aborigines with whom the first settlers at the Cape came in contact had originally the generic name of Quæquæ, and received the name of Hottentots from the Dutch. Owing to intermarriages with Malays, Negroes, and others, and illicit intercourse with the whites during the period of slavery, the race has lost much of its distinctive character. In 1865 the number of people distinguished as Hottentots was 82,000, nearly two-thirds of whom were found in the western division. The Malays were introduced by the Dutch as slaves; their descendants still retain the Mahometan religion, and most of the distinctive habits and customs of their race. We have no means of ascertaining their number, but it cannot be large. They are found chiefly resident in the seaports. The negroes are mostly from the eastern coasts of Africa. Griquas or Baastards are a mixed race sprung from the intercourse of the Dutch boers or farmers with their Hottentot slaves. A great number of them migrated from the colony in the early part of this century with the boers, and settled between the Orange River and the Vaal under the chiefs Waterboer and Adam Kok, in part of the territory now known as Griqua Land West. In 1852 Kok's people (about 15,000 in number) separated from the others and migrated to the district called Nomansland south of Natal, which had been depopulated by the strifes of the Amapondo and Amabaca Kaffres, forming there the settlement called Griqua Land East or New Griqua Land.

The line of division between the native Hottentot (or Bushman) and Kaffre races of South Africa passes south through the Cape Colony in about 26° E. long. The Kaffres now resident within the colony proper are chiefly of the tribe of the Amaxosa, with whom the colonists first came in contact at the line of the Great Fish River in 1778, and the Fingoes, who originally came from Natal and its vicinity; driven thence early in the present century by Chaka, a warlike chief of the Zulu Kaffres, they took refuge with the tribes on the border of Cape Colony. There they

[2] Formerly British Kaffraria.

[3] Including 18,445 Tambookies of the "location" in Wodehouse and North-Eastern Queenstown.

[4] Griqua Land East (1875), pop. 31,901; country west of Griquas, pop. 8407.

[5] Including emigrant Tambookies now in colony.

were reduced to a state of serfdom, from which they were liberated by Sir Benjamin D'Urban after the third Kaffre war of 1835, when a body of 16,000 of them came into the colony and settled in what is now the division of Peddie. From this, again, the greater part of the Fingoes have moved to the district now called Fingo Land, east of the River Kei, recently joined to the colony. In 1865 the number of Kaffres within the limits of the colony was not less than 164,500. The Kaffres of the native districts which have come under British rule during the last three years are—

(1.) The Basutos, sometimes called Mountain Beehwanas, the fragments of several broken tribes of the Beehwana Kaffres which became united under the rule of Chief Moshesh. Besides the inhabited districts of Basuto Land, they now occupy the portion of Nomansland which lies between Griqua Land East and the range of the Drakenberg. (2.) The Ama-baca, who appear to be divided,—one portion of the tribe inhabiting the eastern third of Nomansland on the borders of Natal; the other, under Chief Makaula, the north-eastern portion of St. John's Territory. (3.) The Ama-xesibi, under Chief Jojo, in the country immediately south of Griqua Land East. (4.) The Pondomisi, under the chiefs Umhlonhlo and Umditehwa, occupying the southern portion of St. John's Territory. (5.) The Lehana, Zibi, and Lebenya, small mountain tribes along the north-west side of St. John's Territory. (6.) The Tambookies, one of the most numerous and powerful of the Kaffre tribes, located in part within the colony proper, in the south-east of the division of Wodehouse and the north-east of Queenstown, and in part occupying the adjoining basin of the Tsomo, a tributary of the Kei River, in the districts of their chiefs Geeelo, Stoekwe, Matanzima, and Darala. The Tambookies under Gangelizwe occupy the tract between the Basbee and the Umtata.

All these are now directly under British rule. The following tribes of Kaffraria, enclosed by British territory, still retain their independence. (1.) The Ama-pondo, the largest tribe between the Cape Colony and Natal. These were also formerly driven from a more northerly region by the Zulu Kaffres, and now occupy the country on each side of the lower St. John's River, under their paramount chief Umquikela Faku, his brother Damas ruling a smaller southern division of the tribe; their numbers are estimated by missionaries resident among them at not less than 160,000. (2.) The G'ealeeas and Bom-Vanas (Ama-bomvane), on the coast-land between the Kei and the Umtata Rivers, of whom Kreli is paramount chief, Moni the chief of the Bom-Vanas acknowledging his supremacy.

Government.

Prior to 1827 there existed in the several districts of the colony an institution established by the Dutch called the Board of Landrost and Heemraaden. The landrost was the chief magistrate of the district, appointed and paid by the Government. The heemraaden was a council to assist him, composed of respectable inhabitants appointed by the governor, on the recommendation of the landrost. These boards not only had the administration of the local affairs usually entrusted to municipal bodies, but they also possessed extensive judicial authority. In consequence of abuses, more especially in the exercise of the latter functions, these institutions were abolished in 1827.

Prior to 1837 the whole authority of the general Government was vested in the governor, assisted by a small council of officials. In that year a legislative council was established, consisting of certain government officials, and five persons nominated by the Crown. An executive council was also established to assist the governor in executive matters, consisting of certain high officers of Government. Such was the form of government till 1853, when the legislative council as thus established was abolished, and a new constitution introduced. Under this the legislature consists of the governor appointed by the colonial office for a term of six years, and two chambers, called the legislative council and the house of assembly, both elected by the people. The former body was latterly composed of eleven members for the western and ten for the eastern province, chosen by the whole body of electors. But in 1873 a bill was introduced for dividing the country into seven electoral provinces, to give a more equable distribution of political influence, and to do away with the separation of the colony into two parts; and by this arrangement each of the new divisions is to return three members to the upper chamber. This bill became law in 1874, but does not come into execution until the dissolution of the existing council by expiration of the time of its session. To qualify a man to be elected for this chamber, he must possess property in land worth £2000, clear of charges, or £4000 in landed and personal property together; he must be thirty years of age, and must have been invited to become a candidate by written requisition, signed by not less than twenty-five electors. The voting in this election is cumulative,—that is, any elector may give all his votes (as many as there are members to be chosen) to one candidate, or he may distribute them among the candidates as he pleases. The council is elected for ten years, but so that half its number, as near as may be, go out every five years.

The legislative assembly is chosen by the electors of the towns and other electoral districts into which the colony is divided. The candidates have to be proposed and seconded at the hustings. There is no property qualification required of the candidates. The assembly consists of sixty-eight members, and is elected for five years.

The qualification of electors of both houses is the same, namely, the occupation of fixed property worth £25, or the receipt of wages of not less than £50 a year. The ministry under the governor includes a colonial secretary or premier, a commissioner of crown lands and public works, an attorney-general, a treasurer-general, and a secretary for native affairs. Since 1872 the ministry holds office, like the English cabinet, at the pleasure of the Parliament.

The governor may dissolve both houses, or he may dissolve the house of assembly without dissolving the council. He may give or refuse his assent to bills in the Queen's name, or he may reserve them for the decision of her Majesty. The Queen may disallow any bill assented to by the governor at any time within two years of its receipt. It is further provided, that all bills appropriating any part of the revenues must be recommended to the house of assembly by the governor.

The administration of justice is presided over by a supreme court of five judges—a chief justice and four puisne judges. The chief justice with two judges holds the supreme court in Cape Town; two other judges of the supreme court form the "court of the eastern districts" held at Graham's Town. The jurisdiction of the court of Cape Town extends over the whole colony; that of Graham's Town has a concurrent jurisdiction over the eastern divisions. Circuit courts are held throughout the colony twice yearly. Each division has a salaried magistrate who is also civil commissioner, and the magisterial courts have a limited jurisdiction in civil and criminal cases. The civil commissioner presides over the "divisional council" of his district, an elected body charged with the superintendence of roads, boundaries, and other interests of the division. The Roman or civil law, as received in Holland before the introduction of the Code Napoleon there in 1811, was in force in Cape Colony at the time of its cession to Britain, and remains authoritative, though a few modifications have been sanctioned by Parliament.

The Cape Colony possesses important British military and naval stations, and the establishment maintained by the Home Government has always been very considerable. This was especially the case during the Kaffre wars. In recent years, however, a gradual reduction of the number of imperial troops in the colony has taken place. In 1873 two British infantry regiments, with detachments of the Royal Artillery and Engineers, were quartered in the colony; but these are kept at the Cape rather for the purposes of the Home Government than for the domestic defence of the colony. A force named the Frontier Armed and Mounted Police was organized for the latter purpose in 1853, and has been specially serviceable in quelling disturbances on the interior borders of the country. This force is divided into seven troops, and numbers 750 men. Small volunteer corps of rifles and cavalry have been organized at various points of the eastern and western divisions.

Religion.

The greater number of the Protestant denominations of the United Kingdom, as well as the Roman Catholic Church, are represented in Cape Colony. The Dutch Reformed Church, as might be anticipated from the early history of the country, is by far the most numerous community. In form of government and in order of service it closely resembles the Church of Scotland, to which country a considerable number of its ministers belong. The Church of England has, perhaps, the next smaller number of adherents. In 1847 a bishop of Cape Town was appointed to preside over this church, whose diocese extended not only over Cape Colony and

Natal, but also over the island of St. Helena. Later, however, separate bishops were appointed for the eastern province (with the seat at Graham's Town) and for Natal. Wesleyan Methodists nearly equal the Anglicans in number, and have a larger proportion of colored people in their body than any other sect. The Congregationalists, including Independents and Baptists, are an important body. Lutherans, Presbyterians, and other Protestant communities, such as the Moravians, are in smaller numbers. The Roman Catholics have bishops in Cape Town and Graham's Town, but are comparatively few. Government provides an annual grant for ecclesiastical purposes, which is distributed among the various religious bodies, the Congregationalists alone declining to receive aid from the state. According, however, to the provisions of the "Voluntary Act," recently passed, the grants in aid are to be continued only to present incumbents. There are besides several foreign missions in the colony, the most important being the Moravian, London, and Rhenish missionary societies. The Moravians have been established there since 1732, and have labored hard to convert the native races.

Education. As early as 1839 a scheme of public schools, drawn up by Sir John Herschel, came into operation, which was well adapted to the condition and circumstances of the colony at that time. The Education Act of 1865, now in operation, is an advance on this system, and provides three orders of schools adapted to the wants of the main grades of the population, the Europeans, mixed races, and pure natives. These orders comprise—(1) Undenominational public schools in each division of the colony in three classes, subject to the inspection of a superintendent-general of education, and having teachers whose salaries are guaranteed; (2) Schools established by missionary societies to which Government aid is granted under certain conditions for secular education; (3) Day schools and industrial institutions for the civilization of the aborigines on the frontiers of the colony. For higher education there are several colleges. The South African college in Cape Town was founded in 1829, and in its higher classes prepares for the European universities and for colonial examinations; the college has a grant of £400 annually from Government. Graaf Reinet College, on the same plan, has a similar subsidy. The Grey Institute, in Port Elizabeth; Gill College, in Somerset East; the Diocesan College, under the bishop of Cape Town, the first of the institutions of a purely denominational character; the Theological Seminary of the Dutch Reformed Church at Stellenbosch; and four educational institutions of the Roman Catholic Church, are the other schools of higher education which are chiefly worthy of note. A public university, founded on the plan of that of London, arose out of and superseded the Board of Public Examiners (which had been constituted in 1858), and stands at the head of the educational system of the colony; it was established by Act of Parliament in 1872. Liberal bursaries and scholarships have since been attached to it, enabling students to continue their studies in Britain. The hospital of Cape Town is so far recognized as a medical school by the Colleges of Surgeons and Physicians, that students are allowed to spend two years of their course there in qualifying for their degrees.

Public Institutions. The leading public institutions of the Cape Colony—the Royal Observatory, the South African Public Library and Museum, and the Botanic Garden and Government Herbarium—are noticed under CAPE TOWN below. The Albany or Graham's Town Museum, the chief of the provincial institutions of this kind, perhaps surpasses that of the capital in its collections and classification of the natural products of Southern Africa. A colonial medical committee, appointed by Government and presided over by a Government inspector of hospitals, is at the head of the curative institutions of the colony, the chief of which are the hospitals of Cape Town, the infirmary at Robben Island, and those of Port Elizabeth, Graham's Town, and King William's Town, with the numerous jail hospitals throughout the country.

The Press. The first newspaper of the colony, written in Dutch and English, was published in 1824, and its appearance marked an era not only in the literary but in the political history of the colony, since it drew to a crisis the disputes which had arisen between the colonists and the somewhat arrogant governor, Lord Charles Somerset, who had issued a tyrannical decree prohibiting all persons from convening or attending public meetings. Its criticisms on public affairs soon led to its suppression by the governor, and a memorial from the colonists to the king petitioning for a free press was the result. This boon was secured to the colony in 1828, and the press soon became a powerful agent, characterized in an especial manner by public spirit and literary ability. There are now about fifty newspapers and periodicals in English and Dutch, published in the Cape Colony and Natal.

Trade. The following table, giving the value of imports and exports and the tonnage of shipping in several years, taken at intervals, exhibits the progress of the commerce of the colony:—

Year.	Imports.	Exports.	Shipping.
			Tons.
1836	£541,038	£362,280	134,875
1840	732,494	775,060	184,442
1850	1,277,101	637,252	224,126
1860	2,665,902	2,080,398	329,934
1870	2,352,043	2,453,768	335,509
1874	5,558,215	5,138,838	691,855

In the order of the amount and value of their commerce the ports of the Cape Colony rank thus:—Port Elizabeth, Cape Town, East London, Mossel Bay, Port Alfred (Kowie mouth), and Simon's Town,—the value of the trade of Port Elizabeth being more than double that of Cape Town.

The following table gives the quantities and values of the chief articles, the produce of the colony, exported during 1874:—

	Quantity.	Value.
Aloes.....lb	614,272	£5,526
Argol (crude tartar)..."	75,598	2,268
Copper Ore.....tons	13,646	321,434
Corn, Grain and Meal—		
Barley.....lb	148,260	747
Beans and Pease...."	70,443	469
Bran ...."	94,500	520
Flour. ....."	303,827	3,202
Maize....."	710,766	2,197
Oats....."	679,596	5,337
Wheat....."	35,411	496
Cotton....."	15,117	257
Diamonds.....No.	2,893	8,148
Feathers (Ostrich) .....lb	36,829	205,640
Fish, cured ....."	4,872,814	34,339
Fruit, dried....."	332,762	5,078
Hair, Angora....."	1,036,570	107,139
Hides.....No.	68,458	49,425
Horns....."	134,154	1,900
Horses....."	48	1,925
Ivory.....lb	73,747	26,667
Skins, Goat.....No.	1,478,761	194,323
" Sheep ....."	1,462,367	144,538
Spirit, Brandy.....Galls.	718	245
Wine, Constantia....."	1,655	1,272
" Ordinary ....."	77,802	15,876
Wool.....lb	42,620,481	2,948,571
Other Articles.....		51,299
Add for unregistered diamonds.....		1,000,000
Total value.....		£5,138,838

The most important item of export is wool, and the following table shows the progress of the trade in this product, which is now almost monopolized by the eastern ports:—

	Exports.	
	Port Elizabeth (with Port Alfred and East London). lb	Cape Town (with Port Beaufort and Mossel Bay). lb
1833.....	39,753	73,324
1840.....	401,521	509,597
1850.....	4,323,650	1,589,277
1860.....	19,438,566	3,734,219
1870.....	33,809,934	3,473,357

The number and value of the diamonds exported cannot be judged by the figures in the above table, since but few parcels of them are entered as freight. The whole declared value of the diamonds exported from the year of their discovery till 1874 was £743,000, but it is believed that diamonds to the value of upwards of £10,000,000 have been taken from the mines of Griqua Land West.

The copper ore of the Cape Colony is derived from the mines in Namaqua Land. Since 1863, when this branch of mining became a settled industry, and the Cape Copper Mining Company was formed, the exports of ore have risen steadily from an annual total of 2900 tons to upwards of 13,000 tons. Wine was at one time the staple export, and was imported in large quantity by England; falling into disrepute there, the industry remained in a depressed state for many years, but revived on the impulse given by the discovery of diamonds, and besides acquiring an increased consumption in the colony is again rising as an export.

The imports of the colony consist mainly of manufactured goods, cloths and hardwares, sugar and tobacco. The revenue of the colony is derived chiefly from an *ad valorem* tax on all goods imported (with the exception of agricultural machinery, animals, bullion, books, and unmanufactured African products), and on land sales and rents, and from a tax called transfer-dues on the purchase money of all landed property sold, stamp-duties, and postages. The expenditure is for payment of salaries of officials and support of government. The colony incurs the expense of the regiments of Cape mounted riflemen and police, but the British troops in the colony are maintained by the Imperial Government at an annual cost of about £200,000. The subjoined table shows the progress of the revenue and expenditure of the colony:—

	Revenue.	Expenditure.
1832.....	£130,808	£126,889
1840.....	171,205	181,653
1850.....	245,785	245,655
1860.....	742,771	729,689
1870.....	831,211	795,695
1873.....	2,078,220	2,159,658
1874.....	1,907,951	1,199,970

The revenue of 1873 was abnormally increased by the raising of a loan of £860,000, included in the statement, while the increased expenditure was caused by outlay on public works. The revenue of 1874 was increased by a loan of £369,400. The colony has a public debt, bearing interest at the rate of 6 per cent., dating from 1859. The debt had reached the amount of £1,723,000 in 1874.

Cape Town, the capital and seat of government of Cape Colony, lies at the head of Table Bay, on the northern side of the peninsula formed by Table Mountain, and 30 miles north of the Cape of Good Hope. It was founded in 1652 by Van Riebeeck, and at first consisted of a few houses under the shelter of a fort, at the mouth of the Zocta or "Sweet Stream," on the site of which the still existing castle was built. The chief streets of the increasing town were subsequently laid out at right angles, but the outer streets and suburbs extend irregularly upwards. The town is now paved, and lighted with gas, and has a regular water supply. Its architecture generally retains the features given to it by the earlier settlers, the houses being of brick faced with stucco, with flat roofs and cornices and raised platforms called "stoeps" in front; but these are rapidly giving place to edifices of more modern design. Besides the castle, which is now useless in a military point of view, being commanded by the surrounding heights, the public buildings include the Government House (a modernized Dutch building), the supreme courts, the art gallery, the exchange, the post-office, and the public library (with upwards of 40,000 volumes) and museum, inaugurated in 1860, perhaps the finest edifice in the city. New parliament houses are being built on a magnificent scale, the legislature having voted a large sum for this purpose. Cape Town is the seat of bishops of the Anglican and Roman churches. Among its ecclesiastical buildings the Roman Catholic cathedral, a Gothic structure, is the most conspicuous. A university has been erected, and there are several educational institutions. The botanical gardens, in the centre of the town, serve the purposes of a park, and have been of great value in the introduction to the colony of many trees, flowering plants, and fruits.

The town is a municipality governed by a mayor and council. Its population, amounting in 1875 to nearly 33,000, is formed of many races; people of Dutch descent are still more numerous than British, but all European nations are represented. The "coolie" or laboring population comprises the descendants of negro slaves, and half-bred Hottentots and Kaffres; the Malays form a numerous class.

Cape Town is the starting-point of the Great Western Railway, which at present reaches Wellington, and is being extended towards Beaufort; and from the town communications are maintained by post, cart, or wagon, with all chief points in the interior. Besides being a market for home produce, Cape Town imports manufactured articles for the greater part of the western provinces, and has a large export trade in copper, wool, wine, fish, and fruit; the construction of a breakwater and docks in Table Bay having rendered shipping more secure and facilitated traffic. Several lines of steamers maintain regular communication with Cape Town both from Europe and from India, passing along the eastern and western sides of the continent.

The scenery round the head of Table Bay is very striking. Table Mountain, with its branches the Devil's Peak and

Cape of Good Hope.

Lion's Head, rises in a massive wall immediately at the back of Cape Town. During the prevalence of south-east winds it is covered by a dense whitish cloud, partially overlapping its side like a table-cloth. Along the base of this mountain, where lie the suburban villages of Rondebosch, Claremont, Wynberg, and Constantia, the land is covered with luxuriant vegetation, including oaks and firs, with gardens of flowers and shrubs (especially of heaths) and vineyards, and is studded with villas.

The Royal Observatory of the Cape, established in 1820—one of the most valuable of those supported by the British Government—is three miles east of Cape Town.

See Cape of Good Hope Blue Books; H. Hall, *South African Geography*; J. Fleming, *Southern Africa*; *Handbook for South Africa*; Glanville, *Guide to South Africa*; Noble, *Descriptive Handbook of Cape Colony*. (K. J.)

CAPE HAYTIEN, or Cap Haitien, a town on the north coast of the island of San Domingo in the republic of Hayti, about 19° 46′ N. lat. and 72° 14′ W. long. Its original Indian name was Guarico; and it has also been known at various times as Cabo Santo, Cap Français, and Cape Henry, while it is familiarly designated as simply

Le Cap. It is situated at the foot of a fine range of mountains on a small bay, and possesses a secure and commodious harbor. Its trade is principally with the United States. It has declined considerably from the flourishing condition to which it attained during the French supremacy, when it was the seat of an archbishop, and possessed a university and academies of music and painting, but it is still one of the chief towns of the republic, and is the seat of a civil and criminal court and a tribunal of commerce. It was originally founded by Spaniards from the island of Tortuga, and possesses an eventful history. In 1695 it was burnt by the English; and shortly after the revocation of edict of Nantes it received a French colony. In 1791 it was captured and burnt by Toussaint L'Ouverture; and in almost all the revolutions of the island since that date it has suffered severely. In 1842 it was almost destroyed by an earthquake. The troops of Salnave, who were in possession in 1865, having insulted the British flag, Captain Wake bombarded the town and blew up the arsenal. In 1869 the followers of Saget made themselves masters of the place. The population at present is estimated at 12,000; but in the last century it is said to have exceeded 38,000.

CAPE VERD ISLANDS. This group, situated in the Northern Atlantic Ocean, between the parallels of 14° 20′ and 17° 20′ N. lat., and 22° 20′ and 25° 30′ W. long., consists of ten islands, viz.:—Sant' Antao (commonly miswritten St. Antonio), São Vicente, Santa Luzia, São Nicolao, Sal, Bõa Vista, Maio, San Thiago (the St. Jago of the English), Fogo, and Brava, besides a few uninhabited islets. They form a sort of broken crescent, with the concavity towards the west. The last four constitute the leeward (Sotovento) group and the other six the windward (Barlavento). The distance between the coast of Africa and the nearest island (Bõa Vista) is about 200 miles. Their total area is estimated at 1240 square geographical miles. They belong to Portugal, and derive their name (*Ilhas do Cabo Verde*), frequently but erroneously written Cape *de* Verd Islands, from the African promontory off which they lie, known as Cape Verd, or the Green Cape. The archipelago was partially discovered in 1441 by an expedition fitted out by Dom Henrique of Portugal, under Antonio and Bartolomeo di Nolli; but no settlement was made on the islands till after the voyage of Cada Mosto in 1456.

It is most probable that the islands were uninhabited at the period of the Portuguese discovery. The new settlers, however, imported negroes from the African coast. The population now amounts to upwards of 70,000, and would have been much greater if famine, caused by droughts and epidemics, had not frequently diminished it. The blacks and mulattoes far outnumber the whites, whose constitution is less suited to the climate. Slavery existed in the islands in full force until the Portuguese Government set free the public slaves in 1854, and modified the condition of those who belonged to private individuals. At that time the number of persons subjected to "involuntary servitude" amounted to about 6000, but at the census of 1860 they had been reduced to 3979. Criminals are transported thither from the mother country, and the punishment is much dreaded. All the towns are poor, dirty places; even the best have few tolerable houses. The people are mild and hospitable, but indolent and uncleanly. In religion they are Roman Catholics. They are extremely ignorant and superstitious, and many heathen notions and practices prevail among them, brought from the African coast. All the inhabited islands have churches, except S. Luzia. The language is a bastard Portuguese, known to the people of the mother country as *lingua creoula*.

The archipelago forms one of the foreign provinces of Portugal, and is under the command of a governor-in-chief appointed by the Crown. There are two principal judges, one for the windward and another for the leeward group, the former with his residence at S. Nicolao, and the latter at Praia; and each island has a military commandant, a few soldiers, and a number of salaried officials, such as police, magistrates, and custom-house directors. There is also an ecclesiastical establishment, with a bishop, dean, and canons. In every island there is a primary Government school conducted by the priests, but the attendance is very small, and the children of the wealthier inhabitants are sent to Lisbon for their education. There are no roads in the islands, and ponies and donkeys are the beasts of burden.

Climate and Meteorology.—The atmosphere in the vicinity of these islands is generally hazy, especially in the direction of the continent. With occasional exceptions during summer and autumn, the north-east trade is the prevailing wind, blowing most strongly from November to May. The rainy season is during the months of August, September, and October, when there is thunder and a light variable wind from south-east or south-west, which is principally due to the close approach of the inner margin of the north-east trade winds, and the in-draught to the neighboring continent, occasioned by the rarification of the air over the Sahara. The Harmattan, a very dry east wind from the African continent, occasionally makes itself felt. The heat of summer is high, the thermometer ranging from 80° to 90° Fahr. near the sea. The unhealthy season is the period during and following the rains, when vegetation springs up with surprising rapidity, and there is much stagnant water, poisoning the air on the lower grounds. Remittent fevers are then common. The people of all the islands are also subject in May to an endemic of a bilious nature called locally *levadias*, but the cases rarely assume a dangerous form, and recovery is usually attained in three or four days without medical aid. The droughts already spoken of are sometimes general, sometimes partial. On some of the islands rain has occasionally not fallen for three years. The immediate consequence is a failure of the crops, and this is followed by the death of great numbers from sheer starvation. To add to these horrors, epidemics usually break out afterwards. These disastrous occurrences have greatly obstructed the progress of the colonies. In the general famine of 1730–3, about two-thirds of the population perished, and in that which began in 1831–3, 30,000 persons are supposed to have perished. The years 1855 and 1856 were also marked by great distress in several of the islands.

Productions, Agriculture, &c.—The chief occupation of the islanders is cattle-feeding. In some of the islands the making of salt from sea-water employs a considerable number of persons. Orchil is gathered, and the indigo and castor-oil plants, as well as the physic-nut plant (*Curcas purgans*), are cultivated. The fruit of the last is exported in large quantities to Portugal, where the oil is expressed and consumed in lamps. Maize, sugar-cane, and the manioc plant are also much cultivated, as well as cotton and tobacco to a limited extent. Coffee was introduced in 1790, and grows well. Though the soil and climate are fitted to produce many tropical fruits, these receive little attention. Cocoa-nut trees, date-palms, tamarinds, and bananas are seen on most of the islands. Pumpkins, sweet potatoes, and the *kalo* are generally cultivated. Wood, except in the interior of S. Antao, is entirely wanting, and the people are often reduced to great straits for firing.

Quails are found in all the islands; rabbits in Bõa Vista, and in San Thiago and Fogo. Goats and asses are reared, and the skins of the former are exported. The neighboring sea abounds with fish, and the coral animal is at work building up dangerous reefs on submerged rocks. Turtles come from the African coast to lay their eggs on the sandy shores.

The exports consist chiefly of coral, salt, physic-nuts, hides, coffee, maize, kidney-beans, sugar-cane spirit, and coarse sugar. The imports are cotton cloths, timber, hardware, crockery, glass, and wine. There is a considerable intercourse in the way of exchange between the islands one with another. There is a British consul stationed at Porto Grande in S. Vicente, and a vice-consul at Porto Sal Rey in Bõa Vista. On none of the islands have any lighthouses as yet been erected.

Botany.—The flora of these islands has been described by Mr. P. Barker Webb in his *Spicilegia Gorgonea*, a catalogue of all the plants then discovered in the Cape Verd Islands, which forms part of Hooker's *Niger Flora*, London, 1849; also by Dr. J. A. Schmidt in his *Beiträge zur Flora der Cap-Verdischen Inseln*, Heidelberg, 1852. From these works it appears that the total number of wild flowering plants amounted to 424, of which 77 are monocotyledonous, and 347 dicotyledonous. Of the former an asparagus and 14 grasses are peculiar; and of the latter, 50 are peculiar. There are besides 14 ferns, two of which are peculiar. The flora is closely related in the main to that of the neighboring continent, and is strongly impressed with a tropical character. Doubtless a large proportion of the plants have been introduced.

Geology.—The whole archipelago is of volcanic origin, but little is known of its geological structure. Mr. Darwin's examination of San Thiago (St. Jago) appears to be the fullest that has been made of any of the islands, and that was only partial. Marine shells are found embedded in tufa at Bõa Vista (as we learn from Bowdich, who visited that island in 1823), showing an upheaval to some extent. In Fogo is a still active volcano several thousand feet high, which merits the investigation of geologists; and indeed all the islands would, doubtless, repay the student of volcanic phenomena for the time and labor bestowed on their examination. For instance, an inquiry into the circumstances under which calcareous sand is thrown upon the island of Bõa Vista, and heaped up by the winds into hills 30 feet high, would probably tend to explain the origin of the superficial layer of similar sand in part of Madeira and Porto Santo.

S. Antao, the most north-westerly of the group, has an area of 240 square geographical miles, and a population of about 29,000. Its surface is very rugged, and the interior lofty. The Sugar Loaf, its highest mountain, is thought to reach the altitude of 8000 feet. This island is reputed to be at once the most picturesque, the healthiest, the best watered, and the most fertile of the archipelago. On the other hand, the difficulty of passing from one part to another is very great. There are three indifferent landing-places, of which the most frequented is Ponta do Sol, where the custom-house stands, distant more than a league from the chief town, Ribeira Grande, situated in the north-west of the island, a place of about 7000 inhabitants. Tarrafal Bay is spacious, and is sheltered from the prevalent winds. The island produces good coffee and sugar, and abundance of fruit; but the people are reputed to be indolent and inattentive to the advantages which soil and water afford them. Lead is said to be obtained, and there is a current opinion that other metals exist. Somewhere on the island is an extinct orater, from which the people declare that a wind occasionally issues so strong as to fling back any object that may be cast into the hollow.

S. Vicente (St. Vincents) lies adjacent to S. Antao on the east. It has a superficies of 70 square miles, and a population of about 1700. At Porto Grande, on the north-west coast, is an extensive and excellent harbor, with a coaling station for British steamers; and barracks and municipal buildings are in course of erection. The island is so exposed to the fury of the north-east winds that not a tree will flourish. Its soil yields very little, and the inhabitants are supplied with grain and fruit from S. Antao. The distance from S. Vicente to S. Antao is about 8 miles, to S. Luzia about 4 miles.

Santa Luzia is a small island between S. Vicente and S. Nicolao, with an area of about 18 square miles. The inhabitants, who are wholly occupied in attending to their cattle, do not exceed a dozen. Much orchil was formerly gathered. A little to the south are the two uninhabited islets of Branca and Rasa.

S. Nicolao is a long narrow island of a crescentio shape, with an area of about 115 square geographical miles, and a population of about 6000 persons. The climate is not very healthy. Maize, kidney-beans, manioc, sugar-cane, and vines are cultivated; and in ordinary years grain is exported to the other islands. The interior is mountainous, and has two remarkable hills which can be seen for many leagues; one has the shape of a sugar-loaf, and is near the middle of the island; the other, Monte Gordo, is near the west end, and has a height of 4280 feet. All the other islands of the group can be seen from S. Nicolao in clear weather. Vessels frequently enter Freshwater Bay, near the south-east extremity of the island, for water and fresh provisions; and the custom-house is here. The bishop of the archipelago has his headquarters in the island, and there is also a seminary for priests. The distance from S. Nicolao to S. Vicente is over 20 miles, to Sal, nearly 60 miles.

Sal, a narrow island, through whose centre passes the meridian of 23°, has a length of 20 miles, an area of 70 square geographical miles, and a population of about 750 persons, one-third of whom are employed in the manufacture of salt, of which about 15,000 tons are manufactured in favorable years. The name is derived from a natural salt-spring, at which the trade commenced; but this has now been abandoned for artificial salinas more conveniently situated. A space of nearly 20 miles intervenes between Sal and Bõa Vista.

Bõa Vista, the most easterly island of the group, lies in lat. 16° 5′ N. and long. 22° 55′ W. Its length from east to west is about 17 miles, and its breadth from north to south is about 16 miles. Its coast is indented by numerous shallow bays, the largest of which, situated on the western side, serves as a road for shipping. A chain of heights traverses the middle of the island, and there are inferior hilly ranges on each side; the loftiest peak attains the altitude of 1260 feet. All the hills have basaltic summits. The plateau from which the hills rise has a height of about 60 feet above the sea, and is composed chiefly of calcareous sandstone. Near Porta Sal Rey are tufas containing abundance of marine remains; and near the same place is a raised beach containing shells, &c. The superficial calcareous sandstone also abounds in shells. In the north-western angle of the island there is a low tract covered with loose sand, which is blown about by the winds, to the great annoyance of the inhabitants. This part is inundated with water during the rainy season; and here are some extensive salt-pans, where the sea-water is evaporated by the heat of the sun. The inhabitants number about 5000, and the island is in great part uncultivated. Horned cattle and goats are tolerably numerous. Salt and orchil are exported. With the exception of a few cocoa-nut trees, there is no wood; and in the dry season the island offers to the eye nothing but an arid waste. The little vegetation that then exists is in the bottom of ravines, where corn, beans, and cotton are cultivated. The springs of good water are few. Porta Sal Rey, on the western side of the island, is the chief town (population about 1000); and there are several villages scattered about the island. Remittent fevers are common during and after the rainy season, and diarrhœa, pectoral complaints, and ophthalmia occasionally occur. A good deal of fish is taken on the coast, and supplies the impoverished islands with much of their food. Towards the end of 1845 yellow fever broke out in the island, and carried off about a fourteenth of the population. About the beginning of the century there resided on this island a certain Senhor Manoel Martins, who had great influence and power. He it was who constructed the salt-works in Sal, and laid down there the first iron railway that the Portuguese dominions possessed, for the purpose of conveying the salt from the salinas to the shore.

Maio has a length of 15 miles, and its area is about 50 square geographical miles. The inhabitants, who number 773, derive their support chiefly from their cattle and from the exportation of salt. Fish is abundant. This island is a barren treeless waste, surrounded by dangerous rocks. The best landing-place is at English Road, on the west side. Maio is 35 miles from Bõa Vista, and is separated from San Thiago by a channel 7 miles wide.

San Thiago (St. Jago), the largest but also the most unhealthy island of the archipelago, has a length of 37 miles, an area of 360 square geographical miles, and a population of 32,000 persons. Its geological structure is volcanic, and part of it has been minutely described by Mr. Darwin in his *Observations on Volcanic Islands*, 1844. Its interior is very hilly, the highest point being a pointed conical mountain called Pico de Antonio, which attains the altitude of 4500 feet. There are numerous ravines which bring down perennial streams, and in these ravines there is a good deal of cultivated ground, where crops of sugar-cane, maize, kidney-beans, rice, and manioc are raised. Some of the produce is exported to the other islands. Spirit is distilled from the juice of the sugar-cane, and a coarse sugar is also made. The purgerra or physic-nut tree is largely grown, and in 1869 the crop amounted to no less than 15,750 tons. Fine specimens of the baobab may also be seen. The chief port is at Villa da Praia, a town at the southern extremity of the island, with 2000 inhabitants. At this place, called Porta Praya by the English, the governor-general usually resides. Before the establishment of the coal depôt for British steamers at S. Vicente, it was better known to voyagers than any other town in the group. It stands on a basaltic plateau overhanging the bay, and presents a not unpleasing appearance, with its numerous cocoa-nut trees, and the lofty peak of Antonio rising from behind successive steps of table-land in the background. The streets are wide and well laid out, and there is a large square in the heart of the town. The neighborhood has a desolate aspect from its utter sterility. On the west coast an inlet penetrates several miles into the interior, but does not afford secure anchorage. In the ravine, at its head, is the town of Ribeira Grande, the former capital of the island, which, with its ruined fort and cathedral, has a picturesque appearance.

Fogo.—This island is 30 miles distant from San Thiago, and lies between the parallels of 14° 42′ and 15° 1′ N. lat., and 24° 8′ and 24° 32′ W. long. It measures about 12 leagues from N. to S., and about 14 leagues from E. to W. Its area is estimated at 144 square geographical miles. Through the middle runs a mountain ridge of a semicircular form, the concavity being towards the east, and about the centre there rises a volcanic cone to the height of 9150 feet. This volcano produced fire uninterruptedly from 1680 to 1713. It has been active several times since then, the last eruptions having taken place in 1847, when a current of lava flowed to the sea; the summit still emits vapor. In one part of the island there are a number of extinct craters where much sulphur could be collected. The only anchorage for vessels of burden is in Luz Bay, on the west side. Deep ravines add to the inequalities of the island, and carry off the rain as soon as it falls. The inhabitants, with great want of foresight, have been in the habit of felling trees, without replanting, so that very few trees are now to be found. The water is good but not abundant. The population amounts to about 8400. São Felippe, the largest town, and the only place with any commerce, has a population of about 1000. The chief articles of produce are sugar-cane, ground-nuts, sweet potatoes,

and cassava. There are few goats and swine, but horned cattle are abundant. This island is reputed to be one of the healthiest of the group; but in addition to the usual endemic, remittent and intermittent fevers manifest themselves in October and November, the intensity of which is in proportion to the abundance of the rains. In July, 1855, there was an outbreak of cholera, which attacked upwards of a fourth of the entire population, and carried off nearly 650 persons.

Brava, the most southerly of the group, has an area of 36 square geographical miles, and its population amounts to nearly 7500, so that it is the most densely populated of all. Its distance from Fogo is about 12 miles. The interior is mountainous, but near the coast the soil is comparatively fertile; its agricultural productions are numerous, and much maize is exported. Whalers resort to this island for supplies, and by their means the scanty resources of the population are eked out. This island is usually covered with dense clouds, otherwise its high land would be seen from a great distance.

C. de Chelmicki and T. A. de Varnhagen, *Corografia Cabo-Verdiana*, Lisbon, 1841–2; Charles Darwin, *Geological Observations on Volcanic Islands*, London, 1844; J. J. Lima, *Ensaios sobre a Estatistica da possessoes Portuguesas na Africa occidental e oriental*, Lisbon, 1844.

CAPEFIGUE, Baptiste Honore Raymond (1801–1872), a French historian and biographer, was born at Marseilles in 1801. At the age of twenty he left his native town in order to study law at Paris; but he soon deserted law for journalism. He became editor of the *Quotidienne*, and was afterwards connected, either as editor or leading contributor, with the *Temps*, the *Messager des Chambres*, the *Revolution de* 1848, and other papers. During the ascendency of the Bourbons he held a post in the Foreign Office, for which he was indebted to the royalism of some of his newspaper articles. Indeed all Capefigue's works receive their color from his legitimist politics; he preaches divine right and non-resistance, and finds polite words for even the profligacy of Louis XV. and the worthlessness of his mistresses. His style bears evident marks of haste, and although he had access to an exceptionally large number of sources of information, including the state papers, inaccuracies are not infrequent. This is not surprising when we consider the astonishing number of his biographies and histories. The former include the lives of Catherine and Maria de' Medici, Anne and Maria Theresa of Austria, Catharine II. of Russia, Elizabeth of England, Diana of Poitiers, and Agnes Sorel. The latter, besides histories of the Jews from the fall of the Maccabees to the author's time, of the first four centuries of the Christian church, and of European diplomatists, extend over the whole range of French history. As among the most important, and as illustrative of the extent of the field which he traversed, mention may be made of his histories of the Norman invasions, of the kings from Hugh Capet to Philip Augustus, of the constitution from Louis VIII. to Louis XI., of the Reformation and the League, of Louis XIV. and XV., of the restoration of the Bourbons, of the consulate and the empire, and of Louis XVI. He died at Paris in December, 1872.

CAPEL, Lord Arthur (c. 1600–1649), was the son of Sir Henry Capel. His birth year is not accurately known; but it was about 1600. In 1640 he was chosen to represent the county of Hertford, and sat as a member of the Long Parliament, which was convened that year. He was elevated to the peerage by Charles I.; and on the breaking out of the revolutionary war he raised and maintained a troop in the royal interest, till the final triumph of the Parliamentarians compelled him to make peace with them. During the war he acted, together with Edward Hyde and Lord Colchester, as general in the west, and was concerned in important engagements at Bristol, Exeter, and Taunton. Having with noble devotion reassembled his troop in order to effect the rescue of Charles, he was forced by famine and sedition to surrender at Colchester to General Fairfax, and was condemned by the Commons to be banished; but on the authority of some of the Parliamentary leaders he was immediately committed to the Tower. He contrived to effect his escape from prison, but was apprehended at Lambeth, and again committed to stand his trial at Westminster for treason. He was condemned to death, and was executed on the 9th of March, 1649, exhibiting on the scaffold the greatest calmness and dignity. He was the author of *Daily Observations or Meditations*, a posthumous publication, which was afterwards reprinted under a different title, with an account of his life.

CAPELL, Edward (1713–1781), a well-known critic and annotator of Shakespeare, was born at Troston in Suffolk in 1713. Through the influence of the duke of Grafton he was early appointed to the office of deputy-inspector of plays, with a salary of £200 per annum. Shocked at the inaccuracies which had crept into Sir Thomas Hanmer's edition of Shakespeare, he projected an entirely new edition, to be carefully collated with the original copies. After spending three years in collecting and comparing a vast number of scarce folio and quarto editions, he published his own edition in 10 vols. 8vo, with an introduction, written in a style of extraordinary quaintness, which was afterwards appended to the prolegomena of Johnson's and Steevens's editions. The work was published at the expense of the principal booksellers of London, who gave him £300 for his labor. Three other volumes of *Notes and Various Readings of Shakespeare*, which he had announced in his introduction, under the title of *The School of Shakespeare*, were published under the editorial superintendence of Mr. Collins, in 1783, two years after Capell's death. They contain the results of his unremitting labor for thirty years in collating the ancient MSS., and though utterly wanting in literary taste, throw considerable light on the history of the times of Shakespeare, as well as on the sources from which he derived his plots. Besides the works already specified, he published a volume of ancient poems called *Prolusions*, and an edition of *Antony and Cleopatra* adapted for the stage.

CAPELLA, Martianus Mineus Felix, author of a curious encyclopædic work on the liberal arts, was born in the north of Africa, and flourished probably towards the beginning of the 5th century A.D., or at least during the 4th century. There is, however, no direct evidence as to the exact epoch at which he lived, and the few references to the author contained in the work itself are not sufficiently definite to admit of any certain conclusion being drawn. He appears to have been a solicitor by profession and in easy circumstances. His work, entitled *Satyra de Nuptiis Philologiæ et Mercurii*, is an elaborate allegory in nine books, written in a mixture of prose and verse. The style is heavy and involved, loaded with metaphor and bizarre expressions, and verbose to excess. The first two books contain the allegory proper,—the marriage of Mercury to a nymph named Philologia. It is wrought out in great detail, but the original conception is not a happy one, and the execution is tasteless. The remaining seven books contain expositions of the seven liberal arts, which then comprehended all human knowledge. Book iii. treats of grammar, iv. of dialectics, v. of rhetoric, vi. of geometry, vii. of arithmetic, viii. of astronomy, ix. of music. These abstract discussions are linked on to the original allegory by the device of personifying each science as a courtier of Mercury and Philologia. The work was a complete encyclopædia of the liberal culture of the time, and it was in high repute during the Middle Ages. There is much interesting matter in it, and much erudition is displayed by the author, but the whole is executed in a clumsy, pedantic, and tasteless fashion.

A passage in book viii. has always attracted the attention of commentators, for it contains a very clear statement of the heliocentric system of astronomy. Many have supposed that Copernicus, who quotes Capella, may have received from this work some hints towards his own new system.

The *editio princeps* of Capella is that by Bodianus, 1449; the best of the older editions is that by Grotius, 1599; modern editions are those of Kopp, 1836, and Eyssenhardt, 1866. Eyssenhardt, in various contributions to the *Rheinisches Museum*, has done much for the text and explanation of Capella.

CAPERCALLY, or Caperkally,—to use the spelling of the old law-books,[1] as given by Pennant, the zoologist, who, on something more than mere report, first included this bird among the British Fauna,—a word commonly derived from the Gaelic *Capull*, a horse (or, more properly, a mare), and *Coille*, a wood, but with greater likelihood, according to the opinion of Dr. M'Lauchlan, from *Cabher*, an old man (and, by metaphor, an old bird), and *Coille*, the name of *Tetrao urogallus*, the largest of the grouse family (*Tetraonidæ*), and a species which was formerly indigenous to Scotland and Ireland. The word is fre-

[1] The only one of the "Scots Acts," however, in which the writer has been able to ascertain that the bird is named is No. 30 of James VI. (1621), which was passed to protect "powties, partrikes, moore foulles, blakcoks, gray hennis, termigantis, quailzies, *capercailzies*," &c.

quently spelled otherwise, as Capercalze, Capercailzie (the *z*, a letter unknown in Gaelic, being pronounced like *y*), and Capercaillie, and the English name of Wood-Grouse or Cock-of-the-wood has been often applied to the same bird. The earliest notice of it as an inhabitant of North Britain seems to be by Hector Boethius, whose works were published in 1526, and it can then be traced through various Scottish writers, to whom however it was evidently but little known, for about 200 years, or maybe more, and by one of them only, Bishop Lesly in 1578, was a definite *habitat* assigned to it:—"In Rossia quoque Louguhabria [Lochaber], atqui aliis montanis locis" (*De Origine Moribus de rebus gestis Scotorum*. Romæ: ed. 1675, p. 24). Pennant, during one of his tours in Scotland, found that it was then (1769) still to be met with in Glen Moriston and in the Chisholm's country, whence he saw a cock-bird. We may infer that it became extinct about that time, since Mr. Gray (*Birds of the West of Scotland*, p. 229) quotes the Rev. John Grant as writing in 1794:—"The last seen in Scotland was in the woods of Strathglass about thirty-two years ago." Of its existence in Ireland we have scarcely more details. If we may credit the *Pavones sylvestres* of Giraldus Cambrensis with being of this species, it was once abundant there, and Willughby (1678) was told that it was known in that kingdom as the "Cock-of-the-wood." A few other writers mention it by the same name, and Rutty, in 1772, says (*Nat. Hist. Dublin*, i. p. 302) that "one was seen in the county of Leitrim about the year 1710, but they have entirely disappeared of late, by reason of the destruction of our woods." Pennant also states that about 1760 a few were to be found about Thomastown in Tipperary, but no later evidence is forthcoming, and thus it would seem that the species was exterminated at nearly the same period both in Ireland and Scotland.

When the practice of planting was introduced, the restoration of this fine bird to both countries was attempted. In Ireland the trial, of which some particulars are given by Thompson (*Birds of Ireland*, ii. p. 32), was made at Glengariff, but it seems to have utterly failed, whereas in Scotland, where it was begun at Taymouth, it finally succeeded, and the species is now not only firmly established, but is increasing in numbers and range. The late Mr. Lloyd, author of several excellent works on the wild sports and natural history of Scandinavia, supplied the stock from Sweden, but it must be always borne in mind that the original British race was wholly extinct, and no remains of it are known to exist in any museum.

This species is widely, though intermittently, distributed on the continent of Europe, from Lapland to the northern parts of Spain, Italy, and Greece, but is always restricted to pine-forests, which alone afford it food in winter. Its bones have been found in the kitchen-middens of Denmark, proving that country to have once been clothed with woods of that kind. More lately its remains have been recognized from the caves of Aquitaine. Its eastern or southern limits in Asia cannot be precisely given, but it certainly inhabits the forests of a great part of Siberia. On the Stannovoi Mountains, however, it is replaced by a distinct though nearly allied species, the *T. urogalloides* of Dr. von Middendorff,[1] which is smaller with a slenderer bill but longer tail.

The Cock-of-the wood is remarkable for his large size and glossy-black plumage. He is polygamous, and in spring mounts to the topmost bough of a tall tree, whence he challenges all comers by extraordinary sounds and gestures; while the hens, which are much smaller and mottled in color, timidly abide below the result of the frequent duels, patiently submitting themselves to the victor. While this is going on it is the practice in many countries, though generally in defiance of the law, for the so-called sportsman stealthily to draw nigh, and with well-aimed rifle to murder the principal performer in the scene. The hen makes an artless nest on the ground, and lays therein from seven to nine or even more eggs. The young are able to fly soon after they are hatched, and towards the end of summer and beginning of autumn, from feeding on the fruit and leaves of the bilberries and other similar plants, which form the undercovert of the forests, get into excellent condition and become good eating. With the first heavy falls of snow they betake themselves to the trees, and then, feeding on the pine-leaves, their flesh speedily acquires so strong a flavor of turpentine as to be distasteful to most palates. The usual method of pursuing this species on the Continent is by encouraging a trained dog to range the forests and spring the birds, which then perch on the trees; while he is baying at the foot their attention is so much attracted by him that they permit the near approach of his master, who thus obtains a more or less easy shot. A considerable number, however, are also snared. Hybrids are very frequently produced between the Capercally and the Black Grouse (*T. tetrix*), and the offspring has been described by some authors under the name of *T. medius*, as though a distinct species. (A. N.)

[1] Not to be confounded with the bird so named previously by Prof. Nilsson, which is an hybrid.

CAPERNAUM (Καπερναούμ, that is, probably, the village of Nachum), an ancient city of Palestine, on the western shore of the Lake of Gennesareth, on the borders of the tribes of Zebulun and Naphtali. It was, more than any other place, the residence of Jesus after He commenced His mission, and thus became the scene of many of His most important miracles; but the infidelity of the inhabitants brought down upon them the heavy denunciation:—"And thou, Capernaum, which art exalted unto heaven, shalt be brought down to hell." The site of the city is a matter of much dispute,—one party, headed by Dr. Robinson, maintaining an identification with Khan Minyeh, and another, represented by Wilson, Ritter, and Thomson, supporting the claims of Tell Hum. Khan Minyeh is situated in a "fertile plain formed by the retreat of the mountains about the middle of the western shore." The ruins, according to J. L. Porter, extend over a space of several acres; and in the neighborhood is a water-source, Ain et-Tin, "the fountain of the fig-tree," which may correspond with the fountain of Capernaum mentioned by Josephus. Tell Hum lies about three miles north of Khan Minyeh, and its ruins, covering an area of "half a mile long by a quarter wide," prove it to have been the site of no small town. The satisfactory decision of the question can only be arrived at by more elaborate researches.

CAPERS, the unexpanded flower-buds of *Capparis spinosa*, prepared with vinegar for use as a pickle, which is much esteemed. The caper plant is a trailing shrub, belonging to the Mediterranean region, resembling in habit the common bramble, and having handsome flowers of a pinkish white, with four petals, and numerous long tassel-like stamens. The leaves are simple and ovate, with spiny stipules. The plant is cultivated in Sicily and the South of France; and in commerce, capers are valued according to the period at which the buds are gathered and preserved. The finest are the young tender buds called "nonpareil," after which, gradually increasing in size and lessening in value, come "superfine," "fine," "capucin," and "capot." They possess valuable stimulant, acrid, and anti-scorbutic properties similar to the *Cruciferæ*. Other species of *Capparis* are similarly employed in various localities, and in some cases the fruit is pickled.

CAPET, the name of a family, to which, for nearly nine centuries, belonged the kings of France and many of the rulers of the most powerful fiefs in that country, and which mingled with several of the other royal races of Europe.

The first of the Capets known in history was Robert the Strong, a Saxon who received from Charles the Bald the county of Anjou, and, later, in 861, the duchy of the Ile de France, and who gained popularity by his repulse of the marauding Normans. The most distinguished of his successors were Eudes, Robert, Rudolph, who succeeded to the dukedom of Burgundy in 888, 922, and 923 respectively, and Hugh the Great, count of Paris and Orleans, duke of France and Burgundy, who held vast domains from the Loire to the frontiers of Picardy. His son, Hugh Capet (987–996), being supported by the Normans and by his brother, the duke of Burgundy, was, in 987, elected king by acclamation, and crowned at Rheims, in place of the Carlovingians, who were hated for their German manners and their desire to reconstruct the empire. The Capets, on the contrary, for some time avoided all such pretensions, and carefully maintained friendship with the church and the nobles, among whom they claimed to be no more than *primi inter pares*, and over whom they scarcely attempted to exert the slightest authority. By following this policy, they firmly established themselves on the throne, the influence of which they greatly extended by marriages, treaties, and conquests, and which the family continued to hold, after the failure of the direct royal line, at the death of Charles IV, in 1322, by the accession of the indirect lines of Va-

lois, which reigned from 1322 to 1589, and of Bourbon, the last monarchical dynasty of France (see FRANCE).

The royal house of Valois was founded by Philip VI., son of Charles de Valois, second son of Philip III. (see VALOIS); and the house of Bourbon (whose family name was Capet) was connected with the Capets by the marriage, in 1272, of Robert, the sixth son of Louis IX., to Beatrice, the sole heiress of Agnes of Bourbon and the duke of Burgundy (see BOURBON).

Scarcely second in importance to the royal house is the branch to which belonged the dukes of Burgundy. In the 10th century Burgundy fell into the hands of Hugh the Great, father of Hugh Capet, who gave it, in 956, to his son Otho, and in 965 to his son Henry. In 1032 the second son of Robert the Pious, and grandson of Hugh Capet, founded the first ducal house, which ruled till 1361. For two years the duchy was in the hands of the Crown, but in 1363, the second ducal house, also Capetian, was founded by Philip the Bold, son of King John (see BURGUNDY). This branch of the Capets is also distinguished by its union with the royal house of Austria, through the marriage of Mary, daughter of Charles the Bold of Burgundy, to Maximilian, the archduke.

Of great importance also was the house of Anjou, which was founded by Charles, brother of Louis IX., Anjou having been ceded, with other provinces, by John of England to Philip Augustus, the grandfather of Charles. For an account of the counts and dukes of Anjou see ANJOU. Members of this family sat upon the thrones of three kingdoms. The counts of Anjou were also kings of Naples from 1226 to 1382; in 1309 Charles Robert of Anjou was elected king of Hungary, his claim being based upon the marriage of his ancestor with the daughter of Stephen IV. of Hungary; and, in 1445, Margaret, daughter of Duke René, married Henry VI. of England.

A third branch formed the house of Artois, which was founded, in 1226, by Robert the Illustrious, grandson of Philip Augustus, who gained possession of Artois by his marriage with Isabella of Hainault. This house merged in that of Valois, in 1383, by the marriage of Margaret of Artois with Philip the Hardy.

The throne of Navarre was also filled by the Capets. In 1284 its heiress, Jane, became the wife of Philip the Fair of France, and the two kingdoms were united till Philip of Valois ascended the French throne, when its queen, Jane, daughter of Louis X., married (1328) into the house of Evreux (see NAVARRE).

In the 13th century the throne of Constantinople was occupied by a branch of the Capets,—Pierre, eighth son of Louis VI., having obtained that dignity as brother-in-law of Baldwin count of Flanders (who was appointed emperor by the Crusaders in 1204) and of his successor Henry. Pierre was succeeded by his two sons, Robert and Baldwin de Courtenai, from the latter of whom Constantinople was recovered by the Greeks in 1261.

The counts of Dreux, for two centuries and a half (1132–1377), and the counts of Evreux, from 1307 to 1425, also belonged to the family of the Capets,—other members of which worthy of mention are the Dunois and the Longuevilles, illegitimate branches of the house of Valois, which produced many famous warriors and courtiers.

CAPGRAVE, JOHN (1393–1464), an English historian, was born at Lynn in Norfolk, 21st April, 1393. At an early age he was sent to one of the English universities,—most probably Cambridge,—and at a later period of his life he was connected with both. In his twenty-fourth year he entered the priesthood, and subsequently he prosecuted his studies in London, where he was residing at the time of the birth of King Henry VI. At Oxford he graduated D.D., taught theology publicly in the schools, and lectured on the Old and New Testaments. Having become an Augustinian friar he settled down in the house belonging to that order in his native town, where, to quote Leland's expression, he "stuck to his books like a limpet to its rock." The friary at Lynn was then a flourishing establishment. It possessed a large and valuable library, and afforded a home to no fewer than thirty priests, besides subdeacons and novices to the number of sixteen. It is highly probable that Capgrave became prior of this house, and it is certain that he was chosen provincial of his order in England. Most of his life was spent in the retirement of the cloister at Lynn, but he occasionally visited other Augustinian friaries, and once, at least, went to Rome. He died at Lynn 12th August, 14[illegible]. Capgrave was justly regarded as one of the most learned men of his age. His works are chiefly theological, consisting of commentaries, sermons, and biographies of saints. To the last class belongs the *Nova Legenda Angliæ*, printed in London by Wynkyn de Worde in 1516. Of his historical works the most important is *The Chronicle of England*, published in 1858 under the editorial supervision of the Rev. F. C. Hingeston, and forming one of the series of *Chronicles and Memorials of Great Britain and Ireland*. This "Chronicle," written in English, extends to the year 1417,—the accounts of the reigns of the later kings being very full and valuable, and containing many original notices. Mr. Hingeston also edited in the same year and for the same series Capgrave's *Liber de Illustribus Henricis*, in the original Latin, accompanying it with an English translation in a separate volume. This curious work contains lives of King Henry VI. and other men of eminence who bore the name of Henry. Many other works by Capgrave are preserved in MS., including a *Life of St. Katharine* in quaint English verse; but it is believed that his life of his patron and friend, Humphrey, duke of Gloucester, is irrecoverably lost.

CAPILLARY ACTION. A tube, the bore of which is so small that it will only admit a hair (*capillus*), is called a capillary tube. When such a tube of glass, open at both ends, is placed vertically with its lower end immersed in water, the water is observed to rise in the tube, and to stand within the tube at a higher level than the water outside. The action between the capillary tube and the water has been called Capillary Action, and the name has been extended to many other phenomena which have been found to depend on properties of liquids and solids similar to those which cause water to rise in capillary tubes.

The forces which are concerned in these phenomena are those which act between neighboring parts of the same substance, and which are called forces of cohesion, and those which act between portions of matter of different kinds, which are called forces of adhesion. These forces are quite insensible between two portions of matter separated by any distance which we can directly measure. It is only when the distance becomes exceedingly small that these forces become perceptible. Quincke[1] has made experiments to determine the greatest distance at which the effect of these forces is sensible, and he finds for various substances distances about the twenty-thousandth part of a millimetre.

Poggendorff[2] tells us that Leonardo da Vinci[3] must be considered as the discoverer of capillary phenomena.

The first accurate observations of the capillary action of tubes and glass plates were made by Hauksbee.[4] He ascribes the action to an attraction between the glass and the liquid. He observed that the effect was the same in thick tubes as in thin, and concluded that only those particles of the glass which are very near the surface have any influence on the phenomenon.

Dr. Jurin[5] showed that the height at which the liquid is suspended depends on the section of the tube at the surface of the liquid, and is independent of the form of the lower part of the tube. He considered that the suspension of the liquid is due to "the attraction of the periphery or section of the surface of the tube to which the upper surface of the water is contiguous and coheres." From this he shows that the rise of the liquid in tubes of the same substance is inversely proportional to their radii.

Newton devotes the 31st query in the last edition of his *Opticks* to molecular forces, and instances several examples of the cohesion of liquids, such as the suspension of mercury in a barometer tube at more than double the height at which it usually stands. This arises from its adhesion to the tube, and the upper part of the mercury sustains a considerable tension, or negative pressure, without the separation of its parts. He considers the capillary phenomena to be of the same kind, but his explanation is not sufficiently explicit with respect to the nature and the limits of the action of the attractive force.

It is to be observed that, while these early speculators ascribe the phenomena to attraction, they do not distinctly assert that this attraction is sensible only at insensible dis-

[1] *Pogg. Ann.*, cxxxvii. p. 402.
[2] *Pogg. Ann.*, ci., p. 551.
[3] Died 1519.
[4] *Physico-Mechanical Experiments*, London, 1709, pp. 139–169; and *Phil. Trans.*, 1711 and 1712. Francis, electrician, died in 1731.
[5] *Phil. Trans.*, 1718, No. 355, p. 739, and 1719, No. 363, p. 1083.

tances, and that for all distances which we can directly measure the force is altogether insensible. The idea of such forces, however, had been distinctly formed by Newton, who gave the first example of the calculation of the effect of such forces in his theorem on the alteration of the path of a light-corpuscle when it enters or leaves a dense body.

Clairaut[1] appears to have been the first to show the necessity of taking account of the attraction between the parts of the fluid itself in order to explain the phenomena. He does not, however, recognize the fact that the distance at which the attraction is sensible is not only small but altogether insensible.

Segner[2] introduced the very important idea of the surface-tension of liquids, which he ascribed to attractive forces, the sphere of whose action is so small "ut nullo adhuc sensu percipi potuerit." In attempting to calculate the effect of this surface-tension in determining the form of a drop of the liquid, Segner took account of the curvature of a meridian section of the drop, but neglected the effect of the curvature in a plane at right angles to this section.

But the idea of surface-tension introduced by Segner had a most important effect on the subsequent development of the theory. We may regard it as a physical fact established by experiment in the same way as the laws of the elasticity of solid bodies. We may investigate the forces which act between finite portions of a liquid in the same way as we investigate the forces which act between finite portions of a solid. The experiments on solids lead to certain laws of elasticity expressed in terms of coefficients, the values of which can be determined only by experiments on each particular substance. Various attempts have also been made to deduce these laws from particular hypotheses as to the action between the molecules of the elastic substance. We may therefore regard the theory of elasticity as consisting of two parts. The first part establishes the laws of the elasticity of a finite portion of the solid subjected to a homogeneous strain, and deduces from these laws the equations of the equilibrium and motion of a body subjected to any forces and displacements. The second part endeavors to deduce the facts of the elasticity of a finite portion of the substance from hypotheses as to the motion of its constituent molecules and the forces acting between them.

In like manner we may by experiment ascertain the general fact that the surface of a liquid is in a state of tension similar to that of a membrane stretched equally in all directions, and prove that this tension depends only on the nature and temperature of the liquid and not on its form, and from this as a secondary physical principle we may deduce all the phenomena of capillary action. This is one step of the investigation. The next step is to deduce this surface-tension from an hypothesis as to the molecular constitution of the liquid and of the bodies that surround it. The scientific importance of this step is to be measured by the degree of insight which it affords or promises into the molecular constitution of real bodies by the suggestion of experiments by which we may discriminate between rival molecular theories.

In 1756 Leidenfrost[3] showed that a soap-bubble tends to contract, so that if the tube with which it was blown is left open, the bubble will diminish in size and will expel through the tube the air which it contains. He attributed this force, however, not to any general property of the surfaces of liquids, but to the fatty part of the soap which he supposed to separate itself from the other constituents of the solution, and to form a thin skin on the outer face of the bubble.

In 1787 Monge[4] asserted that "by supposing the adherence of the particles of a fluid to have a sensible effect only at the surface itself and in the direction of the surface it would be easy to determine the curvature of the surfaces of fluids in the neighborhood of the solid boundaries which contain them; that these surfaces would be *linteriæ* of which the tension, constant in all directions, would be everywhere equal to the adherence of two particles, and the phenomena of capillary tubes would then present nothing which could not be determined by analysis." He applied this principle of surface-tension to the explanation of the apparent attractions and repulsions between bodies floating on a liquid.

[1] Clairaut, *Théorie de la Figure de la Terre*, Paris, 1808, pp. 105, 128.
[2] Segner, *Comment. Soc. Reg. Götting.*, i. (1751), p. 301.
[3] *De Aquæ communis nonnullis qualitatibus tractatus*, Duisburg.
[4] *Mémoires de l'Acad. des Sciences*, 1787, p. 506.

In 1802 Leslie[5] gave the first correct explanation of the rise of a liquid in a tube by considering the effect of the attraction of the solid on the very thin stratum of the liquid in contact with it. He does not, like the earlier speculators, suppose this attraction to act in an upward direction so as to support the fluid directly. He shows that the attraction is everywhere normal to the surface of the solid. The direct effect of the attraction is to increase the pressure of the stratum of the fluid in contact with the solid, so as to make it greater than the pressure in the interior of the fluid. The result of this pressure if unopposed is to cause this stratum to spread itself over the surface of the solid as a drop of water is observed to do when placed on a clean horizontal glass plate, and this even when gravity opposes the action, as when the drop is placed on the under surface of the plate. Hence a glass tube plunged into water would become wet all over were it not that the ascending liquid film carries up a quantity of other liquid which coheres to it, so that when it has ascended to a certain height the weight of the column balances the force by which the film spreads itself over the glass. This explanation of the action of the solid is equivalent to that by which Gauss afterwards supplied the defect of the theory of Laplace, except that, not being expressed in terms of mathematical symbols, it does not indicate the mathematical relation between the attraction of individual particles and the final result. Leslie's theory was afterwards treated according to Laplace's mathematical methods by James Ivory in the article on capillary action, under the heading "Fluids, Elevation of," in the supplement to the fourth edition of the *Encyclopædia Britannica*, published in 1819.

In 1804 Thomas Young[6] founded the theory of capillary phenomena on the principle of surface-tension. He also observed the constancy of the angle of contact of a liquid surface with a solid, and showed how from these two principles to deduce the phenomena of capillary action. His essay contains the solution of a great number of cases, including most of those afterwards solved by Laplace, but his methods of demonstration, though always correct, and often extremely elegant, are sometimes rendered obscure by his scrupulous avoidance of mathematical symbols. Having applied the secondary principle of surface-tension to the various particular cases of capillary action, Young proceeds to deduce this surface-tension from ulterior principles. He supposes the particles to act on one another with two different kinds of forces, one of which, the attractive force of cohesion, extends to particles at a greater distance than those to which the repulsive force is confined. He further supposes that the attractive force is constant throughout the minute distance to which it extends, but that the repulsive force increases rapidly as the distance diminishes. He thus shows that at a curved part of the surface, a superficial particle would be urged towards the centre of curvature of the surface, and he gives reasons for concluding that this force is proportional to the sum of the curvatures of the surface in two normal planes at right angles to each other.

The subject was next taken up by Laplace.[7] His results are in many respects identical with those of Young, but his methods of arriving at them are very different, being conducted entirely by mathematical calculations. The form into which he has thrown his investigation seems to have deterred many able physicists from the inquiry into the ulterior cause of capillary phenomena, and induced them to rest content with deriving them from the fact of surface-tension. But for those who wish to study the molecular constitution of bodies it is necessary to study the effect of forces which are sensible only at insensible distances; and Laplace has furnished us with an example of the method of this study which has never been surpassed. Laplace investigates the force acting on the fluid contained in an infinitely slender canal normal to the surface of the fluid arising from the attraction of the parts of the fluid outside the canal. He thus finds for the pressure at a point in the interior of the fluid an expression of the form

$$p = K + \frac{1}{2}H\left(\frac{1}{R} + \frac{1}{R'}\right),$$

[5] *Philosophical Magazine*, 1802, vol. xiv. p. 193.
[6] Essay on the "Cohesion of Fluids," *Philosophical Transactions*, 1805, p. 65.
[7] *Mecanique Celeste*, supplement to the tenth book, published in 1806

where K is a constant pressure, probably very large, which, however, does not influence capillary phenomena, and therefore cannot be determined from observation of such phenomena; H is another constant on which all capillary phenomena depend; and R and R′ are the radii of curvature of any two normal sections of the surface at right angles to each other.

In the first part of our own investigation we shall adhere to the symbols used by Laplace, as we shall find that an accurate knowledge of the physical interpretation of these symbols is necessary for the further investigation of the subject. In the *Supplement to the Theory of Capillary Action*, Laplace deduces the equation of the surface of the fluid from the condition that the resultant force on a particle at the surface must be normal to the surface. His explanation, however, of the rise of a liquid in a tube is based on the *assumption* of the constancy of the angle of contact for the same solid and fluid, and of this he has nowhere given a satisfactory proof. In this supplement Laplace gives many important applications of the theory, and compares the results with the experiments of Gay-Lussac.

The next great step in the treatment of the subject was made by Gauss.[1] The principle which he adopts is that of virtual velocities, a principle which under his hands was gradually transforming itself into what is now known as the principle of the conservation of energy. Instead of calculating the direction and magnitude of the resultant force on each particle arising from the action of neighboring particles, he forms a single expression which is the aggregate of all the potentials arising from the mutual action between pairs of particles. This expression has been called the force function. With its sign reversed it is now called the potential energy of the system. It consists of three parts, the first depending on the action of gravity, the second on the mutual action between the particles of the fluid, and the third on the action between the particles of the fluid and the particles of a solid or fluid in contact with it.

The condition of equilibrium is that this expression (which we may for the sake of distinctness call the potential energy) shall be a minimum. This condition when worked out gives not only the equation of the free surface in the form already established by Laplace, but the conditions of the angle of contact of this surface with the surface of a solid.

Gauss thus supplied the principal defect in the great work of Laplace. He also pointed out more distinctly the nature of the assumptions which we must make with respect to the law of action of the particles in order to be consistent with observed phenomena. He did not, however, enter into the explanation of particular phenomena, as this had been done already by Laplace. He points out, however, to physicists the advantages of the method of Segner and Gay-Lussac, afterwards carried out by Quincke, of measuring the dimensions of large drops of mercury on a horizontal or slightly concave surface, and those of large bubbles of air in transparent liquids resting against the under side of a horizontal plate of a substance wetted by the liquid.

In 1831 Poisson published his *Nouvelle Théorie de l'Action Capillaire*. He maintains that there is a rapid variation of density near the surface of a liquid, and he gives very strong reasons, which have been only strengthened by subsequent discoveries, for believing that this is the case. He then proceeds to an investigation of the equilibrium of a fluid on the hypothesis of uniform density, and he arrives at the conclusion that on this hypothesis none of the observed capillary phenomena would take place, and that, therefore, Laplace's theory, in which the density is supposed uniform, is not only insufficient but erroneous. In particular he maintains that the constant pressure K, which occurs in Laplace's theory, and which on that theory is very large, must be in point of fact very small, but the equation of equilibrium from which he concludes this is itself defective. Laplace assumes that the liquid has uniform density, and that the attraction of its molecules extends to a finite though insensible distance. On these assumptions his results are certainly right, and are confirmed by the independent method of Gauss, so that the objections raised against them by Poisson fall to the ground. But whether the assumption of uniform density be physically correct is a very different question, and Poisson has done good service to science in showing how to carry on the investigation on the hypothesis that the density very near the surface is different from that in the interior of the fluid.

The result, however, of Poisson's investigation is practically equivalent to that already obtained by Laplace. In both theories the equation of the liquid surface is the same, involving a constant H, which can be determined only by experiment. The only difference is in the manner in which this quantity H depends on the law of the molecular forces and the law of density near the surface of the fluid, and as these laws are unknown to us we cannot obtain any test to discriminate between the two theories.

We have now described the principal forms of the theory of capillary action during its earlier development. In more recent times the method of Gauss has been modified so as to take account of the variation of density near the surface, and its language has been translated in terms of the modern doctrine of the conservation of energy.[2]

M. Plateau,[3] who has himself made the most elaborate study of the phenomena of surface-tension, has adopted the following method of getting rid of the effects of gravity: He forms a mixture of alcohol and water of the same density as olive oil. He then introduces a quantity of oil into the mixture. It assumes the form of a sphere under the action of surface-tension alone. He then, by means of rings of iron-wire, disks, and other contrivances, alters the form of certain parts of the surface of the oil. The free portions of the surface then assume new forms depending on the equilibrium of surface-tension. In this way he has produced a great many of the forms of equilibrium of a liquid under the action of surface-tension alone, and compared them with the results of mathematical investigation. He has also greatly facilitated the study of liquid films by showing how to form a liquid, the films of which will last for twelve or even for twenty-four hours. The debt which science owes to M. Plateau is not diminished by the fact that, while investigating these beautiful phenomena, he has never himself seen them. He lost his sight long ago in the pursuit of science, and has ever since been obliged to depend on the eyes and the hands of others.

M. Van der Mensbrugghe[4] has also devised a great number of beautiful illustrations of the phenomena of surface-tension, and has shown their connection with the experiments of Mr. Tomlinson on the figures formed by oils dropped on the clean surface of water.

M. Dupré in his 5th, 6th, and 7th Memoirs on the Mechanical Theory of Heat (*Ann. de Chimie et de Physique*, 1866 to 1868) has done much towards applying the principles of thermodynamics to capillary phenomena, and the experiments of his son are exceedingly ingenious and well devised, tracing the influence of surface-tension in a great number of very different circumstances, and deducing from independent methods the numerical value of the surface-tension. The experimental evidence which M. Dupré has obtained bearing on the molecular structure of liquids must be very valuable, even if many of our present opinions on this subject should turn out to be erroneous.

M. Quincke[5] has made a most elaborate series of experiments on the tension of the surfaces separating one liquid from another and from air.

M. Lüdtge[6] has experimented on liquid films, and has shown how a film of a liquid of high surface-tension is replaced by a film of lower surface-tension. He has also experimented on the effects of the thickness of the film, and has come to the conclusion that the thinner a film is, the greater is its tension. This result, however, has been tested by M. Van der Mensbrugghe, who finds that the tension is the same for the same liquid whatever be the thickness as long as the film does not burst. The phenomena of very thin liquid films deserve the most careful study, for it is in this way that we are most likely to obtain evidence by which we may test the theories of the molecular structure of liquids.

[1] *Principia generalia Theoriæ Figuræ Fluidorum in statu Æquilibrii* (Göttingen, 1830), or *Werke*, v. 29 (Göttingen, 1867).

[2] See Prof. Betti, *Teoria della Capillarità: Nuovo Cimento*, 1867; a memoir by M. Stahl, "Ueber einige Punckte in der Theorie der Capillarerscheinungen," *Pogg. Ann.*, cxxxix. p. 239 (1870); and M. Van der Waal's *Over de Continuiteit van den Gas- en Vloeistoftoestand*. The student will find a good account of the subject from a mathematical point of view in Professor Challis's "Report on the Theory of Capillary Attraction," *Brit. Ass. Report*, iv. p. 253 (1834).

[3] M. Plateau, *Statique experimentale et théorique des liquides*.

[4] *Mém. de l'Acad. Roy. de Belgique*, xxxvii. (1873).

[5] *Pogg. Ann.*, cxxxix. (1870), p. 1.

[6] Ibid., p. 620.

Sir W. Thomson[1] has investigated the effect of the curvature of the surface of a liquid on the thermal equilibrium between the liquid and the vapor in contact with it. He has also calculated the effect of surface-tension on the propagation of waves on the surface of a liquid, and has determined the minimum velocity of a wave, and the velocity of the wind when it is just sufficient to disturb the surface of still water.[2]

Theory of Capillary Action.

When two different fluids are placed in contact, they may either diffuse into each other or remain separate. In some cases diffusion takes place to a limited extent, after which the resulting mixtures do not mix with each other. The same substance may be able to exist in two different states at the same temperature and pressure, as when water and its saturated vapor are contained in the same vessel. The conditions under which the thermal and mechanical equilibrium of two fluids, two mixtures, or the same substance in two physical states in contact with each other, is possible belong to thermodynamics. All that we have to observe at present is that, in the cases in which the fluids do not mix of themselves, the potential energy of the system must be greater when the fluids are mixed than when they are separate.

It is found by experiment that it is only very close to the bounding surface of a liquid that the forces arising from the mutual action of its parts have any resultant effect on one of its particles. The experiments of Quincke and others seem to show that the extreme range of the forces which produce capillary action lies between a thousandth and a twenty thousandth part of a millimetre.

We shall use the symbol ϵ to denote this extreme range, beyond which the action of these forces may be regarded as insensible. If χ denotes the potential energy of unit of mass of the substance, we may treat χ as sensibly constant except within a distance ϵ of the bounding surface of the fluid. In the interior of the fluid it has the uniform value χ_0. In like manner the density, ρ, is sensibly equal to the constant quantity ρ_0, which is its value in the interior of the liquid, except within a distance ϵ of the bounding surface. Hence if V is the volume of a mass M of liquid bounded by a surface whose area is S, the integral

$$M = \iiint \rho dx dy dz \quad . \quad . \quad . \quad . \quad . \quad (1),$$

where the integration is to be extended throughout the volume V, may be divided into two parts by considering separately the thin shell or skin extending from the outer surface to a depth ϵ, within which the density and other properties of the liquid vary with the depth, and the interior portion of the liquid within which its properties are constant.

Since ϵ is a line of insensible magnitude compared with the dimensions of the mass of liquid and the principal radii of curvature of its surface, the volume of the shell whose surface is S and thickness ϵ will be $S\epsilon$, and that of the interior space will be $V - S\epsilon$.

If we suppose a normal ν less than ϵ to be drawn from the surface S into the liquid, we may divide the shell into elementary shells whose thickness is $d\nu$, in each of which the density and other properties of the liquid will be constant.

The volume of one of these shells will be $Sd\nu$. Its mass will be $S\rho d\nu$. The mass of the whole shell will therefore be $S\int_0^\epsilon \rho d\nu$, and that of the interior part of the liquid $(V - S\epsilon)\rho_0$. We thus find for the whole mass of the liquid

$$M = V\rho_0 - S\int_0^\epsilon (\rho_0 - \rho) d\nu \quad . \quad . \quad . \quad . \quad (2).$$

To find the potential energy we have to integrate

$$E = \iiint \chi\rho dx dy dz . \quad . \quad . \quad . \quad . \quad . \quad (3).$$

Substituting $\chi\rho$ for ρ in the process we have just gone through, we find

$$E = V\chi_0\rho_0 - S\int_0^\epsilon (\chi_0\rho_0 - \chi\rho) d\nu \quad . \quad . \quad . \quad (4).$$

Multiplying equation (2) by χ_0, and subtracting it from (4),

$$E - M\chi_0 = \chi_0 S\int_0^\epsilon (\chi - \chi_0)\rho d\nu . \quad . \quad . \quad (5).$$

In this expression M and χ_0 are both constant, so that the variation of the right hand side of the equation is the same as that of the energy E, and expresses that part of the energy which depends on the area of the bounding surface of the liquid. We may call this the surface energy.

The symbol χ expresses the energy of unit of mass of the liquid at a depth ν within the bounding surface. When the liquid is in contact with a rare medium, such as its own vapor or any other gas, χ is greater than χ_0, and the surface energy is positive. By the principle of the conservation of energy, any displacement of the liquid by which its energy is diminished will tend to take place of itself. Hence if the energy is the greater, the greater the area of the exposed surface, the liquid will tend to move in such a way as to diminish the area of the exposed surface, or in other words, the exposed surface will tend to diminish if it can do so consistently with the other conditions. This tendency of the surface to contract itself is called the surface-tension of liquids.

M. Dupré has described an arrangement by which the surface-tension of a liquid film may be illustrated.

A piece of sheet metal is cut out in the form AA (fig. 1). A very fine slip of metal is laid on it in the position BB, and the whole is dipped into a solution of soap, or M. Plateau's glycerine mixture. When it is taken out the rectangle AACC is filled up by a liquid film. This film, however, tends to contract on itself, and the loose strip of metal BB will, if it is let go, be drawn up towards AA, provided it is sufficiently light and smooth.

Fig. 1.

Let T be the surface energy per unit of area; then the energy of a surface of area S will be ST. If, in the rectangle AACC, $AA = a$, and $CC = b$, its area is $S = ab$, and its energy Tab. Hence if F is the force by which the slip BB is pulled towards AA[1],

$$F = \frac{d}{db} Tab = Ta \quad . \quad . \quad . \quad . \quad . \quad (6),$$

or the force arising from the surface-tension acting on a length a of the strip is Ta, so that T represents the surface-tension acting transversely on every unit of length of the periphery of the liquid surface. Hence if we write

$$T = \int_0^\epsilon (\chi - \chi_0)\rho d\nu \quad . \quad . \quad . \quad . \quad . \quad (7),$$

we may define T either as the surface-energy per unit of area, or as the surface-tension per unit of contour, for the numerical values of these two quantities are equal.

If the liquid is bounded by a dense substance, whether liquid or solid, the value of χ may be different from its value when the liquid has a free surface. If the liquid is in contact with another liquid, let us distinguish quantities belonging to the two liquids by suffixes. We shall then have

$$E_1 - M_1\chi_{01} = S\int_0^{\epsilon_1} (\chi_1 - \chi_{01})\rho_1 d\nu_1 \quad . \quad . \quad . \quad (8),$$

$$E_2 - M_2\chi_{02} = S\int_0^{\epsilon_2} (\chi_2 - \chi_{02})\rho_2 d\nu_2 . \quad . \quad . \quad (9).$$

Adding these expressions, and dividing the second member by S, we obtain for the tension of the surface of contact of the two liquids

$$T_{1,2} = \int_0^{\epsilon_1} (\chi_1 - \chi_{01})\rho_1 d\nu_1 + \int_0^{\epsilon_2} (\chi_2 - \chi_{02})\rho_2 d\nu_2 \quad (10).$$

If this quantity is positive, the surface of contact will tend to contract, and the liquids will remain distinct. If, however, it were negative, the displacement of the liquids which tends to enlarge the surface of contact would be aided by the molecular forces, so that the liquids, if not kept separate by gravity, would at length become thoroughly mixed. No instance, however, of a phenomenon of this kind has been discovered, for those liquids which mix of themselves do so by the process of diffusion, which is a molecular motion, and not by the spontaneous puckering and replication of the bounding surface as would be the case if T were negative.

It is probable, however, that there are many cases in which the integral belonging to the less dense fluid is negative. If the denser body be solid we can often demonstrate this; for the liquid tends to spread itself over the surface of the solid, so as to increase the area of the surface of contact, even although in so doing it is obliged to increase the free surface in opposition to the surface-tension. Thus water spreads itself out on a clean surface of glass. This shows that $\int_0^\epsilon (\chi - \chi_0)\rho d\nu$ must be negative for water in contact with glass.

On the Tension of Liquid Films.

The method already given for the investigation of the surface-tension of a liquid, all whose dimensions are sensible, fails in the case of a liquid film such as a soap-bubble. In such a film it is possible that no part of the liquid may be so far from the surface as to have the potential and den-

[1] *Proceedings R. S.*, Edinburgh, February 7, 1870.
[2] *Philosophical Magazine*, November, 1871.

sity corresponding to what we have called the interior of a liquid mass, and measurements of the tension of the film when drawn out to different degrees of thinness may possibly lead to an estimate of the range of the molecular forces, or at least of the depth within a liquid mass, at which its properties become sensibly uniform. We shall therefore indicate a method of investigating the tension of such films.

Let S be the area of the film, M its mass, and E its energy; σ the mass, and e the energy of unit of area; then

$$M = S\sigma \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (11),$$
$$E = Se \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (12).$$

Let us now suppose that by some change in the form of the boundary of the film its area is changed from S to S + dS. If its tension is T the work required to effect this increase of surface will be TdS, and the energy of the film will be increased by this amount. Hence

$$T dS = dE$$
$$= S de + e dS \quad . \quad . \quad . \quad . \quad (13).$$

But since M is constant,

$$dM = S d\sigma + \sigma dS = 0 \quad . \quad . \quad . \quad . \quad (14).$$

Eliminating dS from equations (13) and (14), and dividing by S, we find

$$T = e - \sigma \frac{de}{d\sigma} \quad . \quad . \quad . \quad . \quad . \quad . \quad (15).$$

In this expression σ denotes the mass of unit of area of the film, and e the energy of unit of area.

If we take the axis of z normal to either surface of the film, the radius of curvature of which we suppose to be very great compared with its thickness c, and if ρ is the density, and χ the energy of unit of mass at depth z, then

$$\sigma = \int_0^c \rho dz \quad . \quad . \quad . \quad . \quad . \quad . \quad (16),$$

and

$$e = \int_0^c \chi\rho dz \quad . \quad . \quad . \quad . \quad . \quad . \quad (17).$$

Both ρ and χ are functions of z, the value of which remains the same when $z - c$ is substituted for z. If the thickness of the film is greater than 2ϵ, there will be a stratum of thickness $c - 2\epsilon$ in the middle of the film, within which the values of ρ and χ will be ρ_0 and χ_0. In the two strata on either side of this the law, according to which ρ and χ depend on the depth, will be the same as in a liquid mass of large dimensions. Hence in this case

$$\sigma = (c - 2\epsilon)\rho_0 + 2\int_0^\epsilon \rho d\nu \quad . \quad . \quad . \quad (18),$$

$$e = (c - 2\epsilon)\chi_0\rho_0 + 2\int_0^\epsilon \chi\rho d\nu \quad . \quad . \quad (19),$$

$$\frac{d\sigma}{dc} = \rho_0 \quad , \quad \frac{de}{dc} = \chi_0\rho_0 \quad , \quad \therefore \frac{de}{d\sigma} = \chi_0$$

$$T = 2\int_0^\epsilon \chi\rho d\nu - 2\chi_0 \int_0^\epsilon \rho d\nu,$$

$$= 2\int_0^\epsilon (\chi - \chi_0)\rho d\nu \quad . \quad . \quad . \quad . \quad . \quad (20).$$

Hence the tension of a thick film is equal to the sum of the tensions of its two surfaces as already calculated (equation 7). On the hypothesis of uniform density we shall find that this is true for films whose thickness exceeds ϵ.

The symbol χ is defined as the energy of unit of mass of the substance. A knowledge of the absolute value of this energy is not required, since in every expression in which it occurs it is under the form $\chi - \chi_0$, that is to say, the difference between the energy in two different states. The only cases, however, in which we have experimental values of this quantity are when the substance is either liquid and surrounded by similar liquid, or gaseous and surrounded by similar gas. It is impossible to make direct measurements of the properties of particles of the substance within the insensible distance ϵ of the bounding surface.

When a liquid is in thermal and dynamical equilibrium with its vapor, then if ρ' and χ' are the values of ρ and χ for the vapor, and ρ_0 and χ_0 those for the liquid,

$$\chi' - \chi_0 = JL - p\left(\frac{1}{\rho'} - \frac{1}{\rho_0}\right) \quad . \quad . \quad (21),$$

where J is the dynamical equivalent of heat, L is the latent heat of unit of mass of the vapor, and p is the pressure. At points in the liquid very near its surface it is probable that χ is greater than χ_0, and at points in the gas very near the surface of the liquid it is probable that χ is less than χ', but this has not as yet been ascertained experimentally. We shall therefore endeavor to apply to this subject the methods used in Thermodynamics, and where these fail us we shall have recourse to the hypotheses of molecular physics.

We have next to determine the value of χ in terms of the action between one particle and another. Let us suppose that the force between two particles m and m' at the distance f is

$$F = m\,m'\left(\phi(f) + \frac{C}{f^2}\right) \quad . \quad . \quad . \quad . \quad (22),$$

being reckoned positive when the force is attractive. The actual force between the particles arises in part from their mutual gravitation, which is inversely as the square of the distance. This force is expressed by $m\,m'\frac{C}{f^2}$. It is easy to show that a force subject to this law would not account for capillary action. We shall, therefore, in what follows, consider only that part of the force which depends on $\phi(f)$, where $\phi(f)$ is a function of f which is insensible for all sensible values of f, but which becomes sensible and even enormously great when f is exceedingly small.

If we next introduce a new function of f and write

$$\int_f^\infty \phi(f)df = \Pi(f) \quad . \quad . \quad . \quad . \quad . \quad (23),$$

then $m\,m'\,\Pi(f)$ will represent—1. The work done by the attractive force on the particle m, while it is brought from an infinite distance from m' to the distance f from m'; or 2. The attraction of a particle m on a narrow straight rod resolved in the direction of the length of the rod, one extremity of the rod being at a distance f from m, and the other at an infinite distance, the mass of unit of length of the rod being m'. The function $\Pi(f)$ is also insensible for sensible values of f, but for insensible values of f it may become sensible and even very great.

If we next write

$$\int_z^\infty f\Pi(f)df = \psi(z) \quad . \quad . \quad . \quad . \quad . \quad (24),$$

then $2\pi m\sigma\psi(z)$ will represent—1. The work done by the attractive force while a particle m is brought from an infinite distance to a distance z from an infinitely thin stratum of the substance whose mass per unit of area is σ; 2. The attraction of a particle m placed at a distance z from the plane surface of an infinite solid whose density is σ.

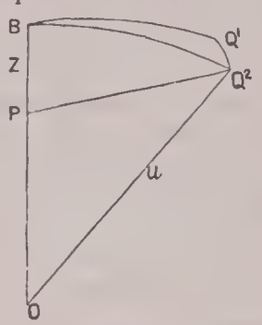


Fig. 2.

Let us examine the case in which the particle m is placed at a distance z from a curved stratum of the substance, whose principal radii of curvature are R_1 and R_2. Let P (fig. 2) be the particle and PB a normal to the surface. Let the plane of the paper be a normal section of the surface of the stratum at the point B, making an angle ω with the section whose radius of curvature is R_1. Then if O is the centre of curvature in the plane of the paper, and BO = u,

$$\frac{1}{u} = \frac{\cos.^2\omega}{R_1} + \frac{\sin.^2\omega}{R_2} \quad . \quad . \quad . \quad . \quad . \quad (25).$$

Let $\quad POQ = \theta \;,\; PO = r \;,\; PQ = f \;,\; BP = z,$

$$f^2 = u^2 + r^2 - 2ur\cos.\theta \quad . \quad . \quad . \quad . \quad (26).$$

The element of the stratum at Q may be expressed by

$$\sigma u^2 \sin.\theta\, d\theta d\omega,$$

or expressing $d\theta$ in terms of df by (26),

$$\sigma\frac{u}{r}f df d\omega.$$

Multiplying this by m and by Πf, we obtain for the work done by the attraction of this element when m is brought from an infinite distance to P_1,

$$m\sigma\frac{u}{r}f\Pi(f)df d\omega.$$

Integrating with respect to f from $f = z$ to $f = a$, where a is a line very great compared with the extreme range of the molecular force, but very small compared with either of the radii of curvature, we obtain for the work

$$\int m\sigma\frac{u}{r}\Big(\psi(z) - \psi(a)\Big)d\omega,$$

and since $\psi(a)$ is an insensible quantity we may omit it. We may also write

$$\frac{u}{r} = 1 + \frac{z}{u} + \&c.,$$

since z is very small compared with u, and expressing u in terms of ω by (25), we find

$$\int_0^{2\pi} m\sigma\psi(z)\left\{1 + z\left(\frac{\cos.^2\omega}{R_1} + \frac{\sin.^2\omega}{R_2}\right)\right\}d\omega$$
$$= 2\pi m\sigma\psi(z)\left\{1 + \frac{1}{2}z\left(\frac{1}{R_1} + \frac{1}{R_2}\right)\right\}.$$

This then expresses the work done by the attractive forces when a particle m is brought from an infinite distance to the point P at a distance z from a stratum whose surface-density is σ, and whose principal radii of curvature are R_1 and R_2.

To find the work done when m is brought to the point P in the neighborhood of a solid body, the density of which is a function of the depth ν below the surface, we have only to write instead of $\sigma\,\rho dz$, and to integrate

$$2\pi m\int_s^\infty \rho\psi(z)dz + \pi m\left(\frac{1}{R_1}+\frac{1}{R_2}\right)\int_z^\infty \rho z\psi(z)dz,$$

where, in general, we must suppose ρ a function of z. This expression, when integrated, gives (1) the work done on a particle m while it is brought from an infinite distance to the point P, or (2) the attraction on a long slender column normal to the surface and terminating at P, the mass of unit of length of the column being m. In the form of the theory given by Laplace, the density of the liquid was supposed to be uniform. Hence if we write

$$K = 2\pi\int_0^\infty \psi(z)dz\ ,\ H = 2\pi\int_0^\infty z\psi(z)dz,$$

the pressure of a column *of the fluid itself* terminating at the surface will be

$$\rho^2\left\{K+\frac{1}{2}H\left(\frac{1}{R_1}+\frac{1}{R_2}\right)\right\},$$

and the work done by the attractive forces when a particle m is brought to the surface of the fluid from an infinite distance will be

$$m\rho\left\{K+\frac{1}{2}H\left(\frac{1}{R_1}+\frac{1}{R_2}\right)\right\}.$$

If we write

$$\int_z^\infty \psi(z)dz = \theta(z),$$

then $2\pi m\rho\theta(z)$ will express the work done by the attractive forces while a particle m is brought from an infinite distance to a distance z from the plane surface of a mass of the substance of density ρ and infinitely thick. The function $\theta(z)$ is insensible for all sensible values of z. For insensible values it may become sensible, but it must remain finite even when $z=0$, in which case $\theta(0)=K$.

If χ' is the potential energy of unit of mass of the substance in vapor, then at a distance z from the plane surface of the liquid

$$\chi = \chi' - 2\pi\rho\theta(z).$$

At the surface

$$\chi = \chi' - 2\pi\rho\theta(0).$$

At a distance z within the surface

$$\chi = \chi' - 4\pi\rho\theta(0) + 2\pi\rho\theta(z).$$

If the liquid forms a stratum of thickness c, then

$$\chi = \chi' - 4\pi\rho\theta(0) + 2\pi\rho\theta(z) + 2\pi\rho\theta(z-c).$$

The surface-density of this stratum is $\sigma = c\rho$. The energy per unit of area is

$$e = \int_0^c \chi\rho dz$$
$$= c\rho(\chi' - 4\pi\rho\theta(0)) + 2\pi\rho^2\int_0^c\theta(z)dz + 2\pi\rho^2\int_0^c\theta(c-z)dz.$$

Since the two sides of the stratum are similar the last two terms are equal, and

$$e = c\rho(\chi' - 4\pi\rho\theta(0)) + 4\pi\rho^2\int_0^c\theta(z)dz.$$

Differentiating with respect to c, we find

$$\frac{d\sigma}{dc} = \rho,$$

$$\frac{de}{dc} = \rho(\chi' - 4\pi\rho\theta(0)) + 4\pi\rho^2\theta(c).$$

Hence the surface-tension

$$T = e - \sigma\frac{de}{d\sigma}$$
$$= 4\pi\rho^2\left(\int_0^c\theta(z)dz - c\theta(c)\right).$$

Integrating the first term within brackets by parts, it becomes

$$c\theta(c) - 0\theta(0) - \int_0^c z\frac{d\theta}{dz}dz.$$

Remembering that $\theta(0)$ is a finite quantity, and that $\frac{d\theta}{dz} = -\psi(z)$, we find

$$T = 4\pi\rho^2\int_0^c z\psi(z)dz.$$

When c is greater than ϵ this is equivalent to 2H in the equation of Laplace. Hence the tension is the same for all films thicker than ϵ, the range of the molecular forces. For thinner films

$$\frac{dT}{dc} = 4\pi\rho^2 c\psi(c)$$

Hence if $\psi(c)$ is positive, the tension and the thickness will increase together. Now $2\pi m\rho\psi(c)$ represents the attraction between a particle m and the plane surface of an infinite mass of the liquid, when the distance of the particle outside the surface is c. Now, the force between the particle and the liquid is certainly, on the whole, attractive; but if between any two small values of c it should be repulsive, then for films whose thickness lies between these values the tension will increase as the thickness diminishes, but for all other cases the tension will diminish as the thickness diminishes.

We have given several examples in which the density is assumed to be uniform, because Poisson has asserted that capillary phenomena would not take place unless the density varied rapidly near the surface. In this assertion we think he was mathematically wrong, though in his own hypothesis that the density does actually vary, he was probably right. In fact, the quantity $4\pi\rho^2K$, which we may call with Van der Waals the molecular pressure, is so great for most liquids (5000 atmospheres for water), that in the parts near the surface, where the molecular pressure varies rapidly, we may expect considerable variation of density, even when we take into account the smallness of the compressibility of liquids.

The pressure at any point of the liquid arises from two causes, the external pressure P to which the liquid is subjected, and the pressure arising from the mutual attraction of its molecules. If we suppose that the number of molecules within the range of the attraction of a given molecule is very large, the part of the pressure arising from attraction will be proportional to the square of the number of molecules in unit of volume, that is, to the square of the density. Hence we may write

$$p = P + A\rho^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1),$$

where A is a constant. But by the equations of equilibrium of the liquid

$$dp = -\rho\,d\chi. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2).$$

Hence

$$-\rho d\chi = 2A\rho d\rho \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3),$$

and

$$\chi' - \chi = 2A\rho - 2B \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4),$$

where B is another constant.

Near the plane surface of a liquid we may assume ρ a function of z. We have then for the value of χ at the point where $z=c$,

$$\chi' - \chi = 2\pi\int_{c-\epsilon}^{c+\epsilon}\rho(z)\psi(z-c)dz \quad . \quad . \quad . \quad (5),$$

where ϵ is the range beyond which the attraction of a mass of liquid bonnded by a plane surface becomes insensible. The value of χ depends, therefore, on those values only of ρ which correspond to strata for which z is nearly equal to c. We may, therefore, expand ρ in terms of $z-c$, or writing x for $z-c$,

$$\rho = \rho_c + x\left(\frac{d\rho}{dz}\right)_{(c)} + \frac{x^2}{2}\left(\frac{d^2\rho}{dz^2}\right)_{(c)} + \&c. \quad . \quad . \quad (6),$$

where the suffix (c) denotes that in the quantity to which it is applied after differentiation, z is to be made equal to c. We may now write

$$\chi' - \chi = 2\pi\rho_{(c)}\int_{-\epsilon}^{+\epsilon}\psi(x)dx + 2\pi\left(\frac{d\rho}{dz}\right)_{(c)}\int_{-\epsilon}^{+\epsilon}x\psi(x)dx +$$
$$2\pi\left(\frac{d^2\rho}{dz^2}\right)_{(c)}\frac{1}{2}\int x^2\psi(x)dx + \&c. \quad . \quad . \quad . \quad . \quad . \quad . \quad (7).$$

The function $\psi(x)$ has equal values for $+x$ and $-x$. Hence $\int_{-\epsilon}^{+\epsilon}x^n\psi(x)dx$ vanishes if n is odd.

But if we write

$$K = \pi\int_{-\epsilon}^{+\epsilon}\psi(x)dx,\ L = \frac{1}{2}\pi\int_{-\epsilon}^{+\epsilon}x^2\psi(x)dx,$$

$$M = \frac{1}{1.2.3.4}\pi\int_{-\epsilon}^{+\epsilon}x^4\psi(x)dx,\ \&c.$$

$$\chi' - \chi = 2K\rho + 2L\frac{d^2\rho}{dz^2} + 2M\frac{d^4\rho}{dz^4} + \&c.$$

This is the expression for χ on the hypothesis that the value of ρ can be expanded in a series of powers of $z-c$ within the limits $z-\epsilon$ and $z+\epsilon$. It is only when the point P is within the distance ϵ of the surface of the liquid that this ceases to be possible.

If we now substitute for χ its value from equation 4, we obtain

$$2A\rho - 2B = 2K\rho + 2L\frac{d^2\rho}{dz^2} + 2M\frac{d^4\rho}{dz^4} + \&c.,$$

a linear differential equation in ρ, the solution of which is

$$\rho = \frac{B}{A-K} + C_1e^{n_1z} + C_2e^{n_2z} + C_3e^{n_3z} + C_4e^{n_4z},$$

where n_1, n_2, n_3, n_4 are the roots of the equation

$$Mn^4 + Ln^2 + K - A = 0.$$

The coefficient M is less than ϵ^2L, where ϵ is the range of the

attractive force. Hence we may consider M very small compared with L. If we neglect M altogether,

$$n_1 = \sqrt{\frac{A-K}{L}},\ n_2 = -\sqrt{\frac{A-K}{L}}.$$

If we assume a quantity a such that $a^2K = 2L$, we may call a the *average range of the molecular forces*. If we also take b, so that $bn = 1$, we may call b the *modulus of the variation of the density near the surface*.

Our calculation hitherto has been made on the hypothesis that a is small when compared with b, and in that case we have found that $a^2 : b^2 :: A - K : K$.

But it appears from experiment on liquids that $A - K$ is in general large when compared with K, and sometimes very large. Hence we conclude, first, that the hypothesis of our calculation is incorrect, and, secondly, that the phenomena of capillary action do not in any very great degree depend on the variation of density near the surface, but that the principal part of the force depends on the finite range of the molecular action.

In the following table, $A\rho$ is half the cubical elasticity of the liquid, and $K\rho$ the molecular pressure, both expressed in atmospheres (the absolute value of an atmosphere being one million in centimetre-gramme-second measure, see below, p. 63). ρ is the density, T the surface-tension, and a the average range of the molecular action, as calculated by Von der Waals from the values of T and K.

The unit in which a is expressed is $1\text{ cm} \times 10^{-9}$; a is therefore the twenty-millionth part of a centimetre for mercury, the thirty-millionth for water, and the forty-millionth part for alcohol. Quincke, however, found by direct experiment that certain molecular actions were sensible at a distance of a two-hundred-thousandth part of a centimetre, so that we cannot regard any of these numbers as accurate.

	$A\rho$	$K\rho$	ρ	T	a
Ether	4600	1300	.73	18	29
Alcohol	5500	2100	.79	25.5	25
Bisulphide of Carbon	16000	2900	1.27	32.1	23
Water	22200	5000	1	81	31
Mercury	542000	22500	13.54	540	49

On Surface-tension.

Definition.—*The tension of a liquid surface across any line drawn on the surface is normal to the line, and is the same for all directions of the line, and is measured by the force across an element of the line divided by the length of that element.*

Experimental Laws of Surface-tension.

1. For any given liquid surface, as the surface which separates water from air, or oil from water, the surface-tension is the same at every point of the surface and in every direction. It is also practically independent of the curvature of the surface, although it appears from the mathematical theory that there is a slight increase of tension where the mean curvature of the surface is concave, and a slight diminution where it is convex. The amount of this increase and diminution is too small to be directly measured, though it has a certain theoretical importance in the explanation of the equilibrium of the superficial layer of the liquid where it is inclined to the horizon.

2. The surface-tension diminishes as the temperature rises, and when the temperature reaches that of the critical point at which the distinction between the liquid and its vapor ceases, it has been observed by Andrews that the capillary action also vanishes. The early writers on capillary action supposed that the diminution of capillary action was due simply to the change of density corresponding to the rise of temperature, and, therefore, assuming the surface-tension to vary as the square of the density, they deduced its variations from the observed dilatation of the liquid by heat. This assumption, however, does not appear to be verified by the experiments of Brunner and Wolff on the rise of water in tubes at different temperatures.

3. The tension of the surface separating two liquids which do not mix cannot be deduced by any known method from the tensions of the surfaces of the liquids when separately in contact with air.

When the surface is curved, the effect of the surface-tension is to make the pressure on the concave side exceed the pressure on the convex side by $T\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$, where T is the intensity of the surface-tension and R_1, R_2 are the radii of curvature of any two sections normal to the surface and to each other.

If three fluids which do not mix are in contact with each other, the three surfaces of separation meet in a line, straight or curved. Let O (fig. 3) be a point in this line, and let the plane of the paper be supposed to be normal to the line at the point O. The three angles between the tangent planes to the three surfaces of separation at the point O are completely determined by the tensions of the three surfaces. For if in the triangle *abc* the side *ab* is taken so as to represent on a given scale the tension of the surface of contact of the fluids *a* and *b*, and if the other sides *bc* and *ca* are taken so as to represent on the same scale the tensions of the surfaces between *b* and *c* and between *c* and *a* respectively, then the condition of equilibrium at O for the corresponding tensions R, P, and Q is that the angle ROP shall be the supplement of *abc*, POQ of *bca*, and, therefore, QOR of *cab*. Thus the angles at which the surfaces of separation meet are the same at all parts of the line of concourse of the three fluids. When three films of the same liquid meet, their tensions are equal, and, therefore, they make angles of 120° with each other. The froth of soapsuds or beat-up eggs consists of a multitude of small films which meet each other at angles of 120°.

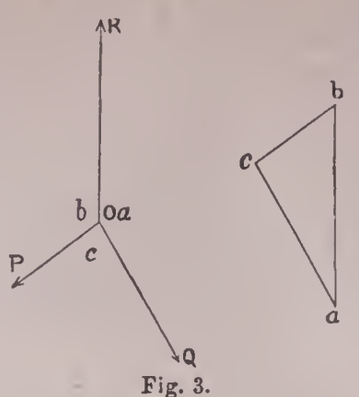


Fig. 3.

If four fluids, *a*, *b*, *c*, *d*, meet in a point O, and if a tetrahedron ABCD is formed so that its edge AB represents the tension of the surface of contact of the liquids *a* and *b*, BC that of *b* and *c*, and so on; then if we place this tetrahedron so that the face ABC is normal to the tangent at O to the line of concourse of the fluids *abc*, and turn it so that the edge AB is normal to the tangent plane at O to the surface of contact of the fluids *a* and *b*, then the other three faces of the tetrahedron will be normal to the tangents at O to the other three lines of concourse of the liquids, and the other five edges of the tetrahedron will be normal to the tangent planes at O to the other five surfaces of contact.

If six films of the same liquid meet in a point the corresponding tetrahedron is a regular tetrahedron, and each film, where it meets the others, has an angle whose cosine is $-\frac{1}{3}$. Hence if we take two nets of wire with hexagonal meshes, and place one on the other so that the point of concourse of three hexagons of one net coincides with the middle of a hexagon of the other, and if we then, after dipping them in Plateau's liquid, place them horizontally, and gently raise the upper one, we shall develop a system of plane laminæ arranged as the walls and floors of the cells are arranged in a honeycomb. We must not, however, raise the upper net too much, or the system of films will become unstable.

When a drop of one liquid, B, is placed on the surface of another, A, the phenomena which take place depend on the relative magnitude of the three surface-tensions corresponding to the surface between A and air, between B and air, and between A and B. If no one of these tensions is greater than the sum of the other two, the drop will assume the form of a lens, the angles which the upper and lower surfaces of the lens make with the free surface of A and with each other being equal to the external angles of the triangle of forces. Such lenses are often seen formed by drops of fat floating on the surface of hot water, soup, or gravy. But when the surface-tension of A exceeds the sum of the tensions of the surfaces of contact of B with air and with A, it is impossible to construct the triangle of forces, so that equilibrium becomes impossible. The edge of the drop is drawn out by the surface-tension of A with a force greater than the sum of the tensions of the two surfaces of the drop. The drop, therefore, spreads itself out, with great velocity, over the surface of A till it covers an enormous area, and is reduced to such extreme tenuity that it is not probable that it retains the same properties of surface-tension which it has in a large mass. Thus a drop of train oil will spread itself over the surface of the sea till it shows the colors of thin plates. These rapidly descend in Newton's scale and at last disappear, showing that the thickness of the film is less than the

tenth part of the length of a wave of light. But even when thus attenuated, the film may be proved to be present, since the surface-tension of the liquid is considerably less than that of pure water. This may be shown by placing another drop of oil on the surface. This drop will not spread out like the first drop, but will take the form of a flat lens with a distinct circular edge, showing that the surface-tension of what is still apparently pure water is now less than the sum of the tensions of the surfaces separating oil from air and water.

The spreading of drops on the surface of a liquid has formed the subject of a very extensive series of experiments by Mr. Tomlinson. M. Van der Mensbrugghe has also written a very complete memoir on this subject.[1]

When a solid body is in contact with two fluids, the surface of the solid cannot alter its form, but the angle at which the surface of contact of the two fluids meets the surface of the solid depends on the values of the three surface-tensions. If a and b are the two fluids and c the solid then the equilibrium of the tensions at the point O depends only on that of thin components parallel to the surface, because the surface-tensions normal to the surface are balanced by the resistance of the solid. Hence if the angle ROQ (fig. 4) at which the surface of contact OP meets the solid is denoted by α,

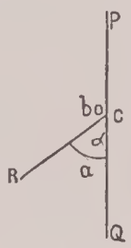


Fig. 4.

$$T_{bc} - T_{ca} - T_{ab} \cos. \alpha = 0,$$

whence

$$\cos. \alpha = \frac{T_{bc} - T_{ca}}{T_{ab}}.$$

As an experiment on the angle of contact only gives us the difference of the surface-tensions at the solid surface, we cannot determine their actual value. It is theoretically probable that they are often negative, and may be called surface-pressures.

The constancy of the angle of contact between the surface of a fluid and a solid was first pointed out by Dr. Young, who states that the angle of contact between mercury and glass is about 140°. Quincke makes it 128° 52′.

If the tension of the surface between the solid and one of the fluids exceeds the sum of the other two tensions, the point of contact will not be in equilibrium, but will be dragged towards the side on which the tension is greatest. If the quantity of the first fluid is small it will stand in a drop on the surface of the solid without wetting it. If the quantity of the second fluid is small it will spread itself over the surface and wet the solid. The angle of contact of the first fluid is 180° and that of the second is zero.

If a drop of alcohol be made to touch one side of a drop of oil on a glass plate, the alcohol will appear to chase the oil over the plate, and if a drop of water and a drop of bisulphide of carbon be placed in contact in a horizontal capillary tube, the bisulphide of carbon will chase the water along the tube. In both cases the liquids move in the direction in which the surface-pressure at the solid is least.

On the Rise of a Liquid in a Tube.

Let a tube (fig. 5) whose internal radius is r, made of a solid substance c, be dipped into a liquid a. Let us suppose that the angle of contact for this liquid with the solid c is an acute angle. This implies that the tension of the free surface of the solid c is greater than that of the surface of contact of the solid with the liquid a. Now consider the tension of the free surface of the liquid a. All round its edge there is a tension T acting at an angle α with the vertical. The circumference of the edge is $2\pi r$, so that the resultant of this tension is a force $2\pi r$T cos. α acting vertically upwards on the liquid. Hence the liquid will rise in the tube till the weight of the vertical column between the free surface and the level of the liquid in the vessel balances the resultant of the surface-tension. The upper surface of this column is not level, so that the height of the column cannot be directly measured, but let us assume that h is the mean height of the column, that is to say, the height of a column of equal weight, but with a flat top. Then if r is the radius of the tube at the top of the column, the volume of the suspended column is $\pi r^2 h$, and its weight is $\pi \rho g r^2 h$, when ρ is its density and g the intensity of gravity. Equating this force with the resultant of the tension

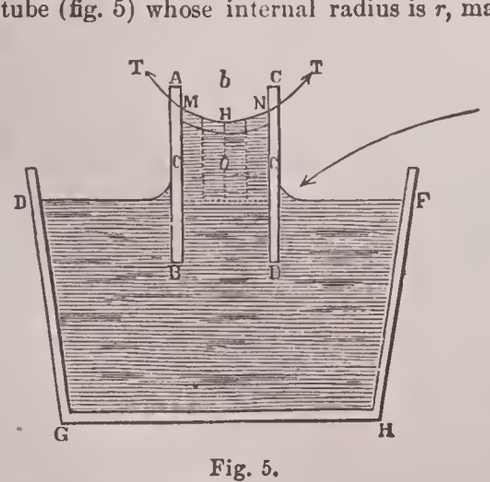


Fig. 5.

$$\pi \rho g r^2 h = 2\pi r \mathrm{T} \cos. \alpha,$$

or

$$h = \frac{2\mathrm{T} \cos. \alpha}{\rho g r}.$$

Hence the mean height to which the fluid rises is inversely as the radius of the tube. For water in a clean glass tube the angle of contact is zero, and

$$h = \frac{2\mathrm{T}}{\rho g r}$$

For mercury in a glass tube the angle of contact is 128° 52′, the cosine of which is negative. Hence when a glass tube is dipped into a vessel of mercury, the mercury within the tube stands at a lower level than outside it.

Rise of a Liquid between Two Plates.

When two parallel plates are placed vertically in a liquid the liquid rises between them. If we now suppose fig. 5 to represent a vertical section perpendicular to the plates, we may calculate the rise of the liquid. Let l be the breadth of the plates measured perpendicularly to the plane of the paper, then the length of the line which bounds the wet and the dry parts of the plates inside is l for each surface, and on this the tension T acts at an angle α to the vertical. Hence the resultant of the surface-tension is $2l$T cos. α. If the distance between the inner surfaces of the plates is a, and if the mean height of the film of fluid which rises between them is h, the weight of fluid raised is $\rho ghla$. Equating the forces—

$$\rho ghla = 2l\mathrm{T} \cos. \alpha,$$

whence

$$h = \frac{2\mathrm{T} \cos. \alpha}{\rho g a}.$$

This expression is the same as that for the rise of a liquid in a tube, except that instead of r, the radius of the tube, we have a the distance of the plates.

Form of the Capillary Surface.

The form of the surface of a liquid acted on by gravity is easily determined if we assume that near the part considered the line of contact of the surface of the liquid with that of the solid bounding it is straight and horizontal, as it is when the solids which constrain the liquid are bounded by surfaces formed by horizontal and parallel generating lines. This will be the case, for instance, near a flat plate dipped into the liquid. If we suppose these generating lines to be normal to the plane of the paper then all sections of the solids parallel to this plane will be equal and similar to each other, and the section of the surface of the liquid will be of the same form for all such sections.

Let us consider the portion of the liquid between two parallel sections distant one unit of length. Let P_1, P_2 (fig. 6) be two points of the surface; θ_1, θ_2 the inclination of the surface to the horizon at P_1 and P_2; y_1, y_2 the heights of P_1 and P_2 above the level of the liquid at a distance from all solid bodies. The pressure at any point of the liquid which is above this level is negative unless another fluid as, for instance, the air, presses on the upper surface, but it is only the difference of pressures with which we

[1] *Sur la Tension Superficielle des Liquides*, Bruxelles, 1873.

have to do, because two equal pressures on opposite sides of the surface produce no effect.

We may, therefore, write for the pressure at a height y

$$p = -\rho g y,$$

where ρ is the density of the liquid, or if there are two fluids the excess of the density of the lower fluid over that of the upper one.

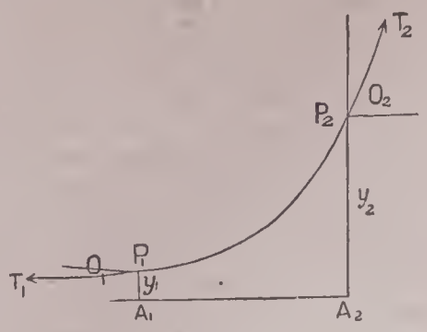


Fig. 6.

The forces acting on the portion of liquid $P_1P_2A_2A_1$ are —first, the horizontal pressures, $-\frac{1}{2}\rho g y_1^2$ and $\frac{1}{2}\rho g y_2^2$; second, the surface-tension T acting at P_1 and P_2 in directions inclined θ_1 and θ_2 to the horizon. Resolving horizontally we find—

$$T(\cos.\theta_2 - \cos.\theta_1) + \frac{1}{2}g\rho(y_2^2 - y_1^2) = 0,$$

whence

$$\cos.\theta_2 = \cos.\theta_1 - \frac{1}{2}g\rho y_1^2 + \frac{1}{2}\frac{g\rho}{T}y_2^2,$$

or if we suppose P_1 fixed and P_2 variable, we may write

$$\cos.\theta = \frac{1}{2}\frac{g\rho y^2}{T} + \text{constant}.$$

This equation gives a relation between the inclination of the curve to the horizon and the height above the level of the liquid.

Resolving vertically we find that the weight of the liquid raised above the level must be equal to T (sin. θ_2 − sin. θ_1), and this is therefore equal to the area $P_1P_2A_2A_1$ multiplied by $g\rho$. The form of the capillary surface is identical with that of the "elastic curve," or the curve formed by a uniform spring originally straight, when its ends are acted on by equal and opposite forces applied either to the ends themselves or to solid pieces attached to them. Drawings of the different forms of the curve may be found in Thomson and Tait's *Natural Philosophy*, vol. i. p. 455.

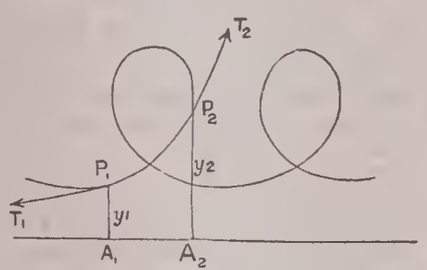


Fig. 7.

We shall next consider the rise of a liquid between two plates of different materials for which the angles of contact are α_1 and α_2, the distance between the plates being a, a small quantity. Since the plates are very near one another we may use the following equation of the surface as an approximation:—

$$y = h_1 + Ax + Bx^2$$
$$h_2 = h_1 + Aa + Ba^2,$$

whence

$$\cot.\alpha_1 = -A$$
$$\cot.\alpha_2 = A + 2Ba$$

$$T(\cos.\alpha_1 + \cos.\alpha_2) = \rho g a\left(h_1 + \frac{1}{2}Aa + \frac{1}{3}BA^2\right),$$

whence we obtain

$$h_1 = \frac{T}{\rho g a}(\cos.\alpha_1 + \cos.\alpha_2) + \frac{a}{6}(2\cot.\alpha_1 - \cot.\alpha_2)$$

$$h_2 = \frac{T}{\rho g a}(\cos.\alpha_1 + \cos.\alpha_2) + \frac{a}{6}(2\cot.\alpha_2 - \cot.\alpha_1).$$

Let X be the force which must be applied in a horizontal direction to either plate to keep it from approaching the other, then the forces acting on the first plate are T+X in the negative direction, and T sin. $\alpha_1 + \frac{1}{2}g\rho h_1^2$ in the positive direction. Hence

$$X = \frac{1}{2}g\rho h_1^2 - T(1 - \sin.\alpha_1).$$

For the second plate

$$X = \frac{1}{2}g\rho h_2^2 - T(1 - \sin.\alpha_2).$$

Hence

$$X = \frac{1}{4}g\rho(h_1^2 + h_2^2) - T\left(1 - \frac{1}{2}(\sin.\alpha_1 + \sin.\alpha_2)\right),$$

or, substituting the values of h_1 and h_2,

$$X = \frac{1}{2}\frac{T^2}{\rho g a^2}(\cos.\alpha_1 + \cos.\alpha_2)^2$$
$$-T\left\{1 - \frac{1}{2}(\sin.\alpha_1 + \sin.\alpha_2) - \frac{1}{12}(\cos.\alpha_1 + \cos.\alpha_2)(\cot.\alpha_1 + \cot.\alpha_2)\right\},$$

the remaining terms being negligible when a is small. The force, therefore, with which the two plates are drawn together consists first of a positive part, or in other words an attraction, varying inversely as the square of the distance, and second, of a negative part or repulsion independent of the distance. Hence in all cases except that in which the angles α_1 and α_2 are supplementary to each other, the force is attractive when a is small enough, but when cos. α_1 and cos. α_2 are of different signs, as when the liquid is raised by one plate, and depressed by the other, the first term may be so small that the repulsion indicated by the second term comes into play. The fact that a pair of plates which repel one another at a certain distance may attract one another at a smaller distance was deduced by Laplace from theory, and verified by the observations of the Abbé Haüy.

A Drop between Two Plates.

If a small quantity of a liquid which wets glass be introduced between two glass plates slightly inclined to each other, it will run towards that part where the glass plates are nearest together. When the liquid is in equilibrium it forms a thin film, the outer edge of which is all of the same thickness. If d is the distance between the plates at the edge of the film and Π the atmospheric pressure, the pressure of the liquid in the film is $\Pi - \frac{2T\cos.\alpha}{d}$, and if A is the area of the film between the plates and B its circumference, the plates will be pressed together with a force

$$\frac{2AT\cos.\alpha}{d} + BT\sin.\alpha,$$

and this, whether the atmosphere exerts any pressure or not. The force thus produced by the introduction of a drop of water between two plates is enormous, and is often sufficient to press certain parts of the plates together so powerfully as to bruise them or break them. When two blocks of ice are placed loosely together so that the superfluous water which melts from them may drain away, the remaining water draws the blocks together with a force sufficient to cause the blocks to adhere by the process called Regelation.

In many experiments bodies are floated on the surface of water in order that they may be free to move under the action of slight horizontal forces. Thus Newton placed a magnet in a floating vessel and a piece of iron in another in order to observe their mutual action, and Ampère floated a voltaic battery with a coil of wire in its circuit in order to observe the effects of the earth's magnetism on the electric circuit. When such floating bodies come near the edge of the vessel they are drawn up to it, and are apt to stick fast to it. There are two ways of avoiding this inconvenience. One is to grease the float round its water-line so that the water is depressed round it. This, however, often produces a worse disturbing effect, because a thin film of grease spreads over the water and increases its surface-viscosity. The other method is to fill the vessel with water till the level of the water stands a little higher than the rim of the vessel. The float will then be repelled from the edge of the vessel. Such floats, however, should always be made so that the section taken at the level of the water is as small as possible.

Phenomena arising from the Variation of the Surface-tension.

Pure water has a higher surface-tension than that of any other substance liquid at ordinary temperatures except mercury. Hence any other liquid if mixed with water diminishes its surface-tension. For example, if a drop of

alcohol be placed on the surface of water, the surface-tension will be diminished from 80, the value for pure water, to 25, the value for pure alcohol. The surface of the liquid will therefore no longer be in equilibrium, and a current will be formed at and near the surface from the alcohol to the surrounding water, and this current will go on as long as there is more alcohol at one part of the surface than at another. If the vessel is deep, these currents will be balanced by counter currents below them, but if the depth of the water is only two or three millimetres, the surface-current will sweep away the whole of the water, leaving a dry spot where the alcohol was dropped in. This phenomenon was first described and explained by Professor James Thomson, who also explained a phenomenon, the converse of this, called the "tears of strong wine."

If a wine-glass be half-filled with port wine the liquid rises a little up the sides of the glass as other liquids do. The wine, however, contains alcohol and water, both of which evaporate, but the alcohol faster than the water, so that the superficial layer becomes more watery. In the middle of the vessel the superficial layer recovers its strength by diffusion from below, but the film adhering to the side of the glass becomes more watery, and therefore has a higher surface-tension than the surface of the stronger wine. It therefore creeps up the side of the glass dragging the strong wine after it, and this goes on till the quantity of fluid dragged up collects into a drop and runs down the side of the glass.

The motion of small pieces of camphor floating on water arises from the gradual solution of the camphor. If this takes place more rapidly on one side of the piece of camphor than on the other side, the surface-tension becomes weaker where there is most camphor in solution, and the lump, being pulled unequally by the surface-tensions, moves off in the direction of the strongest tension, namely, towards the side on which least camphor is dissolved.

If a drop of ether is held near the surface of water the vapor of ether condenses on the surface of the water, and surface-currents are formed flowing in every direction away from under the drop of ether.

If we place a small floating body in a shallow vessel of water and wet one side of it with alcohol or ether, it will move off with great velocity and skim about on the surface of the water, the part wet with alcohol being always the stern.

The surface-tension of mercury is greatly altered by slight changes in the state of the surface. The surface-tension of pure mercury is so great that it is very difficult to keep it clean, for every kind of oil or grease spreads over it at once.

But the most remarkable effects of change of surface-tension are those produced by what is called the electric polarization of the surface. The tension of the surface of contact of mercury and dilute sulphuric acid depends on the electromotive force acting between the mercury and the acid. If the electromotive force is from the acid to the mercury the surface-tension increases; if it is from the mercury to the acid, it diminishes. Faraday observed that a large drop of mercury, resting on the flat bottom of a vessel containing dilute acid, changes its form in a remarkable way when connected with one of the electrodes of a battery, the other electrode being placed in the acid. When the mercury is made positive it becomes dull and spreads itself out; when it is made negative it gathers itself together and becomes bright again. M. Lippmann, who has made a careful investigation of the subject, finds that exceedingly small variations of the electromotive force produce sensible changes in the surface-tension. The effect of one of a Daniell's cell is to increase the tension from 30·4 to 40·6. He has constructed a capillary electrometer by which differences of electric potential less than 0·01 of that of a Daniell's cell can be detected by the difference of the pressure required to force the mercury to a given point of a fine capillary tube. He has also constructed an apparatus in which this variation in the surface-tension is made to do work and drive a machine. He has also found that this action is reversible, for when the area of the surface of contact of the acid and mercury is made to increase, an electric current passes from the mercury to the acid, the amount of electricity which passes while the surface increases by one square centimetre being sufficient to decompose ·000013 grammes of water.

On the Forms of Liquid Films which are Figures of Revolution.

A Spherical Soap-bubble.

A soap-bubble is simply a small quantity of soap-suds spread out so as to expose a large surface to the air. The bubble, in fact, has two surfaces, an outer and an inner surface, both exposed to air. It has, therefore, a certain amount of surface-energy depending on the area of these two surfaces. Since in the case of thin films the outer and inner surfaces are approximately equal, we shall consider the area of the film as representing either of them, and shall use the symbol T to denote the energy of unit of area of the film, both surfaces being taken together. If T′ is the energy of a single surface of the liquid, T the energy of the film is 2T′. When by means of a tube we blow air into the inside of the bubble we increase its volume and therefore its surface, and at the same time we do work in forcing air into it, and thus increase the energy of the bubble.

That the bubble has energy may be shown by leaving the end of the tube open. The bubble will contract, forcing the air out, and the current of air blown through the tube may be made to deflect the flame of a candle. If the bubble is in the form of a sphere of radius r this material surface will have an area

$$S = 4\pi r^2. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1).$$

If T be the energy corresponding to unit of area of the film the surface-energy of the whole bubble will be

$$ST = 4\pi r^2 T \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2).$$

The increment of this energy corresponding to an increase of the radius from r to $r + dr$ is therefore

$$T dS = 8\pi r T dr \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3).$$

Now this increase of energy was obtained by forcing in air at a pressure greater than the atmospheric pressure, and thus increasing the volume of the bubble.

Let Π be the atmospheric pressure and $\Pi + p$ the pressure of the air within the bubble. The volume of the sphere is

$$V = \frac{4}{3}\pi r^3 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4),$$

and the increment of volume is

$$dV = 4\pi r^2 dr \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5).$$

Now if we suppose a quantity of air already at the pressure $\Pi + p$, the work done in forcing it into the bubble is $p dV$. Hence the equation of work and energy is

$$p dV = T ds \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (6),$$

or

$$4\pi p r^2 dr = 8\pi r dr T \quad . \quad . \quad . \quad . \quad . \quad . \quad (7),$$

or

$$p = 2T\frac{1}{r}. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (8).$$

This, therefore, is the excess of the pressure of the air within the bubble over that of the external air, and it is due to the action of the inner and outer surfaces of the bubble. We may conceive this pressure to arise from the tendency which the bubble has to contract, or in other words from the surface-tension of the bubble.

If to increase the area of the surface requires the expenditure of work, the surface must resist extension, and if the bubble in contracting can do work, the surface must tend to contract. The surface must therefore act like a sheet of india-rubber when extended both in length and breadth, that is, it must exert surface-tension. The tension of the sheet of india-rubber, however, depends on the extent to which it is stretched, and may be different in different directions, whereas the tension of the surface of a liquid remains the same however much the film is extended, and the tension at any point is the same in all directions.

The intensity of this surface-tension is measured by the stress which it exerts across a line of unit length. Let us measure it in the case of the spherical soap-bubble by considering the stress exerted by one hemisphere of the bubble on the other, across the circumference of a great circle. This stress is balanced by the pressure p acting over the area of the same great circle: it is therefore equal to $\pi r^2 p$. To determine the intensity of the surface-tension we have

to divide this quantity by the length of the line across which it acts, which is in this case the circumference of a great circle $2\pi r$. Dividing $\pi r^2 p$ by this length we obtain $\frac{1}{2}pr$ as the value of the intensity of the surface-tension, and it is plain from equation 8 that this is equal to T. Hence the numerical value of the intensity of the surface-tension is equal to the numerical value of the surface-energy per unit of surface. We must remember that since the film has two surfaces the surface-tension of the film is double the tension of the surface of the liquid of which it is formed.

To determine the relation between the surface-tension and the pressure which balances it when the form of the surface is not spherical, let us consider the following case:—

Let fig. 8 represent a section through the axis Cc of a soap-bubble in the form of a figure of revolution bounded by two circular disks AB and *ab*, and having the meridian section AP*a*. Let PQ be an imaginary section normal to the axis. Let the radius of this section PR be y, and let PT, the tangent at P, make an angle α with the axis.

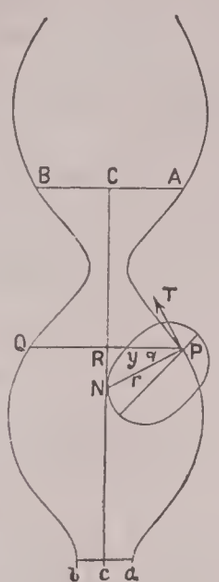


Fig. 8.

Let us consider the stresses which are exerted across this imaginary section by the lower part on the upper part. If the internal pressure exceeds the external pressure by p, there is in the first place a force $\pi y p$ acting upwards arising from the pressure p over the area of the section. In the next place, there is the surface-tension acting downwards, but at an angle α with the vertical, across the circular section of the bubble itself, whose circumference is $2\pi y$, and the downward force is therefore $2\pi y \mathrm{T} \cos. \alpha$.

Now these forces are balanced by the external force which acts on the disk ACB, which we may call F. Hence equating the forces which act on the portion included between ACB and PRQ,

$$\pi y^2 p - 2\pi y \mathrm{T} \cos. \alpha = -\mathrm{F} \quad . \quad . \quad . \quad (9).$$

If we make CR = z, and suppose z to vary, the shape of the bubble of course remaining the same, the values of y and of α will change, but the other quantities will be constant. In studying these variations we may if we please take as our independent variable the length s of the meridian section AP reckoned from A. Differentiating equation 9 with respect to s we obtain, after dividing by 2π as a common factor,

$$py\frac{dy}{ds} - \mathrm{T} \cos. \alpha \frac{dy}{ds} + \mathrm{T}y \sin. \alpha \frac{d\alpha}{ds} = 0. \quad . \quad (10).$$

Now

$$\frac{dy}{ds} = \sin. \alpha \quad . \quad . \quad . \quad . \quad . \quad (11).$$

The radius of curvature of the meridian section is

$$\mathrm{R}_1 = -\frac{ds}{d\alpha} \quad . \quad . \quad . \quad . \quad . \quad (12).$$

The radius of curvature of a normal section of the surface at right angles to the meridian section is equal to the part of the normal cut off by the axis, which is

$$\mathrm{R}_2 = \mathrm{PN} = \frac{y}{\cos. \alpha}. \quad . \quad . \quad . \quad . \quad (13).$$

Hence dividing equation 10 by $y \sin. \alpha$, we find

$$p = \mathrm{T}\left(\frac{1}{\mathrm{R}_1} + \frac{1}{\mathrm{R}_2}\right). \quad . \quad . \quad . \quad . \quad (14).$$

This equation, which gives the pressure in terms of the principal radii of curvature, though here proved only in the case of a surface of revolution, must be true of all surfaces. For the curvature of any surface at a given point may be completely defined in terms of the positions of its principal normal sections and their radii of curvature.

Before going further we may deduce from equation 9 the nature of all the figures of revolution which a liquid film can assume. Let us first determine the nature of a curve, such that if it is rolled on the axis its origin will trace out the meridian section of the bubble. Since at any instant the rolling curve is rotating about the point of contact with the axis, the line drawn from this point of contact to the tracing point must be normal to the direction of motion of the tracing point. Hence if N is the point of contact, NP must be normal to the traced curve. Also, since the axis is a tangent to the rolling curve, the ordinate PR is the perpendicular from the tracing point P on the tangent. Hence the relation between the radius vector and the perpendicular on the tangent of the rolling curve must be identical with the relation between the normal PN and the ordinate PR of the traced curve. If we write r for PN, then $y = r \cos. \alpha$, and equation 9 becomes

$$y^2\left(2\frac{\mathrm{T}}{pr} - 1\right) = \frac{\mathrm{F}}{\pi p}.$$

This relation between y and r is identical with the relation between the perpendicular from the focus of a conic section on the tangent at a given point and the focal distance of that point, provided the transverse and conjugate axes of the conic are $2a$ and $2b$ respectively, where

$$a = \frac{\mathrm{T}}{p}, \text{ and } b^2 = \frac{\mathrm{F}}{\pi p}.$$

Hence the meridian section of the film may be traced by the focus of such a conic, if the conic is made to roll on the axis.

On the different Forms of the Meridian Line.

(1.) When the conic is an ellipse the meridian line is in the form of a series of waves, and the film itself has a series of alternate swellings and contractions as represented in figs. 8 and 9. This form of the film is called the unduloid.

(1*a*.) When the ellipse becomes a circle, the meridian line becomes a straight line parallel to the axis, and the film passes into the form of a cylinder of revolution.

(1*b*.) As the ellipse degenerates into the straight line joining its foci, the contracted parts of the unduloid become narrower, till at last the figure becomes a series of spheres in contact.

In all these cases the internal pressure exceeds the external by $\frac{2\mathrm{T}}{a}$ where a is the semitransverse axis of the conic. The resultant of the internal pressure and the surface-tension is equivalent to a tension along the axis, and the numerical value of this tension is equal to the force due to the action of this pressure on a circle whose diameter is equal to the conjugate axis of the ellipse.

(2.) When the conic is a parabola the meridian line is a catenary (fig. 10), the internal pressure is equal to the external pressure, and the tension along the axis is equal to $2\pi \mathrm{T}m$ where m is the distance of the vertex from the focus.

(3.) When the conic is a hyperbola the meridian line is in the form of a looped curve (fig. 11). The corresponding figure of the film is called the nodoid. The resultant of the internal pressure and the surface-tension is equivalent to a pressure along the axis equal to that due to a pressure p acting on a circle whose diameter is the conjugate axis of the hyperbola.

When the conjugate axis of the hyperbola is made smaller and smaller, the nodoid approximates more and more to the series of spheres touching each other along the axis. When the conjugate axis of the hyperbola increases without limit, the loops of the nodoid are crowded on one another, and each becomes more nearly a ring of circular section, without, however, ever reaching this form. The only closed surface belonging to the series is the sphere.

These figures of revolution have been studied mathematically by Poisson,[1] Goldschmidt,[2] Lindelöf and Moigno,[3] Delaunay,[4] Lamarle,[5] Beer,[6] and Mannheim,[7] and have been produced experimentally by Plateau[8] in the two different ways already described.

[1] *Nouvelle théorie de l'action capillaire* (1831).
[2] *Determinatio superficiei minimæ rotatione curvæ data duo puncta jungentis circa datum axem ortæ* (Göttingen, 1831).
[3] *Leçons de calcul des variations* (Paris, 1861).
[4] "Sur la surface de revolution dont la courbure moyenne est constante," *Liouville's Journal*, vi.
[5] "Théorie geometrique des rayons et centres de courbure," *Bullet. de l'Acad. de Belgique*, 1857.
[6] *Tractatus de Theoria Mathematica Phænomenorum in Liquidis actioni gravitatis detractis observatorum* (Bonn, 1857).
[7] *Journal l'Institut*, No. 1260.
[8] *Statique experimentale et théorique des liquides.*

The limiting conditions of the stability of these figures have been studied both mathematically and experimentally. We shall notice only two of them, the cylinder and the catenoid.

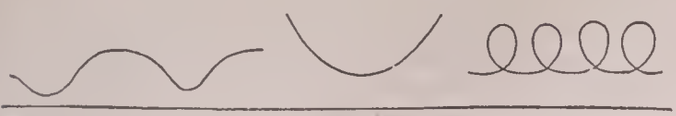


Fig. 9.—Unduloid. Fig. 10.—Catenoid. Fig. 11.—Nodoid.

Stability of the Cylinder.

The cylinder is the limiting form of the unduloid when the rolling ellipse becomes a circle. When the ellipse differs infinitely little from a circle, the equation of the meridian line becomes approximately $y = a + c \sin \frac{x}{a}$ where c is small. This is a simple harmonic wave-line, whose mean distance from the axis is a, whose wave-length is $2\pi a$, and whose amplitude is c. The internal pressure corresponding to this unduloid is as before $p = \frac{T}{a}$. Now consider a portion of a cylindric film of length x ter-

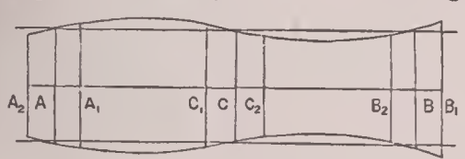


Fig. 12.

minated by two equal disks of radius r and containing a certain volume of air. Let one of these disks be made to approach the other by a small quantity dx. The film will swell out into the convex part of an unduloid, having its largest section midway between the disks, and we have to determine whether the internal pressure will be greater or less than before. If A and C (fig. 12) are the disks, and if x the distance between the disks is equal to πr half the wave-length of the harmonic curve, the disks will be at the points where the curve is at its mean distance from the axis, and the pressure will therefore be $\frac{T}{r}$ as before. If A_1, C_1 are the disks, so that the distance between them is less than πr, the curve must be produced beyond the disks before it is at its mean distance from the axis. Hence in this case the mean distance is less than r, and the pressure will be greater than $\frac{T}{r}$. If, on the other hand, the disks are at A_2 and C_2, so that the distance between them is greater than πr, the curve will reach its mean distance from the axis before it reaches the disks. The mean distance will therefore be greater than r, and the pressure will be less than $\frac{T}{r}$. Hence if one of the disks be made to approach the other, the internal pressure will be increased if the distance between the disks is less than half the circumference of either, and the pressure will be diminished if the distance is greater than this quantity. In the same way we may show that if the distance between the disks is increased, the pressure will be diminished or increased according as the distance is less or more than half the circumference of either.

Now let us consider a cylindric film contained between two equal fixed disks A and B, and let a third disk, C, be placed midway between. Let C be slightly displaced towards A. If AC and CB are each less than half the circumference of a disk the pressure on C will increase on the side of A and diminish on the side of B. The resultant force on C will therefore tend to oppose the displacement and to bring C back to its original position. The equilibrium of C is therefore stable. It is easy to show that if C had been placed in any other position than the middle, its equilibrium would have been stable. Hence the film is stable as regards longitudinal displacements. It is also stable as regards displacements transverse to the axis, for the film is in a state of tension, and any lateral displacement of its middle parts would produce a resultant force tending to restore the film to its original position. Hence if the length of the cylindric film is less than its circumference, it is in stable equilibrium. But if the length of the cylindric film is greater than its circumference, and if we suppose the disk C to be placed midway between A and B, and to be moved towards A, the pressure on the side next A will diminish, and that on the side next B will increase, so that the resultant force will tend to increase the displacement, and the equilibrium of the disk C is therefore unstable. Hence the equilibrium of a cylindric film whose length is greater than its circumference is unstable. Such a film, if ever so little disturbed, will begin to contract at one section and to expand at another, till its form ceases to resemble a cylinder, if it does not break up into two parts which become ultimately portions of spheres.

Instability of a Jet of Liquid.

When a liquid flows out of a vessel through a circular opening in the bottom of the vessel, the form of the stream is at first nearly cylindrical though its diameter gradually diminishes from the orifice downwards on account of the increasing velocity of the liquid. But the liquid after it leaves the vessel is subject to no forces except gravity, the pressure of the air, and its own surface-tension. Of these gravity has no effect on the form of the stream except in drawing asunder its parts in a vertical direction, because the lower parts are moving faster than the upper parts. The resistance of the air produces little disturbance until the velocity becomes very great. But the surface-tension, acting on a cylindric column of liquid whose length exceeds the limit of stability, begins to produce enlargements and contractions in the stream as soon as the liquid has left the orifice, and these inequalities in the figure of the column go on increasing till it is broken up into elongated fragments. These fragments as they are falling through the air continue to be acted on by surface-tension. They therefore shorten themselves, and after a series of oscillations in which they become alternately elongated and flattened, settle down into the form of spherical drops.

This process, which we have followed as it takes place on an individual portion of the falling liquid, goes through its several phases at different distances from the orifice, so that if we examine different portions of the stream as it descends, we shall find next the orifice the unbroken column, then a series of contractions and enlargements, then elongated drops, then flattened drops, and so on till the drops become spherical.

Stability of the Catenoid.

When the internal pressure is equal to the external, the film forms a surface of which the mean curvature at every point is zero. The only surface of revolution having this property is the catenoid formed by the revolution of a catenary about its directrix. This catenoid, however, is in stable equilibrium only when the portion considered is such that the tangents to the catenary at its extremities intersect before they reach the directrix.

To prove this, let us consider the catenary as the form of equilibrium of a chain suspended between two fixed points A and B. Suppose the chain hanging between A and B to be of very great length, then the tension at A or B will be very great. Let the chain be hauled in over a peg at A. At first the tension will diminish, but if the process be continued the tension will reach a minimum value and will afterwards increase to infinity as the chain between A and B approaches to the form of a straight line. Hence for every tension greater than the minimum tension there are two catenaries passing through A and B. Since the tension is measured by the height above the directrix these two catenaries have the same directrix. Every catenary lying between them has its directrix higher, and every catenary lying beyond them has its directrix lower than that of the two catenaries.

Now let us consider the surfaces of revolution formed by this system of catenaries revolving about the directrix of the two catenaries of equal tension. We know that the radius of curvature of a surface of revolution in the plane normal to the meridian plane is the portion of the normal intercepted by the axis of revolution.

The radius of curvature of a catenary is equal and opposite to the portion of the normal intercepted by the directrix of the catenary. Hence a catenoid whose directrix

coincides with the axis of revolution has at every point its principal radii of curvature equal and opposite, so that the mean curvature of the surface is zero.

The catenaries which lie between the two whose direction coincides with the axis of revolution generate surfaces whose radius of curvature convex towards the axis in the meridian plane is less than the radius of concave curvature. The mean curvature of these surfaces is therefore convex towards the axis. The catenaries which lie beyond the two generate surfaces whose radius of curvature convex towards the axis in the meridian plane is greater than the radius of concave curvature. The mean curvature of these surfaces is, therefore, concave towards the axis.

Now if the pressure is equal on both sides of a liquid film, if its mean curvature is zero, it will be in equilibrium. This is the case with the two catenoids. If the mean curvature is convex towards the axis the film will move from the axis. Hence if a film in the form of the catenoid which is nearest the axis is ever so slightly displaced from the axis it will move further from the axis till it reaches the other catenoid.

If the mean curvature is concave towards the axis the film will tend to approach the axis. Hence if a film in the form of the catenoid which is nearest the axis be displaced towards the axis, it will tend to move further towards the axis and will collapse. Hence the film in the form of the catenoid which is nearest the axis is in unstable equilibrium under the condition that it is exposed to equal pressures within and without. If, however, the circular ends of the catenoid are closed with solid disks, so that the volume of air contained between these disks and the film is determinate, the film will be in stable equilibrium however large a portion of the catenary it may consist of.

The criterion as to whether any given catenoid is stable or not may be obtained as follows.

Let PABQ and ApqB (fig. 13) be two catenaries having the same directrix and intersecting in A and B. Draw Pp and Qq touching both catenaries, Pp and Qq will intersect at T, a point in the directrix; for since any catenary with its directrix is a similar figure to any other catenary with its directrix, if the directrix of the one coincides with that of the other the centre of similitude must lie on the common directrix. Also, since the curves at P and p are equally inclined to the directrix, P and p are corresponding points and the line P p must pass through the centre of similitude. Similarly Qq must pass through the centre of similitude.

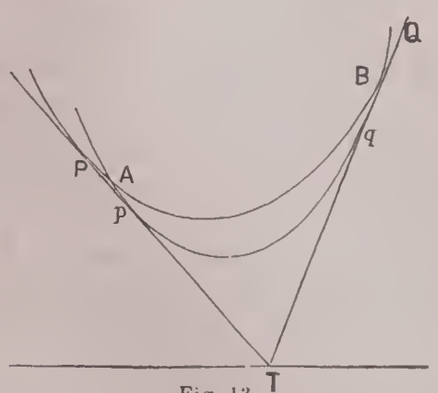


Fig. 13.

Hence T, the point of intersection of Pp and Qq, must be the centre of similitude and must be on the common directrix. Hence the tangents at A and B to the upper catenary must intersect above the directrix, and the tangents at A and B to the lower catenary must intersect below the directrix. The condition of stability of a catenoid is therefore that the tangents at the extremities of its generating catenary must intersect before they reach the directrix.

Stability of a Plane Surface.

We shall next consider the limiting conditions of stability of the horizontal surface which separates a heavier fluid above from a lighter fluid below. Thus, in an experiment of M. Duprez,[1] a vessel containing olive oil is placed with its mouth downwards in a vessel containing a mixture of alcohol and water, the mixture being denser than the oil. The surface of separation is in this case horizontal and stable, so that the equilibrium is established of itself. Alcohol is then added very gradually to the mixture till it becomes lighter than the oil. The equilibrium of the fluids would now be unstable if it were not for the tension of the surface which separates them, and which, when the orifice of the vessel is not too large, continues to preserve the stability of the equilibrium.

When the equilibrium at last becomes unstable, the destruction of equilibrium takes place by the lighter fluid ascending in one part of the orifice and the heavier descending in the other. Hence the displacement of the surface to which we must direct our attention is one which does not alter the volume of the liquid in the vessel, and which therefore is upward in one part of the surface and downward in another. The simplest case is that of a rectangular orifice in a horizontal plane, the sides being a and b.

Let the surface of separation be originally in the plane of the orifice, and let the co-ordinates x and y be measured from one corner parallel to the sides a and b respectively, and let z be measured upwards. Then if ρ be the density of the upper liquid, and σ that of the lower liquid, and P the original pressure at the surface of separation, then when the surface receives an upward displacement z, the pressure above it will be $P - \rho gz$, and that below it will be $P - \sigma gz$, so that the surface will be acted on by an upward pressure $(\rho - \sigma)gz$. Now if the displacement z be everywhere very small, the curvature in the planes parallel to xz and yz will be $\frac{d^2z}{dx^2}$ and $\frac{d^2z}{dy^2}$ respectively; and if T is the surface-tension the whole upward force will be

$$T\left(\frac{d^2z}{dx^2} + \frac{d^2z}{dy^2}\right) + (\rho - \sigma)gz.$$

If this quantity is of the same sign as z, the displacement will be increased, and the equilibrium will be unstable. If it is of the opposite sign from z, the equilibrium will be stable. The limiting condition may be found by putting it equal to zero. One form of the solution of the equation, and that which is applicable to the case of a rectangular orifice, is

$$z = C \sin. px \sin. qy.$$

Substituting in the equation we find the condition

$$(p^2 + q^2)\,T - (\rho - \sigma)g = \begin{cases} +^{ve} \text{ stable.} \\ 0 \quad \text{neutral.} \\ -^{ve} \text{ unstable.} \end{cases}$$

That the surface may coincide with the edge of the orifice, which is a rectangle, whose sides are a and b, we must have

$$pa = m\pi\,,\quad qb = n\pi\,,$$

when m and n are integral numbers. Also, if m and n are both unity, the displacement will be entirely positive, and the volume of the liquid will not be constant. That the volume may be constant, either n or m must be an even number. We have, therefore, to consider the conditions under which

$$\pi^2\left(\frac{m^2}{a^2} + \frac{n^2}{b^2}\right)T - (\rho - \sigma)g$$

cannot be made negative. Under these conditions the equilibrium is stable for all small displacements of the surface. The smallest admissible value of $\frac{m^2}{a^2} + \frac{n^2}{b^2}$ is $\frac{4}{a^2} + \frac{1}{b^2}$, where a is the longer side of the rectangle. Hence the condition of stability is that

$$\pi^2\left(\frac{4}{a^2} + \frac{1}{b^2}\right)T - (\rho - \sigma)g$$

is a positive quantity. When the breadth b is less than $\sqrt{\frac{\pi^2 T}{(\rho - \sigma)g}}$ the length a may be unlimited.

When the orifice is circular of radius a, the limiting value of a is $\sqrt{\frac{T}{g\rho}}z$, where z is the least root of the equation

$$\frac{2}{z}J^1(z) = 1 - \frac{z^2}{2\cdot4} + \frac{z^4}{2\cdot4^2\cdot6} - \frac{z^6}{2\cdot4^2\cdot6^2\cdot8} + \&c., = 0.$$

The least root of this equation is

$$z = 3{\cdot}83171.$$

If h is the height to which the liquid will rise in a capillary tube of unit radius, then the diameter of the largest orifice is

$$2a = 3{\cdot}8317\sqrt{2h}$$
$$= 5{\cdot}4188\sqrt{h}.$$

M. Duprez found from his experiments

$$2a = 5{\cdot}485\sqrt{h}.$$

[1] "Sur on cas particulier de l'équilibre des liquides," par F. Duprez, *Nouveaux Mém. de l' Acad. de Belgique*, 1851 et 1854.

Effect of Surface-tension on the Velocity of Waves.[1]

When a series of waves are propagated on the surface of a liquid, the surface-tension has the effect of increasing the pressure at the crests of the waves and diminishing it in the troughs. If the wave-length is λ, the equation of the surface is

$$y = b \sin. 2\pi \frac{x}{\lambda}.$$

The pressure due to the surface-tension T is

$$p = -T\frac{d^2y}{dx^2} = \frac{4\pi^2}{\lambda^2}Ty.$$

This pressure must be added to the pressure due to gravity $g\rho y$. Hence the waves will be propagated as if the intensity of gravity had been

$$f = g + \frac{4\pi^2 T}{\lambda^2 \rho}.$$

instead of g. Now it is shown in hydrodynamics that the velocity of propagation of waves in deep water is that acquired by a heavy body falling through half the radius of the circle whose circumference is the wave-length, or

$$v = \sqrt{\frac{f\lambda}{2\pi}}$$
$$= \sqrt{\frac{\lambda y}{2\pi} + \frac{2\pi T}{\lambda\rho}}.$$

This velocity is a minimum when

$$\lambda = 2\pi\sqrt{\frac{T}{g\rho}},$$

and the minimum value is

$$v = \sqrt[4]{4\frac{Tg}{\rho}}.$$

For waves whose length from crest to crest is greater than λ, the principal force concerned in the motion is that of gravitation. For waves whose length is less than λ the principal force concerned is that of surface-tension. Sir William Thomson proposes to distinguish the latter kind of waves by the name of ripples.

When a small body is partly immersed in a liquid originally at rest, and moves horizontally with constant velocity V, waves are propagated through the liquid with various velocities according to their respective wave-lengths. In front of the body the relative velocity of the fluid and the body varies from V where the fluid is at rest, to zero at the cutwater on the front surface of the body. The waves produced by the body will travel forwards faster than the body till they reach a distance from it at which the relative velocity of the body and the fluid is equal to the velocity of propagation corresponding to the wave-length. The waves then travel along with the body at a constant distance in front of it. Hence at a certain distance in front of the body there is a series of waves which are stationary with respect to the body. Of these, the waves of minimum velocity form a stationary wave nearest to the front of the body. Between the body and this first wave the surface is comparatively smooth. Then comes the stationary wave of minimum velocity, which is the most marked of the series. In front of this is a double series of stationary waves, the gravitation waves forming a series increasing in wave-length with their distance in front of the body, and the surface-tension waves or ripples diminishing in wave-length with their distance from the body, and both sets of waves rapidly diminishing in amplitude with their distance from the body.

If the current-function of the water referred to the body considered as origin is ψ, then the equation of the form of the crest of a wave of velocity w, the crest of which travels along with the body, is

$$d\psi = w ds,$$

where ds is an element of the length of the crest. To integrate this equation for a solid of given form is probably difficult, but it is easy to see that at some distance on either side of the body, where the liquid is sensibly at rest, the crest of the wave will approximate to an asymptote inclined to the path of the body at an angle whose sine is $\frac{w}{V}$, where w is the velocity of the wave and V is that of the body.

The crests of the different kinds of waves will therefore appear to diverge as they get further from the body, and the waves themselves will be less and less perceptible. But those whose wave-length is near to that of the wave of minimum velocity will diverge less than any of the others, so that the most marked feature at a distance from the body will be the two long lines of ripples of minimum velocity. If the angle between these is 2θ, the velocity of the body is w sec. θ, where w for water is about 23 centimetres per second.

[1] See Sir W. Thomson, "Hydrokinetic Solutions and Observations," *Phil. Mag.*, Nov., 1871.

Tables of Surface-tension.

In the following tables the units of length, mass, and time are the centimetre, the gramme, and the second, and the unit of force is that which if it acted on one gramme for one second would communicate to it a velocity of one centimetre per second:—

Table of Surface-tension at 20° C. (Quincke).

Liquid.	Specific Gravity.	Tension of surface separating the liquid from			Angle of contact with glass in presence of		
		Air.	Water.	Mercury.	Air.	Water.	Mercury.
Water	1	81	.....	418	25° 32′	.....	26° 8′
Mercury	13·5432	540	418	.....	51° 8′	26° 8′	.....
Bisulphide of Carbon	1·2687	32·1	41·75	372·5	32° 16′	13° 8′	.....
Chloroform	1·4878	30·6	29·5	399	.....	.....	.....
Alcohol	0·7906	25·5	.....	399	25° 12′	.....	.....
Olive Oil	0·9136	36·9	20·56	335	21° 50′	17°	47° 2′
Turpentine	0·8867	29·7	11·55	250·5	37° 44′	37° 44′	47° 2′
Petroleum	0·7977	31·7	27·8	284	36° 20′	42° 46′	.....
Hydrochloric Acid	1·1	70·1	.....	377	.....	.....	.....
Solution of Hyposulphite of Soda	1·1248	77·5	.....	442·5	23° 20′	.....	10° 42′

Olive Oil and Alcohol, 12·2.
Olive oil and aqueous alcohol (sp. g. ·9231, tension of free surface 25·5), 6·8, angle 87° 48′.

Quincke has determined the surface-tension of a great many substances near their point of fusion or solidification. His method was that of observing the form of a large drop standing on a plane surface. If K is the height of the flat surface of the drop, and k that of the point where its tangent plane is vertical, then

$$T = \frac{1}{2}(K-k)^2 g\rho.$$

Surface-tensions of Liquids at their Point of Solidification. From Quincke.

Substance.	Temperature of Solidification.	Surface-Tension.
Platinum	2000° C.	1658
Gold	1200°	983
Zinc	360°	860
Tin	230°	587
Mercury	— 40°	577
Lead	330°	448
Silver	1000°	419
Bismuth	265°	382
Potassium	58°	364
Sodium	90°	253
Antimony	432°	244
Borax	1000°	212
Carbonate of Soda	1000°	206
Chloride of Sodium	.....	114
Water	0°	86·2
Selenium	217°	70·4
Sulphur	111°	41·3
Phosphorus	43°	41·1
Wax	68°	33·4

Quincke finds that for several series of substances the surface-tension is nearly proportional to the density, so that if we call $(K-k)^2 = \frac{2T}{g\rho}$ the specific cohesion, we may state the general results of his experiments as follows:—

The bromides and iodides have a specific cohesion about half that of mercury. The nitrates, chlorides, sugars, and

fats, as also the metals, lead, bismuth, and antimony, have a specific cohesion nearly equal to that of mercury. Water, the carbonates and sulphates, and probably phosphates, and the metals, platinum, gold, silver, cadmium, tin, and copper have a specific cohesion double that of mercury. Zinc, iron, and palladium, three times that of mercury, and sodium, six times that of mercury.

Relation of Surface-tension to Temperature.

It appears from the experiments of Brunner and of Wolff on the ascent of water in tubes that at the temperature $t°$ centigrade

$T = 75{\cdot}20\ (1 - 0{\cdot}00187t)$ (Brunner);
$= 76{\cdot}08\ (1 - 0{\cdot}002t + 0{\cdot}00000415t^2)$, for a tube ·02346 cm. diameter (Wolff);
$= 77{\cdot}34\ (1 - 0{\cdot}00181t)$, for a tube ·03098 cm. diameter (Wolff).

Sir W. Thomson has applied the principles of Thermodynamics to determine the thermal effects of increasing or diminishing the area of the free surface of a liquid, and has shown that in order to keep the temperature constant while the area of the surface increases by unity, an amount of heat must be supplied to the liquid which is dynamically equivalent to the product of the absolute temperature into the decrement of the surface-tension per degree of temperature. We may call this the *latent heat of surface-extension.*

It appears from the experiments of Brunner and Wolff that at ordinary temperatures the latent heat of extension of the surface of water is dynamically equivalent to about half the mechanical work done in producing the surface-extension. (J. C. M.)

CAPIS, or Capiz, a town of the Philippine Islands, in a province of the same name, on the north coast of Panay, at the mouth of the rivers Panay, Panitan, and Ivisan, which are subject to inundations during the rainy season. It is the seat of a Spanish alcalde, and is defended by a small fort. Most of its buildings are light erections of nipa palm. Its exports are mainly rice, dyewood, gold-dust, and cattle. Population, 11,470. Lat. 11° 25′ N., long. 122° 45′ E.

CAPISTRANO, Giovanni di (1386–1456), was born at the little town of Capistrano in the Abruzzi. He was educated for the profession of law, and till about his thirtieth year was engaged in practice as an advocate. He then entered the Franciscan order, and became one of its most rigid and devoted adherents. At the same time he manifested very remarkable powers as a popular preacher, and was consequently employed on various missions by the popes. In 1450 he was sent by Nicholas V. to Germany to preach against the Hussite heresy, and at the same time to excite the Germans to a crusade against the Turks, who, under their great leader, Mahomet II., were threatening to overrun Europe. Capistrano did much to repress the Hussite movement, and though he failed to excite a crusade against the Turks, his religious enthusiasm sustained the inhabitants of Belgrade when that town was besieged by the Turkish forces in 1456. He accompanied them with the cross in his hand in their successful sortie, a few months before his death. He was canonized in 1690.

CAPITAL, in social discussions sometimes treated as antithetical to Labor, is in reality the accumulated savings of labor and of the profits accruing from the savings of labor. It is that portion of the annual produce reserved from consumption to supply future wants, to extend the sphere of production, to improve industrial instruments and processes, to carry out works of public utility, and, in short, to secure and enlarge the various means of progress necessary to an increasing community. It is the increment of wealth or means of subsistence analogous to the increment of population and of the wants of civilized man. Hence Mr. Mill and other economists, when seeking a graphic expression of the service of capital, have called it "abstinence." The laborer serves by giving physical and mental effort in order to supply his means of consumption. The capitalist, or laborer-capitalist, serves by abstaining from consumption, by denying himself the present enjoyment of more or less of his means of consumption, in the prospect of a future profit. This quality, apparent enough in the beginnings of capital, applies equally to all its forms and stages; because whether a capitalist stocks his warehouse with goods and produce, improves land, lends on mortgage or other security, builds a factory, opens a mine, or orders the construction of machines or ships, there is the element of self-deprival for the present, with the risk of ultimate loss of what is his own, and what, instead of saving and embodying in some productive form, he might choose to consume. On this ground rests the justification of the claims of capital to its industrial rewards, whether in the form of rent, interest, or profits of trade and investment.

To any advance in the arts of industry or the comforts of life, a rate of production exceeding the rate of consumption, with consequent accumulation of resources, or in other words, the formation of capital, is indispensable. The primitive cultivators of the soil, whether those of ancient times or the modern pioneers who have formed settlements in the forests of the New World, soon discovered that their labor would be rendered more effective by implements and auxiliary powers of various kinds, and that until the produce from existing means of cultivation exceeded what was necessary for their subsistence, there could be neither labor on their part to produce such implements and auxiliaries, nor means to purchase them. Every branch of industry has thus had a demand for capital within its own circles from the earliest times. The flint arrow-heads, the stone and bronze utensils of fossiliferous origin, and the rude implements of agriculture, war, and navigation, of which we read in Homer, were the forerunners of that rich and wonderful display of tools, machines, engines, furnaces, and countless ingenious and costly appliances, which represent so large a portion of the capital of civilized countries, and without the pre-existing capital could not have been developed. Nor in the cultivation of land, or the production simply of food, is the need of implements, and of other auxiliary power, whether animal or mechanical, the only need immediately experienced. The demands on the surplus of produce over consumption are various and incessant. Near the space of reclaimed ground, from which the cultivator derives but a bare livelihood, are some marshy acres that, if drained and enclosed, would add considerably in two or three years to the produce; the forest and other natural obstructions might also be driven farther back with the result, in a few more years, of profit; fences are necessary to allow of pasture and field crops, roads have to be made and farm buildings to be erected; as the work proceeds more artificial investments follow, and by these successive outlays of past savings in improvements, renewed and enhanced from generation to generation, the land, of little value in its natural state either to the owner and cultivator or the community, is at length brought into a highly productive condition. The history of capital in the soil is substantially the history of capital in all other spheres. No progress can be made in any sphere, small or large, without reserved funds possessed by few or more persons, in small or large amounts, and the progress in all cases is adventured under self-deprival in the meanwhile of acquired value, and more or less risk as to the final result.

Capital is necessarily to be distinguished from money, with which in ordinary nomenclature it is almost identical. It is impossible to draw any line where capital may not operate actively without the intervention of money. A farmer, manufacturer, or artisan, who has saved from his consumption and expenses of the past year an amount of product value, may in the following year either employ more labor to direct production or divert a portion of the labor hitherto employed to an improvement of his process, which in either case would be an investment of capital. Money, strictly speaking, is the gold and silver coins in circulation and banking reserve, and its sum in the United Kingdom may amount to over 100 millions sterling. But when the bank deposits of the kingdom are taken into account, they are found to be fives of hundreds of millions sterling, all active as money, and forming what is called the "floating capital" of the country. The explanation is that the farmer, manufacturer, and artisan already supposed, having a surplus produce to dispose of, sell it at what they deem the proper time for their advantage and put the proceeds in bank; or the domestic servant or laboring man having a surplus from his wages, or the investor or speculator in stocks and shares having realized a profit, or the owner of a thousand acres, or the millionaire embarrassed with the returns of a capital so large that he can only add to it year after year, do the same thing—the money employed in these multiplied transactions being merely the vehicle of their notation in money-value, and

after accomplishing one series of transactions being available for another series following. The deposits thus made to the banks may be recalled soon or late, in whole or in part, or may go on increasing under the same names for a generation; but, in any case, they are the realized money-values of commodities, wages, rents, interest, and profits, of which the owners had no present need, and which they placed at the service of the public in this social form at some rate of interest until such time as they might choose or need to recall them. This is capital in its most vitalized form, because it is offered through the banks to all who want capital and can give the requisite securities of document or character for its repayment. In proportion as this fund increases a country may be safely deemed richer in resource for the extended employment of labor in all profitable branches of industry, and for coping with every exigency in its industrial and commercial condition. It is a necessary element of all great enterprises, such as railways, telegraphs, lines of ocean steamers, and the like, as well as of operations in foreign commerce where there is a long train of outlays in materials, wages, and charges before there can be any return. Still the idea of capital cannot be confined to money and bank deposits of money. The indefinite extent to which, in the practical conduct of trades and industries, the capital is insensibly increased out of the resources of the business itself, without loans or contribution of new capital shares, and the facility with which property and commodities command the energy of free and active capital, forbid any narrow definition. The capital of a country can scarce be said to be less than the whole sum of its investments in a productive form, and possessing a recognized productive value.

The distinction of "fixed" and "circulating" capital by the author of the *Wealth of Nations* (book ii. c. 1.) cannot fail to be always useful in exhibiting the various forms and conditions under which capital is employed. Yet the principal phenomena of capital are found to be the same, whether the form of investment be more or less permanent or circulable. The machinery in which capital is "fixed," and which yields a profit without apparently changing hands, is in reality passing away day by day, until it is worn out, and has to be replaced. So also of drainage and other land improvements. When the natural forests have been consumed and the landowners begin to plant trees on the bare places, the plantations while growing are a source of health, shelter, and embellishment—they are not without a material profit throughout their various stages to maturity—and when, at the lapse of twenty or more years, they are ready to be cut down, and the timber is sold for useful purposes, there is a harvest of the original capital expended as essentially as in the case of the more rapid yearly crops of wheat or oats. The chief distinction would appear to rest in the element of time elapsing between the outlay of capital and its return. Capital may be employed in short loans or bills of exchange at two or three months, in paying wages of labor for which there may be return in a day or not in less than a year or more, or in operations involving within themselves every form of capital expenditure, and requiring a few years or ninety-nine years for the promised fructification on which they proceed. But the common characteristic of capital is that of a fund yielding a return and reproducing itself whether the time to this end be long or short. The division of expenditure or labor (all expenditure having a destination to labor of one kind or another) into "productive" and "unproductive" by the same distinguished authority (book ii. c. 3) is also apposite both for purposes of political economy and practical guidance, though economists have found it difficult to define where "productive expenditure" ends and "unproductive expenditure" begins. Adam Smith includes in his enumeration of the "fixed capital" of a country "the acquired and useful abilities of all the inhabitants;" and in this sense expenditure on education, arts, and sciences might be deemed expenditure of the most productive value, and yet be wanting in strict commercial account of the profit and loss. It must be admitted that there is a personal expenditure among all ranks of society, which, though not in any sense a capital expenditure, may become capital and receive a productive application, always to be preferred to the grossly unproductive form in the interest both of the possessors and of the community.

These remarks have probably indicated with sufficient clearness the origin, nature, and uses of capital. The subject in its details is full of controversies, on which it would be out of place here to enter. It may be enough to indicate simply some conclusions which appear to be fully established. 1. Capital is not a prerogative or monopoly of any class, but embraces both in its actual form and its future possibilities all classes of men from the humblest laborer to the millionaire. 2. In proportion as capital increases the rate of profit falls, the competition of capital with capital being fully more close and active than that of labor with labor (J. S. Mill's *Principles of Political Economy*, book iv. c. 4). 3. The amount of the annual produce falling to capital is necessarily larger in proportion to the amount falling to labor in countries where the capital is large than in those where it is relatively small, in old than in new countries, though the rate of profit may be lower in the former than in the latter. The rate of profit may fall over the whole capital of a country, and yet from the increase of capital employed the aggregate profit be undiminished or even increased. M. Bastiat puts this conclusion in the following formula:—"In proportion to the increase of capital the *absolute* share of the total product falling to the capitalist is augmented and his *relative* share is diminished, while, on the contrary, the laborer's share is increased both absolutely and relatively" (*Harmonies of Political Economy*, vii.). 4. Capital, so far from being the antagonist, is the ally of labor, the indispensable means of all extended employment and reward of labor, as well as of all increase of population and civilized well-being (*Some Leading Principles of Political Economy*, by Professor Cairnes, part ii. c. 3).

CAPITANATA, or Foggia, a province of Southern Italy, formerly belonging to the kingdom of Naples. It has an area of 2955 square miles, and is bounded on the N. and E. by the Adriatic Sea, on the S.E. by the province of Bari, on the S. by Basilicata and Principato Ulteriore, on the W. by Benevento and Molise. The south-west of the province is occupied by the slopes and underfalls of the Apennines, and on the north-east the mountain mass of Gargano covers an extent of more than 800 square miles. The central district, however, is very level, and is known as the Tavogliere di Puglie, or Chess-board of Apulia; while the mountainous parts also enclose many fertile valleys. Except at the promontory of Gargano the coast is low, and is in many parts covered with lagoons, of which the principal are the Lago di Lesina, the Lago di Verana, and the Lago di Salpi. The harbors are few and unimportant. The Fortore, the Candelaro, and the Cervajo are the chief rivers, to which must be added the Ofanto, which forms the boundary towards the south. The products are wheat, maize, pulse, fruits, hemp, flax, oil, and wine; the breeding of horses and cattle is pursued to a considerable extent, and vast herds of sheep are pastured throughout the province. The manufactures are few and of no great importance; and the commerce consists mainly in the coasting trade. The province is divided into the three districts of Foggia, San Severo, and Manfredonia; its capital is Foggia, and the other principal towns, besides those which give name to the districts, are Lucera, Bovino, Cerignola, Ascoli di Satriano, and Vieste. Population in 1871, 322,758.

CAPITO, or Koepflin, Wolfgang Fabricius (1478–1541), a Reformed divine, was born of humble parentage at Hagenau in Alsace. He was educated for the medical profession, and he also devoted some time to the study of law, in which he gained the degree of doctor. At the same time he applied himself so earnestly to theology that he received the doctorate in that faculty also, and taught for some time at Freiburg. He acted for three years as pastor in Bruchsal, and was then called to the cathedral church of Basel. In 1520 he removed to Mainz, at the request of Albrecht, archbishop of that city. In 1523 he settled at Strasburg, where he remained till his death. He took a prominent part in the earlier ecclesiastical transactions of the 16th century, was present at the second conference of Zurich and at the conference of Marburg, and along with Bucer was appointed to present to the emperor the confession of Augsburg. From his endeavors to conciliate the Lutheran and Zwinglian parties in regard to the sacraments, he seems to have incurred the suspicions of his own friends; while from his intimacy with several divines of the Socinian school he drew on himself the charge of Arianism His principal works were,—*Institutionum Hebraicarum libri*

duo; Enarrationes in Habacuc et Hoseam Prophetas; and *Explicatio doctissima in Hexaemeron.*

CAPITOL, the great temple of Jupiter on the Tarpeian or Capitoline Hill at Rome. See ROME.

CAPITOLINUS, JULIUS, one of a number of historical writers who lived about the end of the 3d century. See AUGUSTAN HISTORY, vol. iii. p. 65.

CAPITULARIES are certain laws enacted under the auspices of kings of the Frankish race. They are called *Capitularia*, a name of no classical authority, but derived from *capitulum*, the diminutive of *caput;* and they are so described from the circumstance of their being enacted or digested *capitulatim*, by heads or chapters. The term is very frequently used in a general sense, but in other instances capitularies are distinguished from laws.

The laws of the Franks were enacted "consensu populi et constitutione regis." Liberty was the chief inheritance of the ancient people of Germany; nor were they governed by laws which they had no share in enacting. It has been remarked by Dr. Stuart, that "the short but comprehensive and sentimental work of Tacitus, on the manners of Germany, is the key to the institutions, the Capitularies, and the code of the barbarians." But the national assemblies of those who were capable and worthy of bearing arms appear to have been gradually superseded by a select council, composed of the two orders of the clergy and nobility; and if the great body of the people attended their deliberations, it seems to have been more in the capacity of spectators than of actual legislators. The initiative in promulgating any resolution was always taken by the king or emperor, and the final adoption seems also to have been very much in his hands, the assembled magnates merely giving their advice on the circumstances of the case. This was the form of the constitution in the time of Charlemagne, in whose name a great proportion of the Capitularies are promulgated, though some of them belong to a more recent, and others to a much more early period, the collection commencing with an enactment of King Childebert, dated in the year 554. The Capitularies are written in the Latin language, and were doubtless drawn up by the ecclesiastics. The Latin copies were deposited among the national archives, but the laws were divulged to the people in their mother tongue.

Savigny gives the following summary of what is now known with regard to the Capitularies:—"The imperial ordinances of the Franks (*Capitularia*), which, after the extension of their empire, were distinguished from the national laws (*Leges*), arose from the enlargement of the same principle. All royal enactments, particularly in later times, were called Capitularia, or Capitula. The king had a double character,—the one, as chief of each individual tribe, and the other as head of the whole nation. Hence the Capitularies also are of two classes,—those defining the law of a particular race, *e.g.*, 'Capitula addita ad Legem Salicam,' and those of general application over the whole Frank territory. In the kingdom of the Franks, with which so many different nations were incorporated, the Capitularies are so frequently general under the Carlovingian dynasty, that when their character is not specially fixed they may be understood as belonging to that class. In Lombardic Italy, on the contrary, where the Lombards and Romans were the only distinct peoples, most of the ordinances of Charles and his successors must be understood as constituting exclusively Lombardic law. For this reason probably they have been inserted in all the early collections of that law, and were consequently never obligatory on the Romans. It is, however, of great importance to determine accurately the limits of the general Capitularies. The laws of the race of Charlemagne have been erroneously supposed to apply to all the subjects of their extensive empire. These princes reigned over three distinct kingdoms, the Frankish, the Lombardic, and that which under the name of Rome and the Exarchate had recently constituted part of the Greek empire. No Capitulary, however general, could overstep the boundaries of that state in which it had originated. The only exceptions to this rule were some clerical laws; and their universal validity arose from the unity of the church, and from the common old ecclesiastical authorities, on which they were founded. No example of a similarly general application is found in any of the temporal ordinances."

The first collection of the Capitularies was made in the 9th century by Ansegise, abbot of Fontenelle, one of the councillors of Charlemagne. He collected the Capitula of Charlemagne and Louis le Debonnaire into four books. In 842 Benedict, deacon of Mainz, added three books, bringing up the number of *Capitula* to 1697. Supplements were afterwards added, which increased the number to 2100. The history of the later editions will be found in the preface of Baluze, who has himself surpassed all preceding and all subsequent editors. His great collection appeared under the following title: *Capitularia Regum Francorum; additæ sunt Marculfi monachi et aliorum formulæ veteres, et notæ doctissimorum virorum: Stephanus Baluzius Tutelensis in unum collegit, ad vetustissimos codices manuscriptos emendavit, magnam partem nunc primum edidit, notis illustravit*, Paris, 1677, 2 tom. fol. This valuable work was long afterwards reprinted in Italy (Venetiis, 1771, 2 tom. fol.). Another edition, for which Baluze had himself made preparations, is that of De Chiniac, which appeared at Paris, 1780, 2 tom. fol. This edition is splendidly printed, but is somewhat disfigured by a French translation of the preface, exhibited column for column. The Capitularies are also to be found in Georgisch's *Corpus Juris Germanici antiqui*, Halæ Magd. 1738, 4to; in Canciani's *Leges Barbarorum antiquæ*, Venetiis, 1781–91, 5 tom. fol.; in Walter, *Corpus Juris German. antiq.*, 1823–4; and in Pertz, *Monumenta Germanica*. An admirable analysis of the contents of the Capitularies will be found in Guizot, *His. de la Civilization*, Leç. xxi. and xxv. See also Michelet, *Origines du Droit Français*.

CAPITULATION (the *Pactum deditionis* of Grotius) is an agreement in time of war for the surrender to a hostile armed force of a particular body of troops, a town, or a territory. It is an ordinary incident of war, and therefore no previous instructions from the captor's Government are required before finally settling the conditions of capitulation. The most usual of such conditions are freedom of religion, and security of private property on the one hand, and a promise not to bear arms within a certain period on the other. Such agreements may be rashly concluded with an inferior officer, on whose authority the enemy are not in the actual position of the war entitled to place reliance. The Roman consuls sometimes introduced the condition—"Ita ratum sit, *si populus Romanus censuisset.*" Saturninus surrendered the Capitol on the promise of Marius; but Cicero asks (*pro C. Rab.*, c. x.), "Fides qui potuit sine senatusconsulto dari?" Cæsar evidently thought that responsibility in such matters should rest in the commander-in-chief: "Alter agere ad præscriptum alter, libere ad summam rerum consulere debet" (*de B. C.*, iii. 51). In modern times the question has been raised whether a capitulation can ever amount to a conveyance of the sovereignty, or a perpetual cession of political allegiance. Such matters are fixed by the terms of peace; but before then questions may rise as to rights in the property passed by capitulation. Although private ransoms are theoretically allowed by English admiralty law in cases of necessity, the Prize Act (27 and 28 Vict. c. 25, § 45) confers a right only to ships and goods afloat. Hence part of the consideration of a capitulation may be condemned to the Crown. Again, as in the case of Thorshaven and its dependencies (Island of Stromoe), which capitulated to Captain Baugh in 1808, public property passed by the capitulation, if not taken possession of by the private enemy, may afterwards be seized by privateers and forfeited to the Crown. In two great capitulations of modern history, Great Britain has made a not very creditable appearance. That of Closter Seven, between the duke of Cumberland and Marshal Richelieu for a suspension of arms in N Germany, King George, as elector of Hanover, refused to ratify, and ordered the *Hanoverian* troops, which ought to have been disbanded, to resume service as *British* troops. In the capitulation of El Arish (1800), which related to the evacuation of Egypt by the French, the British Government, so long as it seemed more advantageous to fight, pleaded a defect in the authority of Sir Sidney Smith; but when Kleber's brilliant movement to Heliopolis had changed matters, they clamored for the faithful execution of the agreement. The most important case on the subject of capitulation is, however, that of the merchants of Genoa, particulars of which may be got in *Hansard*, vol. xxx., and 4 *Robinson*, 388.

Capitulation is also the name given to an arrangement by which a body of foreigners enjoy certain privileges within the state making the capitulation; *e.g.*, the Swiss Guards at the Tuileries, or the consular jurisdictions in the Levant. It is also applied by French writers to the oath which on his election the emperor of the Romans used to make to the college of electors; this related chiefly to such matters

as regalian rights, appeals from local jurisdictions, the rights of the Pope, &c.

CAPMANY, Antonio de Montpalan y (1743–1813), a Spanish historian and philosopher, was born at Barcelona. He spent the early part of his life in military service, and after his retirement in 1770 removed to Madrid, where he was elected secretary of the Royal Academy of History. His principal works are,—*Memorias historicas sobre la Marina, Commercio, y Artes de l'antigua ciudad de Barcelona*, 4to, Madrid, 1779–1792; *Teatro historico-critico de la Eloquencia Española*, 4to, Madrid, 1786; *Dictionario Frances-Español*, 4to, Madrid, 1805; *Filosofia de l'Elocuencia*, 1776; and *Questiones criticas sobre varios puntos de historia economica, politica, y militar*, 8vo, 1807.

CAPO D'ISTRIA, a fortified seaport town of Austria, in the government of Trieste and circle of Istria. It stands on a small island in the Gulf of Trieste, 8 miles south of that city, in 45° 32′ 20″ N. lat. and 13° 42′ 29″ E. long., and is connected with the mainland by a causeway half a mile in length. It is the seat of a bishopric, and has a cathedral and about thirty other churches, a citadel, a gymnasium, a prison, and a theatre. It manufactures salt, sugar, leather, and soap; it also exports wine, oil, and fish. The harbor is large, but is little frequented except by fishing-boats. Population in 1869, 9169. Capo d'Istria is usually identified with the town of Ægida, mentioned by Pliny, which appears by an inscription to have afterwards received the name of Justinopolis from Justin II. At a later period it formed a free commonwealth, which was subjugated by the Venetians in the 10th century, fell into the hands of the Genoese in 1380, and was recaptured by the Venetians in 1487. As capital of Istria it passed into Austrian possession in 1797.

CAPO D'ISTRIA, John, Count (1780–1831), was born at Corfu, where his father was a physician, in 1780. At first he devoted himself to the study of medicine in the academics of Padua and Venice, but joined the Russian diplomatic service when at the treaty of Tilsit the Ionian Islands were ceded to the French. He held the office of secretary for foreign affairs under the Emperor Alexander, and was president of the Greek republic after the battle of Navarino. Having been suspected of treachery to the republican cause, he was assassinated when entering a church at Nauplia, October 9, 1831. See Greece.

CAPPADOCIA, an extensive province of Asia Minor, that for a considerable period constituted an independent kingdom. It was originally a country of much greater extent; in the time of Herodotus, the Cappadocians occupied the whole region from the chain of Mount Taurus on the south to the shores of the Euxine. That author tells us that the name of Cappadocians was that applied to them by the Persians, while they were termed by the Greeks Syrians, or White Syrians (Leucosyri). The fact that they were a branch of the same race with the Syrians appears indeed to admit of no doubt. Under the Persian empire they were divided into two separate satrapies or governments, the one comprising the central and inland portion of the country, to which the name of Cappadocia continued to be applied, while the other was called Cappadocia ad Pontum, and gradually came to be known simply as Pontus. As after the fall of the Persian government the two provinces continued to be subject to separate rulers, this distinction was perpetuated, and the name of Cappadocia came to be restricted to the inland province (sometimes called Great Cappadocia), which alone will be considered in the present article. The history and geography of the region bordering on the Euxine will be found under Pontus.

Cappadocia, in this sense, was bounded on the S. by the chain of Mount Taurus, on the E. by the prolongation of that ridge and the Euphrates, on the N. by Pontus, and on the W. by Galatia and Lycaonia. But it had no natural boundaries except on the south and east, so that it is impossible to define its limits with accuracy on the other sides. Strabo is the only ancient author who gives any circumstantial account of the country, but he has greatly exaggerated its dimensions; it was in reality about 250 miles in length by less than 150 in breadth. With the exception of a narrow strip of the district called Melitene, on the east, which forms part of the valley of the Euphrates, the whole of this extensive region is a high upland tract, attaining to the level of more than 3000 feet above the sea, and constituting the central and most elevated portion of the great table-land of Asia Minor. (See Asia Minor.) The western parts of the province, where it adjoins Lycaonia, and extending thence to the foot of Mount Taurus, are open treeless plains, affording pasture in modern as well as ancient times to numerous flocks of sheep, but almost wholly desolate and uncultivated. But out of the midst of this great upland level rise detached groups or masses of mountains, mostly of volcanic origin, of which the loftiest is Mount Argæus (still called by the Turks Erdjish Dagh), which attains to a height of 13,000 feet above the sea, while that of Hassan Dagh to the south-west of it rises to about 8000 feet.

The eastern portion of the province is of a more varied and broken character, being traversed by the mountain-chain called by the Greeks Anti-Taurus, as well as by several subordinate ridges, some of them parallel with it, others extending eastwards from thence towards the Euphrates. Between these mountains and the southern chain of Taurus properly so called lies the region called in ancient times Cataonia, occupying an upland plain in a basin surrounded on all sides by mountains. This district in the time of Strabo formed a portion of Cappadocia, and though several ancient writers had regarded the Cataonians as a distinct people from the Cappadocians, Strabo, who had himself visited the country, could find no distinction between them either in language or manners.

The River Pyramus (now called the Jihun) rises in the table-land of Cataonia, and forces its way through narrow and rocky defiles across the chain of Taurus to the plains of Cilicia. The Sarus, or Sihun, rises much farther north, in the Anti-Taurus, near the frontiers of Pontus, and flows through a deep and narrow valley between two parallel ridges of mountains, for a distance of more than 150 miles, till it in like manner forces its way through the main range of the Taurus, and emerges into the plains of Cilicia. The Halys, or Kizil Irmak, which has its sources within the confines of Pontus, traverses the northern part of Cappadocia throughout its whole extent, passing within about 20 miles of the capital city of Kaisariyeh. The other rivers of Cappadocia are of little importance.

The kingdom of Cappadocia, which was still in existence down to the time of Strabo, as a nominally independent state, was divided, according to that geographer, into ten districts, viz., Melitene, Cataonia, Cilicia, Tyanitis, and Garsauritis in the south, or adjoining Mount Taurus; and five others, Laviniasene, Sargarausene, Saravene, Chamanene, and Morimene, on the side of Pontus. The position and limits of these northern subdivisions cannot be determined with any certainty, but the others are better known. Cataonia has been already described, and the adjoining district of Melitene, which did not originally form part of Cappadocia at all, but was annexed to it by Ariarathes I., was a fertile tract adjoining the Euphrates, the chief town of which still retains the name of Malatiyeh. Cilicia was the name given to the district in which Cæsarea, the capital of the whole country, was situated, and in which rose the lofty and conspicuous mass of Mount Argæus. Tyanitis, as its name shows, was the region of which Tyana was the capital,—a level tract in the extreme south of the province, extending quite to the foot of Mount Taurus. Garsauritis appears to have comprised the western or south-western districts adjoining Lycaonia; its chief town was Archelaïs, now Ak Serai.

The only two cities of Cappadocia in the days of Strabo which were considered by the geographer to deserve that appellation were — Mazaca, the capital of the kingdom under its native monarchs, but which, after it had passed under the Roman government, obtained the name of Cæsarea, which it has ever since retained under the scarcely altered form of Kaisariyeh; and Tyana, not far from the foot of the Taurus, the site of which is marked by some ruins at a place called Kiz Hissar, about 12 miles south-west of Nigdeh. Archelaïs, founded by Archelaus, the last king of the country, subsequently became a Roman colony, and a place of some importance. At the present day the only considerable town in this part of Asia Minor is Kaisariyeh, which has a population of about 25,000 souls, and is an important centre of trade, and the resort of merchants from all parts of Asia Minor, as well as Syria and Armenia.

The ancient Cappadocians were much devoted to the practice of religious and superstitious rites, and several localities in their country were the sites of temples that

enjoyed a great reputation for sanctity. Among these the most celebrated was that of Comana, dedicated to the goddess Mā, whom the Greeks identified with Enyo, the Bellona of the Romans, and the same deity who was worshipped at the Pontic Comana. The high-priest enjoyed consideration second only to the king, and exercised rule over the greater part of Cataonia, of which Comana was the chief place. It was situated on the river Sarus, but the site has not been identified. Next to him ranked the high-priest of Zeus at Venasa, in Morimene, which had not less than 3000 slaves. The temple of Artemis Perasia at Castabala also enjoyed a great reputation of sanctity. Cappadocia was remarkable for the number of slaves, which constituted indeed the principal wealth of its monarchs. They were sent in large numbers to Rome, but did not enjoy a good reputation. The province was also celebrated for the number and excellence of its horses, as well as for its vast flocks of sheep; but from its elevation above the sea, and the coldness of its climate, it could never have been a rich and fertile country.

History.—Nothing is known of the history of Cappadocia before it became subject to the Persian empire. It was included in the third satrapy of that empire in the division established by Darius, but continued to be governed by satraps or rulers of its own, who apparently retained the title of kings. These derived their descent from a Persian named Anaphus, who was one of the seven conspirators that slew the false Smerdis. The first ruler who succeeded in establishing himself in a position of virtual independence was Ariarathes (hence called Ariarathes I.), who was a contemporary of Alexander the Great, and maintained himself on the throne of Cappadocia after the fall of the Persian monarchy.

After the death of Alexander, Perdiccas, marching into Cappadocia with a powerful and well-disciplined army, succeeded in taking Ariarathes prisoner, and crucified him and all those of the royal blood who fell into his hands. His son Ariarathes II., however, having escaped the general slaughter, fled into Armenia, where he lay concealed till the civil dissensions which arose among the Macedonians after the death of Eumenes (to whom Perdiccas had surrendered the kingdom) gave him a favorable opportunity of recovering the throne. Having defeated Amyntas in a pitched battle, he compelled the Macedonians to abandon all the strongholds, and after a long and undisturbed reign, left his kingdom to his son Ariamnes II., under whose peaceful administration, as well as that of his successor Ariarathes III., Cappadocia made great progress.

He was succeeded by Ariarathes IV., who joined Antiochus the Great against the Romans, and after his defeat was obliged to atone for taking up arms against the people of Rome by paying a fine of two hundred talents. He afterwards assisted the republic with men and money against Perseus king of Macedon, and was honored by the senate with the title of the friend and ally of the Roman people. He left the kingdom to his son Mithridates, who took the name of Ariarathes V.

During the reign of this prince, surnamed *Philopator*, the Cappadocians remained in close alliance with Rome. Notwithstanding this, he was for a time expelled from his kingdom by Orophernes, who had been set up against him by Demetrius Soter, king of Syria, as a rival claimant to the throne of Cappadocia; but Ariarathes succeeded in expelling Orophernes, and afterwards united his arms with those of Alexander Balas against Demetrius, who was defeated and killed in battle. Some years afterwards Ariarathes, having espoused the cause of the Romans in their contest with Aristonicus, a claimant of the throne of Pergamus, was slain in the same battle in which Crassus, proconsul of Asia, was taken, and the Roman army cut to pieces (130 B.C.). He left six sons by his wife Laodice, on whom the Romans bestowed Lycaonia and Cilicia. But Laodice, fearing lest her children when they came of age should take the government out of her hands, poisoned five of them,—the youngest only having escaped her cruelty by being conveyed out of the kingdom. She was soon, however, put to death by her subjects, who rose in rebellion against her tyrannical government.

Laodice was succeeded by Ariarathes VI., who soon after his accession married Laodice, daughter of Mithridates the Great, wishing to gain the alliance of that powerful prince in his contest with Nicomedes king of Bithynia, who laid claim to part of his kingdom. Mithridates, however, instead of assisting, procured the death of Ariarathes by poison, and under pretence of maintaining the rights of the Cappadocians against Nicomedes, proclaimed himself regent till the children of Ariarathes should be competent to govern the kingdom. The Cappadocians at first acquiesced; but finding him unwilling to resign the regency in favor of the lawful king, they rose in arms, expelled the foreign garrisons, and placed Ariarathes VII., eldest son of the late king, on the throne.

The new prince found himself immediately engaged in a war with Nicomedes; but, being assisted by Mithridates, he not only drove him out of Cappadocia, but stripped him of a great part of his hereditary dominions. On the conclusion of the peace, the refusal of Ariarathes to recall Gordius, the murderer of his father, led to a war with Mithridates. When the two armies met on the frontiers of Cappadocia, Mithridates invited Ariarathes to a conference, and openly stabbed him with a dagger which he had concealed in his dress. The terror-stricken Cappadocians immediately dispersed, and submitted to the yoke of Mithridates; but, unable to endure the tyranny of his prefects, they quickly rose in rebellion, and recalling the exiled brother of the late king they placed him on the throne. He had scarcely ascended the throne when Mithridates invaded the kingdom at the head of a numerous army, defeated the army of the Cappadocians with great slaughter, and compelled Ariarathes VIII. to abandon the kingdom. The unhappy prince soon after died of grief, and Mithridates bestowed the kingdom on his own son, a youth only eight years old, giving him also the name of Ariarathes. But Nicomedes Philopator, king of Bithynia, dreading the increase of power in a rival already so formidable, claimed the throne for a youth who pretended to be the third son of Ariarathes, and whom he sent with Laodice to Rome to advocate his cause. Having received the declaration of Laodice that the petitioner was one of three sons which she had borne to Ariarathes, and whom she had kept concealed lest he should share the fate of his brothers, the senate assured him that they would reinstate him in his kingdom. Mithridates, receiving notice of these transactions, despatched Gordius to Rome to advocate his cause, and to persuade the senate that the youth to whom he had resigned the kingdom of Cappadocia was the lawful son of the late king, and grandson to Ariarathes, who had lost his life in the service of the Romans against Aristonicus. On receiving this embassy, the senate inquired more narrowly into the matter, discovered the whole plot, and ordered Mithridates to resign Cappadocia. The Cappadocians enjoyed their freedom for a short time, but soon sent ambassadors to Rome, requesting the senate to appoint a king. Leave was given them to elect a king of their own nation; and as the old royal family was now extinct, they chose Ariobarzanes, who received the sanction of the senate, and continued steadily attached to the Roman interest (93 B.C.).

Ariobarzanes had scarcely taken possession of his kingdom when he was driven out by Tigranes, king of Armenia, who resigned Cappadocia to the son of Mithridates, in terms of an alliance previously concluded between them. Ariobarzanes fled to Rome, and by the assistance of Sulla, who routed Gordius the general of Mithridates, he was quickly reinstated in his kingdom. On the return of Sulla, however, Ariobarzanes was again driven out by Ariarathes, the son of Mithridates, whom Tigranes had set up as king. By the intervention of Sulla, Ariobarzanes was again placed on the throne; and immediately after Sulla's death he was a third time forced to abandon his kingdom, when Pompey, after defeating Mithridates near Mount Stella, restored the unfortunate monarch, and rewarded him for his services during the war with the provinces of Sophene, Gordyene, and a great part of Cilicia. Wearied with such a succession of disasters, soon after his restoration he resigned the crown to his son Ariobarzanes (63 B.C.), and spent the rest of his life in retirement.

Ariobarzanes II. proved no less faithful to the Romans than his father had been. On the breaking out of the civil war between Cæsar and Pompey he sided with the latter; but after the death of Pompey he was received into favor by Cæsar, who bestowed upon him a great part of Armenia. While the dictator was engaged in war with the Egyptians, Pharnaces, king of Pontus, invaded Cappadocia and stripped Ariobarzanes of all his dominions; but Cæsar, after defeating Pharnaces, restored the king of Cap-

padocia, and honored him with new titles of friendship. After the murder of Cæsar, Ariobarzanes, refusing to join Brutus and Cassius, was declared an enemy to the republic, and was soon afterwards taken prisoner and put to death (42 B.C.). His brother, Ariarathes IX., was then for a few years raised to the throne, but was in his turn put to death by Antony, and with him the royal family became extinct.

Archelaus, the grandson of the general of the same name who commanded against Sulla in the Mithridatic war, owed his elevation to the throne of Cappadocia solely to the intrigues of his mother Glaphyra with Mark Antony, to whom he remained faithful in the contests with Augustus. On the defeat of Antony, he was pardoned by the emperor at the intercession of the Cappadocians, and received Armenia Minor and Cilicia Trachea as a reward for having assisted the Romans in clearing the seas of pirates who infested the coast of Asia. He contracted a strict friendship with Herod the Great, king of Judea, and married his daughter Glaphyra to Alexander, Herod's son. On the accession of Tiberius (who entertained a secret hostility to Archelaus on account of his previous neglect of his merits during the lifetime of Caius Cæsar), he was decoyed to Rome by the fair promises of Livia, the emperor's mother; but being accused before the senate, and loaded with reproaches at the court, he died of grief, after a reign of fifty years.

On the death of Archelaus (17 A.D.) the kingdom of Cappadocia was reduced to a Roman province, and governed by men of the equestrian order. It continued under the Roman empire to enjoy a high state of prosperity, and its capital, Cæsarea, became a great and flourishing city. But in the reign of Valerian, it was overrun by the Persian king Sapor, who took Cæsarea after a long siege, and put most of the inhabitants to the sword. Cappadocia, however, continued to form part of the Byzantine empire, till it was conquered by the Seljukian Turks in 1074. It has ever since remained incorporated with the Turkish empire.

During the Roman period Cappadocia assumes rather a prominent part in ecclesiastical history. Its capital, Cæsarea, was the birthplace of St. Basil, who long occupied its episcopal see, while that of Nyssa was held by his brother Gregory; and the small town of Nazianzus, in the southwest of the province, was at once the birthplace and the residence of the more celebrated Gregory, commonly known from thence as St. Gregory Nazianzen. (E. H. B.)

CAPPEL, the name of a family of distinguished theologians, scholars, and jurisconsults, of whom the following are the most important. Guillaume Cappel, in 1491, as rector of the university of Paris, had the boldness to forbid the payment of the tithe demanded by Pope Innocent VIII. His son Jacques, jurisconsult and councillor of state under Francis I., is famous for the speech which he delivered in 1537 before the king and nobility of France against Charles V. and the counts of Flanders, Artois, and Charolais. His son, Louis Cappel, sieur de Moniambert (1534–1586), who began life as professor of Greek at Bordeaux, and ended his days as professor of theology at Sedan, is remarkable for his devotion to the cause of Protestantism, for the sake of which he risked his life on more than one occasion. It was he who, in 1560, presented to Charles IX. the Confession of Faith which had been drawn up by the Parisian Protestants. Another son, Jacques Cappel (1570–1624), was a distinguished jurisconsult. He was the father of Jacques Cappel, author of a number of works of considerable celebrity on theology, history, philology, and antiquities, and of Louis Cappel, noticed below.

CAPPEL, LOUIS, the most celebrated member of the above family, a learned Protestant theologian and scholar, was born at St. Elien in 1585, and died at Saumur in 1658. He studied theology at Sedan, Oxford, and Saumur. At the age of twenty-eight he accepted the chair of Hebrew at Saumur, and twenty years after that of theology. As a Hebrew scholar, his greatest achievement is his demonstration, against the Buxtorfs, that the vowel points and accents are not an essential part of the Hebrew language, but were inserted by the Masorete Jews of Tiberias, not earlier than the 5th century A.D., and that the primitive Hebrew characters are those now known as the Samaritan, while the square characters are Chaldean, substituted for the more ancient at the time of the Captivity. As a theologian, he advocated liberal views with regard to the verbal inspiration of Scripture and the history of the Bible. These doctrines of Cappel were generally distasteful to his co-religionists. Their protest against the Church of Rome being founded upon Scripture, to allow the possibility of the slightest inaccuracy in its text seemed to them to be striking at the very root of their position. They, therefore, made strenuous efforts to prevent the publication of his views. The Swiss clergy were compelled to sign a paper condemning them, and Cappel found great difficulty in printing some of his works. His *Critica Sacra*, a collection of various readings in the Old Testament and of canons of textual criticism, lay in MS. for ten years, and he was only able to print it at Paris, in 1650, by aid of a son who had turned Catholic. Cappel is also the author of *Annotationes et Commentarii in Vetus Testamentum*, *Chronologia Sacra*, and other theological works, as well as of several treatises on Hebrew besides the *Critica Sacra*, among which are the *Arcanum Punctuationis revelatum* (1624), and the *Diatriba de veris et antiquis Ebræorum literis* (1645). His *Commentarius de Capellorum gente*, giving an account of the distinguished family to which he belonged, was published by his nephew James Cappel (1639–1722), who, at the age of nineteen, became professor of Hebrew at Saumur, but, on the revocation of the edict of Nantes, fled to England, where he died in 1722.

CAPPERONIER, CLAUDE (1671–1744), a classical scholar, was the son of a tanner at Montdidier. He studied at Amiens and Paris, and took orders in the Church of Rome, but devoted himself almost entirely to classical studies. He declined a professorship in the university of Basel, and was afterwards appointed to the Greek chair in the Collége de France. He published an edition of Quintilian, and left behind him at his death an edition of the ancient Latin Rhetoricians, which was published in 1756. His nephew, Jean Capperonier, was also a famous linguist.

CAPRERA, or CABRERA, a small island of Italy, in the Mediterranean, two miles off the north-east coast of Sardinia, in 41° 12′ 47″ N. lat. and 9° 29′ 14″ E. long. It forms one of the Buccinarian group, and belongs to the province of Sassari. The most of its surface of 6700 acres is rocky and unfertile; and till the present century it was only occasionally visited. In 1854 Garibaldi[1] acquired possession of a part of the island, and built himself a house, which has been his principal place of residence since that date. See Vecchj, *Garibaldi at Caprera*, 1862.

CAPRI, the ancient *Capreæ*, a small island of Italy on the south side of the Bay of Naples, in 40° 32′ N. lat. and 14° 11′ E. long., and separated by a space of 3½ miles from the promontory of Sorrento. It is a mass of limestone rock, with an area of about 20 square miles, rising into two distinct peaks or plateaus, with a little valley of great fertility between. The coast consists for the most part of precipitous cliffs, and there are only two landing-places in the whole circuit. The scenery throughout the island is of unusual beauty, and some of the sea-caves are unrivalled for the splendid colors reflected on the rock. The two most famous are called respectively the Blue and the Green Grotto; the former, though it has only become a popular resort in the present century, seems to have been known in the 17th. The inhabitants still retain distinct traces of the Greek type of countenance and figure. They are industrious, religious, and simple, and, in general, poor. Besides the cultivation of the narrow surface that can be reclaimed from the rock, they chiefly depend on the capture of the quails which visit the island in May and December; and about 200 of the young men take part annually in the coral fishery off the coast of Africa. The chief towns are Capri in the east, with 2332 inhabitants, and a beautiful cathedral and a seminary; and Anacapri in the west, situated on the summit of Monte Solara, and accessible by a stair of 552 steps cut in the rock.

First inhabited, according to Virgil and Tacitus, by the Telaboes, Capri afterwards became a naval station of the Etruscans; and in the 5th century B.C. passed under the power of the Grecks of Neapolis. From that city it was purchased by Augustus, who occasionally retired to its grateful seclusion in the latter part of his life. It is chiefly celebrated, however, as the retreat of Tiberius, where he spent the last ten years of his reign. He erected twelve villas in different parts of the island, the most famous of which was the *Villa Jovis*, built on the summit of the eastern cliffs 1500 feet above the sea. Large parts of the building, which combined the strength of a fortress with the luxury of a palace, still remain to bear witness to the power and wealth of the empire. The whole island, indeed, is full of Roman re-

[1] [Giuseppe (1807–82), born in Nice, a sailor, fled to Brazil 1836 and fought for the Rio Grande Republic, returned to Sardinia in 1848 to expel the Austrians from Lombardy, defended the Roman Republic of '49 against the French, came to New York in 1850, joined Cavour in the war of '59, freed the Sicilies, assailed Rome in 1866, fought for France in 1870, was an impracticable Italian deputy. Died June 2 at Caprera.—AM. ED.]

mains, and has yielded to the archæologist a rich harvest of mosaics, bas-reliefs, coins, and inscriptions. Of the last one of the most remarkable is the strange lamentation of Hypatus, which was discovered in the Mithraic temple at Metromania. On the fall of the Roman empire, Capri passed to the see of Rome, and it formed part of the bishopric of Sorrento till the 10th century, when it received a bishop of its own. Of its mediæval history the principal remains are the castles of Castiglione and Anacapri. In 1803 it was captured by Sir Sidney Smith, and defended by new fortifications; but in 1808, while Sir Hudson Lowe was in command, it was recaptured by Murat.

See Hadrava, *Lettere sull' isola di Capri*, Dresden, 1794; Hans Andersen, *Improvisatore;* and three articles (reprinted from the *Saturday Review*, 1873) in J. R. Green's *Stray Studies*, 1876.

CAPSICUM. See CAYENNE PEPPER.

CAPSTAN, an appliance used on board ship and elsewhere for heaving up the anchor or any heavy weight. Fig. 1 represents one of Harfield & Co.'s patent wrought-iron capstans as used in the Royal Navy. It has a vertical spindle D, passing through sockets firmly secured in the deck, a drumhead E being keyed on to the spindle, and the capstan is turned round by means of bars inserted in holes made to receive them all round the edge of the drumhead. A capstan of the kind shown would have about twenty holes for bars, and each bar would be about fifteen feet in length. The capstan bars are made of tough wood, such as American ash or rock elm. Three or four men can stand to each bar, so that when the capstan is fully manned at least sixty men are employed. When a hempen cable or a hawser is brought to the capstan, three turns are taken round the barrel GG, and men are stationed to haul on the end of the rope to prevent it from slipping, and to coil it up as it comes in. When a chain cable is brought to the capstan it is passed round the "whelps" at H, and is kept upon them by the rollers *a*, *a*, *a*, *a*, as shown in the plan (fig. 2), so that the cable assumes the position shown at ABC, A being towards its outer and C towards its inner end.

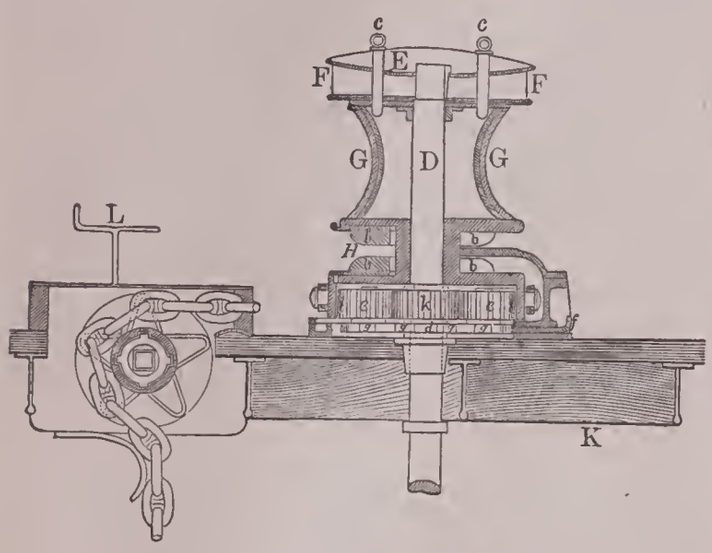


FIG. 1.—Vertical Section of Capstan.

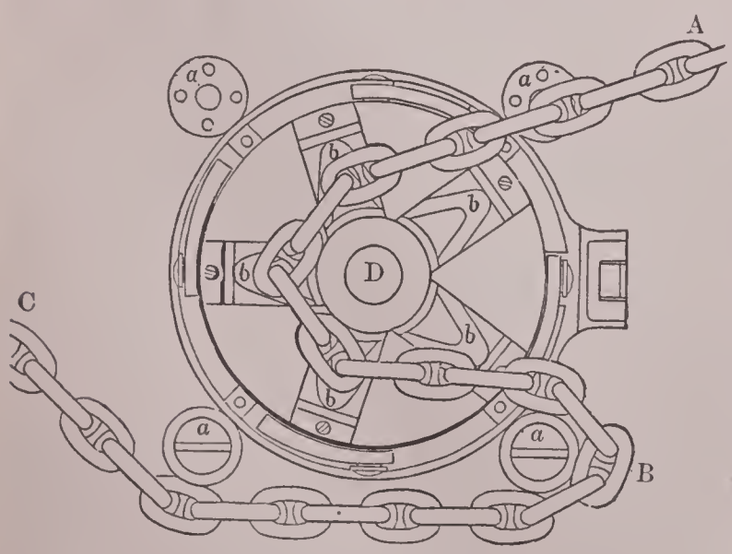


FIG. 2.—Plan of Capstan.

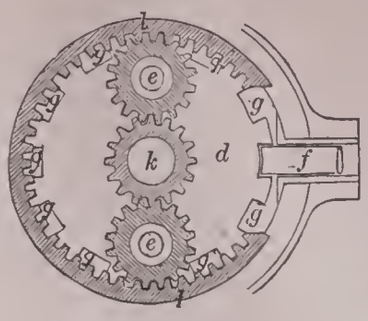


FIG. 3.—Section showing Pinions.

Capstans in their primitive form were merely blocks of wood wrought to the required shape and made to traverse on an iron spindle, and improvements have been gradually effected in them, some important ones being introduced by Captain Phillips, R.N. In all these capstans the cable was brought in by means of a "messenger" (see article CABLE); but in 1857 Mr. Thomas Brown took out a patent for dispensing with the messenger, and working the cable itself on the capstan by fitting a grooved pulley with guide rollers for securing the requisite amount of turn of the chain, as before described, at ABC. Subsequently important improvements were introduced into the details of this invention, particularly in making the stops or whelps *b*, *b* which hold the links movable, so that they may be adjusted to fit the links of the cable exactly, and also admitting of their renewal when worn.

The capstan shown in figs. 1, 2, and 3 is constructed of wrought iron, no cast-iron or wood being used. It is fitted with treble purchase gear, which is a simplification of Captain Phillips's original power capstan, and has the advantage of the toothed gearing remaining at rest with respect to the capstan, when the single purchase only is required. The treble power is obtained by withdrawing the connecting bolts *c*, *c* from the capstan barrel, and locking the plate *d*, which carries the intermediate pinions *e*, *e* to a fixed point in the deck, by sliding the horizontal paul *f* into one of the recesses *g*, *g* provided for the purpose. The action then is as follows:—The drumhead E, which is keyed to the spindle D, drives the centre pinion *k;* this drives the intermediate pinions *e*, *e*, which rotate around their centres, as the pinion plate *d* is fixed to the deck by the paul *f;* these pinions in their turn drive the annular wheel *l*, which forms part of the capstan proper.

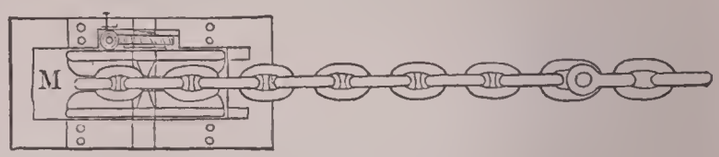


FIG. 4.—Cable-holder.

In large ships the spindle D is frequently continued down to the deck below, and another capstan is worked on it. In such cases the two capstans are so arranged that they may be worked either separately or together; thus, if required, the power applied by the men on both capstans may be brought to bear on a chain or hawser attached to either. In large ships of the navy and in many merchant vessels steam power is employed to drive the forward capstan, which is the one most used. Small engines specially constructed for this purpose, and secured to the under side of the deck beams at K, are generally used. All capstans are provided with pauls to prevent them from running back.

Figs. 1 and 4 show a new form of "cable-holder," which has been recently introduced by Mr. W. H. Harfield of London, and is in use in a few ships of British and foreign navies. The cable-holder is placed on the fore side of the deck pipe, and is fitted with a grooved pulley M for the cable to pass over, similar to the whelps of the capstan shown in fig. 1. It revolves on a horizontal spindle fixed to the deck by brackets. The interior is made hollow, and contains a double series of disks, which can be screwed together by means of a hand-lever L, thereby causing sufficient friction to let the cable run out slowly, or to stop it entirely, and also to hold the ship when riding at anchor. Means have been devised, and are now being fitted in one of the ships of the British navy, for connecting these "cable-holders" with the cap-

stan, so that the cable may be hove up by them without taking it to the capstan. (T. M.)

CAPUA, a large and important city of ancient Italy, capital of Campania, was situated in the midst of a very fertile and valuable territory, two miles from the bank of the Vulturnus, and about half that distance from the mountain Tifata. Much diversity of opinion has prevailed as to the date of its foundation, and the people by whom it was originally inhabited. It is now generally agreed that Capua was one of the twelve cities which the Tuscans were said to have founded in the south of Italy at the beginning of the 9th century B.C. The city soon rose in importance, and its inhabitants became renowned throughout the whole peninsula for their wealth, and the luxurious magnificence of their lives. In course of time, as was natural, they degenerated so far that, from having been originally a brave and warlike people, they could no longer resist the encroachments of the Samnites, who in 424 B.C. made themselves masters of the city, and put the inhabitants to the sword. The material prosperity of the city remained undiminished under the rule of the Samnites, who in less than a century became as effeminate and degenerate as the Capuans had been. When they in turn were attacked by the mountaineers, they were compelled to apply to Rome for assistance, which was immediately granted. At the close of the Latin war, in which the Capuans had assisted the allies, they were deprived of the *Campanus Ager*, the most valuable district in Italy, but were admitted to take rank as citizens of Rome. They still continued, however, to select their own rulers. When the second Punic war broke out, the Capuans, elated with the prospect of retrieving their high position, opened their gates to Hannibal, who spent an entire winter with his army in the city. To the enervating contagion of Capuan effeminacy historians have always attributed the want of success which subsequently attended the Carthaginian commander in his Italian campaigns. When the Romans at length made themselves masters of the city, in the seventh year of the war, they took a terrible revenge, and only forbore to raze the city to the ground in consideration of the great natural advantages of its site. For its fidelity in the social war, the Romans restored to Capua all its municipal privileges, and the city recovered all its commercial, though it never regained its political importance. Under Julius Cæsar, the Campanus Ager was distributed among 20,000 citizens of Rome, and Capua became a Roman colony. Under the emperors it continued to prosper commercially, and it seems to have been as rich and populous at the downfall of the Western empire as during the time of its political independence. Its wealth marked it out as a special object of attack to the Vandals, who took and nearly destroyed it under Genseric 456 A.D. What was left undone by the Vandals was completed by the Saracens, who burnt the city to the ground in 840. The inhabitants, who had fled for shelter to the neighboring mountains, returned on the departure of their eastern invaders, and established themselves at Casilinum, a stronghold on the Vulturnus two miles distant from their ancient home. Casilinum is the modern Capua, formerly one of the strongest forts in the kingdom of the two Sicilies. The site of the ancient Capua is now occupied by Santa Maria, a thriving town of 16,000 inhabitants, the seat of the tribunals of the southern division of the province of Terra di Lavoro. Outside Santa Maria, on the north-west, are the extensive remains of the old Capuan amphitheatre, second only to the Flavian amphitheatre in size and magnificence, near which are the remains of a triumphal arch; and other ruins may still be traced within the town and in its immediate neighborhood, but they are not of much interest.

Granata, *Storia civile della fedelissima città di Capua*, 3 vols., Naples, 1752–56; Rinaldo, *Memorie istor. della città di Capua*, 1755; Rucca, *Capua Vetere*, 1828; Daniele, *Monete antiche di Capua*, 1802.

CAPUCHINS. The Capuchin friars are one branch of the great Franciscan order, and their rule is in all essentials the same as that of the other friars minor, or Minorites. It was in the first decade of the 13th century that St. Francis established his order; but it was not till 1528 that a bull of Clement VII. erected into a separate order the disciples of a certain minorite friar, who had conceived that he was inspired to reform the practices of his order in some respects. This man's name was Mathew da Bassi, a Franciscan of the March of Ancona. The legend of the order states that, having seen a representation of St. Francis wearing a square-cut pyramidal hood, he made a similar one for himself, sewed it on to his monastic habit and began to wear it. This was in 1525. This audacious innovation drew down on the author of it much blame, and some persecution on the part of his superiors; but as usual in similar cases, that did not prevent others from following his example. Specially two brothers Ludovico and Raffaelle of Fossombrone, the first a priest and the second a lay brother of the Franciscan order, joined themselves to Mathew, and underwent punishment from their superiors for so doing. They, however, obtained the countenance and patronage of the Duchess Cibo, a connection of the then reigning Pope Clement VII. (Giulio de' Medici), and the wife of Giorgio Varano, duke of Camerino. That lady gave her protegés a letter of recommendation to the pope, armed with which they went to Rome, and, despite the fact that they were disobedient to their superiors and therefore had broken their monastic vows, obtained from the pope the bull known as *Religionis Zelus*, by which they were permitted to impart their hooded habit to any disciples who might be willing to join them, to live as hermits in wild and desolate places, to go barefoot, to wear beards, and to call themselves "Hermit Friars Minor." The populace, however, gave them a nickname which has supplanted the more formal one. "Cappuccio" is a hood in Italian; and the diminutive "Cappuccino," formed half affectionately, half contemptuously, as is the Italian wont, means "little hooded fellow." When this bull had been obtained, a place for the first congregation of the new order was soon found in an abandoned convent at Colmenzone, near Camerino, given to them by the duchess. Disciples thronged to the "new religion," and three other convents were shortly built. Mathew, the disobedient monk who had rebelled against his superiors and abandoned his convent, had fully suceeeded in the objects to which his ambition had prompted him. He had been made, of course, superior of the first convent, and, subsequently, when the "families" of his new congregation had multiplied, he became vicar-general, subject only to the general of all the Franciscans.

In 1538, in a chapter of the new congregation convoked at Florence—so rapidly had the order of Capuchins spread itself—the celebrated Bernardino Ochino of Siena was elected vicar general, and a second time in 1541. But having shortly afterwards fallen into heresy, and taken refuge in Switzerland, the society to which he had belonged, and on which his celebrity had thrown a lustre which has never since belonged to it, fell under grave suspicions of heterodoxy. The recently established congregation ran great risk of being dissolved, and its leading members were cited by Paul III. to Rome to give an account of their opinions. The Capuchins were forbidden to preach, and would have been abolished, but for a warm and eloquent defence pronounced in Consistory by the Neapolitan Cardinal Antonio Sanseverino, which warned the Pope of the danger of "plucking up tares and wheat together!" This privilege was restored to the society in 1545; and the congregation multiplied itself largely in Italy. Paul III. had forbidden them to extend themselves beyond the Alps; but Gregory XIII., at the request of King Charles IX., revoked this decree, and permitted them to establish convents in any part of the world Gregory XIV. in 1591 forbade the Capuchins by bull to hear confessions and grant absolution; but these functions were restored to them by Clement VIII. in 1602. Paul V. in 1619 gave the congregation the rank and status of a distinct order, gave their vicar the title of Minister General, relieved him from the necessity (which heretofore had marked the *quasi* subjection of the society to that of the parent Franciscan *observantive* or *conventual* friars) of asking the confirmation of his election from the general of the Conventuals, exempted the Capuchin convents from the right of visitation previously exercised by the superiors of the elder branch, and conferred on them the much-valued privilege of carrying a cross of their own in all processions, instead of being obliged to walk after that of the elder branch. It is stated that at this time the Capuchins numbered 15,000 members. Urban VIII. was a notable protector of the order, and created his brother, who was a member of it, cardinal. It was mainly by him that the convent in the Piazza Barberini,—which has been from that day to the recent one when the generals of all the orders were removed from their convents, the residence of the Capuchin generals,—was founded. Benedict XIV. gave the order the privilege that the preacher of the Sacred Apostolic Palace should always be a member of their society.

The Capuchins have from a very early period of their separate existence had the reputation of being great converters of

heretics and infidels. It is related that they converted a thousand Calvinists in Poitou alone to the orthodox faith. From an early period they specially dedicated themselves to the work of missionaries. Up to the year 1641 the Capuchins, though sending missionaries to all parts of the world, had never had a missionary college. In that year their general, Eugenio di Rumilly of Savoy, founded a college in Rome for the express education of their members for the work of missions. In the first eighteen months after the foundation of this college thirty-six Italian Capuchins were sent to Hindustan and Brazil, and eighty Spaniards of the order to Venezuela.

The order at present maintains eighty-two missions, served (according to the latest accounts) by a few more than two hundred missionaries. They have twenty-three stations in Switzerland; in the north of Italy, nine; in the Levant, eleven. In Asia also they have stations at Beyrout, Gazir, Saida, Damascus, Mount Lebanon, and Aleppo. In Georgia there are five stations, and four in Mesopotamia. In the East Indies they have fourteen missions, seven in Africa, and four in South America. It is a result which might be expected from such a field of labor, that the Capuchin Martyrology is a specially extensive one.

The saints and martyrs of the order have been recorded by Father Charles of Brussels in two volumes, under the title of *Flores Seraphicæ*. A *Biblioteca degli scrittori Cappucini* was printed in Venice in 1747. The history of the order has been written by Zachariah Boverius in Latin, Lyons, 1632–39, 2 vols. folio. A decree of the Congregation of the Index in 1651 ordered the suppression of this work on account of the absurd tales with which it abounds. A subsequent decree of the following year, however, permitted the publication of it on condition of certain emendations. The work has been translated into French, Italian, and Spanish. A continuation of the *History* of Boverius, by Father Marco of Pisa, was published in folio at Lyons, 1676. The curious reader may also consult the work of Giuseppe Zarlino, *On the Origin of the Congregation of the Capuchins*, Venice, 1579; also the *Annals* of Wadding; and Helyot's *History of the Monastic Orders*, tom. vii. ch. 24.

CAPYBARA (*Hydrochœrus capybara*), the largest of existing Rodents, measuring about 4 feet in length and 3 in girth, and weighing usually over 100 lb. It is also known as the water-hog from the resemblance which it bears when walking to a pig, although when sitting on its haunches it reassumes the characteristic appearance of the Cavy family, to which it belongs. In the coarseness and scantiness of its fur, in the numerous enamel plates, embedded in cement, which stretch entirely across its molar teeth, like those of the elephant, and in the habit, when swimming, of carrying its young on its back like the hippopotamus, the capybara has been supposed to form a connecting link between the rodents and pachyderms, and in the Linnæan system of classification it was placed among the *Suidæ*. Its scanty fur is of a dark brown color, its tail forms a small horny protuberance, and its feet are webbed, though not to the extremities of the toes. This paehydermatous rodent, as it has been called, is confined to South America, where it extends from Guiana southward to the Rio de la Plata, and westward to the eastern slope of the Andes. It is a nocturnal animal, feeding on fruits and herbs, inhabiting the banks of rivers and fresh water lakes, and occasionally frequenting, according to Darwin, the mouths of such rivers as the Rio Plata where the water is entirely salt. Capybaras congregate in considerable numbers, browsing by night among aquatic plants, and in districts where they are not liable to the attacks of the jaguar, are sufficiently tame to allow themselves to be approached within a few feet; while, under domestication, they are said to be capable of considerable attachment. When disturbed they utter a low abrupt grunt, "resembling," says Darwin, "the first hoarse bark of a large dog," apparently produced by a sudden expulsion of air; then, rushing at full speed into the water, they dive out of sight, remaining submerged for seven or eight minutes, and reappearing only to show the upper surface of their heads. They are readily killed, seldom attempting to defend themselves, although when driven to extremity they have been known to tear the flesh from the paw of a jaguar or the leg of a horse. Their skin is of little value, and their flesh, which is made into hams, is of indifferent quality. The missionary monks of Brazil were wont to eat it during Lent, along with their turtle, in virtue of the capybara's amphibious habits. On land it is a favorite food of the jaguar, as it is of the alligator in the water. Fossil remains of this and of another species of capybara have been found in the caves of Brazil.

CARACAL, The (*Felis caracal*), belongs to a group of Lynxes characterized by comparative slenderness of body and length of tail and ears. It is somewhat larger than a fox, of a uniform reddish brown color above, and whitish beneath, with two white spots above each of the eyes, and with a long black tuft of hair at the tip of the ears, the latter, according to Sir W. Jardine, being only present in spring, or at the commencement of the breeding season. It is to the ear-tufts that it owes its name, which is derived from two Turkish words signifying "black-ear." The caracal is widely distributed, being found throughout Africa and South-western Asia. It feeds on the smaller quadrupeds and birds, hunting the former in packs after the manner of wolves, and climbing trees in pursuit of the latter. It is said also to resemble the jackal in following in the wake of the lion and other large carnivora, in order to feed on what those lords of the lower creation may leave, and on this account has received the name of the "lion's provider." Like the cheetah, it was formerly trained by Eastern princes to hunt the smaller quadrupeds, and such birds as the crane and pelican; but from its fierceness, and the extreme irritability which it displays in confinement, it does not seem well fitted for domestication. Frequent reference is made in Greek and Roman literature to the lynx, and from such descriptions as are given of it there is little doubt that the caracal, and not the more northerly species now known as the lynx, was referred to. In South Africa, where the caracal abounds, its hide is made by the Kaffres into skin-cloaks, known as karosses.

CARACALLA, Marcus Aurelius Antoninus (188–219 A.D.), a Roman emperor, son of the Emperor Septimius Severus, was born at Lyons in 188. His original name, Bassianus, has been entirely dropped in favor, either of the nickname Caracalla (taken from the long-hooded tunic which he wore, and introduced into the army), or of the imperial title of Marcus Aurelius Antoninus, which he received at the time when his father declared himself the adopted son of M. Aurelius. Dion Cassius regularly calls him Tarantus, from his resemblance to a certain coarse and bloodthirsty gladiator. The heartless cruelty of his disposition was early displayed in an attempt to assassinate his father; and when, on his father's death, he mounted the throne (211) as colleague of his brother Geta, he did not shrink from murdering him in the presence of his mother, to seize the supreme power, nor from making himself secure by butchering 20,000 persons whom he suspected. It is said that he was, however, unable to rid himself of remorse, and that it was the torment of conscience which drove him to spend the rest of his life in the maddest acts of destruction and bloodshed. He visited Gaul, Germany, France, Egypt, and various parts of Asia, plundering everywhere, and committing the most atrocious crimes. In Alexandria he took vengeance for the sarcasms of the people by a general massacre; and he laid Mesopotamia waste because Artabanus, the Parthian king, refused to give him his daughter in marriage. In 217 he was killed at the instigation of Macrinus, who succeeded him. See Roman History.

CARÁCAS, a large city of South America, capital of the United States of Venezuela, and of the federal district, is situated on the declivity of a mountain 2880 feet above the level of the sea, 16 miles south-south-east of La Guayra, its port on the Caribbean Sea, in 10° 30′ N. lat., 67° 4′ W. long. Population in 1873, 48,897. The city is finely situated, and has a temperate and healthy though variable climate. The mean temperature of the year is about 72° Fahr., being in the hot season 75°, and in the cold season 66°. The thermometer, however, sometimes rises to 84° or 85°, and at other times descends as low as 51° or 52°. Rain is abundant during the months of April, May, and June, but not so incessant as in other tropical countries; the rest of the year is rather dry. The city is much subject to earthquakes, from which it has frequently suffered; in that of 1812, 12,000 persons are said to have perished. Carácas is separated from the sea-coast, and from its port of Guayra, by the high ridge of the Cerro de Avila, and lies on the western skirt of the plain Chacao, which has a steep slope from north-north-west to south-south-east. The Guayra, a tributary of the River Tuy, which falls into the ocean thirty-six miles east of Cape Codera, flows past the southern side of the city, and is joined by the streams called the Anauco, Catuche, and Caroata passing through the town from the north. Two miles east the great double-peaked mountain known as the Silla de Carácas rises to 8600 feet.

The Calvario hill, west of the city, was the scene of a battle between the Spaniards and patriots in June, 1821. The town is well and regularly built; the streets are wide and well paved, crossing each other at right angles. There are several squares, of which the Plaza Mayor, or great square, is the most worthy of notice. Its east side is principally occupied by the cathedral, the south by the college, and the west by the public prison. This square is a great market for provisions, fruit, and other articles, and contains a sort of inner square in which are ranges of shops. A reservoir in the ravine of the Catuche to the north furnishes the city with water, which is supplied to the inhabitants by public fountains as well as in pipes. The chief public building is the cathedral, which is 250 feet in length by 75 in breadth, and is supported by twenty-four pillars, without beauty or proportion. It contains the tomb of Bolivar. The university of Carácas, which, with the House of Assembly, the National Library (of 10,000 volumes), and a church, forms one block of the town, was originally a convent of Carmelite friars, and has faculties of divinity, chemistry, and medicine. The Municipal Hall, close to the Grand Plaza, is a plain building, one of the oldest in Carácas. There are several parish churches, three monasteries for friars, two nunneries, three hospitals (one of which is for lepers alone), and a theatre. The city is very inaccessible from the north, in which direction three rough mountain tracts unite it with La Guayra. A railroad is projected to unite Carácas and its port. A railway to the eastward from the city was partly constructed at one time, but was not completed. Carácas was founded by Diego Losada in 1567.

CARACCI, Lodovico, Agostino, and Annibale, three celebrated Italian painters, were born at Bologna in 1555, 1558, and 1560 respectively. Lodovico, the eldest, son of a butcher, was cousin to the two younger, Agostino and Annibale, sons of a tailor, and had nearly finished his professional studies before the others had begun their education. From being a reputed dunce while studying under Tintoretto in Venice, he gradually rose, by an attentive observation of nature and a careful examination of the works of the great masters preserved at Bologna, Venice, Florence, and Parma, to measure himself with the teachers of his day, and ultimately projected the opening of a rival school in his native place. Finding himself unable to accomplish his design without assistance, he sent for his two cousins, and induced them to abandon their handicrafts (Agostino being a goldsmith, and Annibale a tailor) for the profession of painting. Agostino he first placed under the care of Fontana, retaining Annibale in his own studio; but he afterwards sent both to Venice and Parma, to copy the works of Titian, Tintoretto, and Correggio, on which his own taste had been formed. On their return, the three relatives, assisted by an eminent anatomist, Anthony de la Tour, opened, in 1589, an academy of painting under the name of the Incamminati (or, as we might paraphrase it, the Right Road), provided with numerous casts, books, and bassi-rilievi, which Lodovico had collected in his travels. From the affability and kindness of the Caracci, and their zeal for the scientific education of the students, their academy rose rapidly in popular estimation, and soon every other school of art in Bologna was deserted and closed. They continued together till, at the invitation of Cardinal Farnese, Annibale and Agostino went to Rome in 1600 to paint the gallery of the cardinal's palace. The superior praises awarded to Agostino inflamed the jealousy of Annibale, already kindled by the brilliant reception given by the pupils of the Incamminati to Agostino's still highly celebrated picture of the communion of St. Jerome, and the latter was dismissed to Parma to paint the great saloon of the Casino. Here he died in 1601, when on the eve of finishing his renowned painting of Celestial, Terrestrial, and Venal Love. Annibale continued to work alone at the Farnese gallery till the designs were completed; but, disappointed at the miserable remuneration offered by the cardinal, he retired to Naples, where an unsuccessful contest for a great work in the church of the Jesuits threw him into a fever, of which he died in 1609. Lodovico always remained at his academy in Bologna (excepting for a short visit to his cousin at Rome), though invited to execute paintings in all parts of the country. He died in 1619, and was interred in the church of St. Mary Magdalene. The works of Lodovico are numerous in the chapels of Bologna. The most famous are—The Madonna standing on the moon, with St. Francis and St. Jerome beside her, attended by a retinue of angels; John the Baptist, St. Jerome, St. Benedict, and St. Cecilia; and the Limbo of the Fathers. He was by far the most amiable of the three cousins, rising superior to all feelings of jealousy towards his rivals; and though he received large sums for his productions, yet, from his almost unparalleled liberality to the students of the academy, he died poor. With skill in painting Agostino combined the greatest proficiency in engraving (which he had studied under Cornelius de Cort) and high accomplishments as a scholar. He died not untroubled by remorse for the indecencies which, in accordance with the corruption of the time, he had introduced into some of his engravings. The works of Annibale are more diversified in style than those of the others, and comprise specimens of painting after the manner of Correggio, Titian, Paolo Veronese, Raphael, and Michelangelo. The most distinguished are the Dead Christ in the lap of the Madonna; the Infant and St. John; St. Catherine; St. Roch distributing alms (now in the Dresden Gallery); and the Saviour wailed over by the Maries, at present in possession of the earl of Carlisle. He frequently gave great importance to the landscape in his compositions. The reputation of Annibale is tarnished by his jealousy and vindictiveness towards his brother, and the licentiousness of his disposition, which contributed to bring him to a comparatively early grave.

The three Caracci were the founders of the so-called Eclectic School of painting, the principle of which was to study in the works of the great masters the several excellences for which they had been respectively pre-eminent, and to combine these in the productions of the school itself; for instance, there was to be the design of Raphael, the power of Michelangelo, the color of Titian, and so on. The dullest or mildest connoisseur will at once perceive that a picture uniting these various kinds of greatness would be a glorious and indeed an unparagoned work of art; but it does not follow that the attempt to transfer the several qualities, by study and practice, from the works of various men to those of one man, is fruitful of good. It is, in fact, far the reverse; and at the present day perhaps few axioms in art have won a wider acceptance than that which pronounces eclecticism to be at once a result and a symptom of decadence. Eclecticism indicates that the creative impulse, the vital energy and fertility, of art have departed; that the practitioners of the day can no longer do what their forerunners did—produce admirable works, because in themselves spontaneously capable of doing so. They have on the contrary to investigate what has been achieved, and labor not for a new achievement resembling those which preceded in so far as all are the product of some personal gift, special and unforestalled, but rather for an achievement re-combining and re-applying old successes, and qualifying, or indeed neutralizing, the strength of one quality by that of another. This is, in effect, an attempt to produce works of art upon the principles which govern the criticism of those works,—an attempt predestined to sterility, for no two things are more antagonistic than the producing power and the criticising power. They may, no doubt, be united in the same person, but cannot work out their results the one through the medium of the other.

CARACTACUS, a chief of the Silures in ancient Britain. See Britannia, vol. iv. p. 318.

CARAMAN, or Karaman, a town of Asiatic Turkey, in the vilayet of Konia in Asia Minor, 61 miles south-east of the city of Konia (*Iconium*) on the border of an extensive plain at the foot of Mount Taurus, in 37° 13′ N. lat. and 33° 28′ E. long. It now contains about 1000 houses, three or four mosques, and an American church, and among other traces of its former importance are the ruins of a castle, the outer wall of which is of compass enough to contain about 100 houses. It trades with Smyrna and the other towns of Asia Minor, and manufactures coarse cloth from the wool of the neighboring highlands. By the Greeks it is still called by its ancient name of Laranda, which was changed by the Turks for its present designation in honor of Karaman, the founder of the Karamanian kingdom. Little is known of its ancient history except that it was destroyed by Perdiccas about 322 B.C., and afterwards became a seat of Isaurian pirates. It was taken possession of by Frederick Barbarossa in 1190;

in 1466 it was captured by Mahomet II., and in 1486 by Bajazet II.

CARAMANIA, or KARAMANIA, is a name that has been frequently given by modern geographers to the south coast of Asia Minor, including the whole of the districts between Mount Taurus and the Mediterranean, known in ancient times as Lycia, Pamphylia, and Cilicia. It is in this sense that the term is used by Captain Beaufort, who, by the publication of his work (*Karamania: a Description of the South-east Coast of Asia Minor*, 8vo, 1816), which contained the first detailed account of the countries in question, did much to perpetuate the usage. But he himself admits that there is no authority for the application of the term in this sense. The only foundation for it was the existence, after the break up of the monarchy of the Seljukian Turks, of an independent Turkish kingdom, comprising a portion of the interior, north of the Taurus, to which for a short time the adjacent maritime provinces were annexed. This state bore the name of Karaman-ili, derived from that of its founder, and after it was finally subdued by the Ottoman Turks in 1486 it still continued to exist as a pashalic or government, the seat of which was fixed at Karaman, a considerable town on the north side of the Taurus, occupying the site of the ancient Laranda. But the pashalic thus named was situated wholly in the interior, north of the great chain of Mount Taurus, and comprised no part of the maritime districts, to which the name of Karamania was applied by European geographers. This erroneous use of the term may be considered as now obsolete, and the name of Karaman is no longer found among the territorial divisions of Turkey. The regions comprised under this appellation as employed by Captain Beaufort and Colonel Leake will be described under the headings LYCIA, PAMPHYLIA, and CILICIA.

CARAVACA, a town of Spain, in the province of Murcia, near a stream of the same name, which is tributary to the Segura, in 38° 6′ N. lat., 2° 2′ W. long. It is commanded by the ancient castle of Santa Cruz, and has an old parish church, with several convents, hospitals, and schools. The hills in the neighborhood yield various kinds of marble, and in a mountain on the west is the stalactite cavern of Barquilla. The miraculous cross of Caravaca is famous for its healing powers, and a great festival is held in its honor on the 3d of May. Population, 6840.

CARAVAGGIO, MICHELANGELO AMERIGHI (or MERIGHI) DA (1569–1609), a celebrated painter, born in the village of Caravaggio, in Lombardy, from which he received his name. He was originally a mason's laborer, but his powerful genius directed him to painting, at which he worked with immitigable energy and amazing force. He despised every sort of idealism whether noble or emasculate, became the head of the Naturalisti (unmodified imitators of ordinary nature) in painting, and adopted a style of potent contrasts of light and shadow, laid on with a sort of fury, emblematic of that fierce temper which led the artist to commit a homicide in a gambling quarrel at Rome. To avoid the consequences of his crime he fled to Naples and to Malta, where he was imprisoned for another attempt to avenge a quarrel. Escaping to Sicily, he was attacked by a party sent in pursuit of him, and severely wounded. Being pardoned, he set out for Rome; but having been arrested by mistake before his arrival, and afterwards released, and left to shift for himself in excessive heat, and still suffering from wounds and hardships, he expired of fever on the beach at Pontercole in 1609. His best pictures are the Entombment of Christ, now in the Vatican; St. Sebastian, in the Roman Capitol; a magnificent whole-length portrait of a grand-master of the Knights of Malta, Alof de Vignacourt, and his page, in the Louvre; and the Supper at Emmaus, in the Borghese Palace.

CARAVAGGIO, POLIDORO CALDARA DA (1495–1543), a celebrated painter of frieze and other decorations in the Vatican, whose merits were such that, while a mere mortar-carrier to the artists engaged at that work, he attracted the admiration of Raphael, then employed on his great pictures in the Loggie of the palace. Polidoro's works, as well as those of his master, Maturino of Florence, have mostly perished, but are well known by the fine etchings of P. S. Bartoli, Alberti, &c. On the sack of Rome by the army of the Constable Bourbon in 1527, Polidoro fled to Naples. Thence he went to Messina, where he was much employed, and gained a considerable fortune, with which he was about to return to the mainland of Italy when he was robbed and murdered by an assistant, Tonno Calabrese, in 1543. Two of his principal paintings are a Crucifixion, painted in Messina, and Christ bearing the Cross, in the Naples gallery.

CARAVAN, or, to write it more correctly, KARAWAN, is a Persian word, adopted into the later Arabic vocabulary, but rarely employed in speech and never in writing within the limits of Arabia proper, where other designations of strictly Arabic origin such as "Rikb" (assembled riders) or "Kafileh" (wayfaring band) are in ordinary use.

In common acceptance, then, throughout Syria, Mesopotamia, and Asiatic Turkey generally, besides Persia, a caravan denotes a body of peaceable citizens, merchants, salesmen, and the like, travelling together on business for some considerable distance. The principal reasons which in the Asiatic region induce people of this class thus to unite for their journeys, and that in as large numbers as practicable, are, firstly, the greater security thus insured, or at least expected, against robbers, and in particular against marauding parties of Bedouins, Kurds, Tartars, and the like, whose grazing-grounds the proposed route may traverse; and, secondly, mutual assistance in the matter of provisions, water, and so forth. Bad government, or not rarely the absence of any government whatever, necessitates the first precaution; want of inns, baiting-places, and perhaps of habitations altogether, the second. It should also be remembered that no roads, in the European sense of the word, but merely tracks, and those difficult and often interrupted, exist throughout Asiatic Turkey and Persia generally,—a fact that speaks badly for the "Public Works Department" in both empires. These conditions having existed more or less from time immemorial in the major part of Western Asia, and still existing, caravans always have been in that part of the world, and still are the principal means for conveying merchandise from one commercial centre to another.

In these companies camels are most generally employed for the transport of heavy goods, especially where the track, like that between Damascus and Baghdad, for example, lies across level, sandy, and arid districts. The camels are harnessed in strings of fifty and more at a time, a hair-rope connecting the rear of one beast with the head of another; the leader is gayly decorated with party-colored trappings, tassels, and bells; an unladen ass precedes the file, for luck, say some, for guidance, say others—a not inappropriate allusion to human affairs in general. Where the route is rocky and steep, as that between Damascus and Aleppo, mules, or even asses, are used for burdens. The wealthier individuals of the party accompany it, where possible, on horseback. Every man carries arms; but these are in truth more for show than for use, and are commonly flung away in the presence of any serious robber-attack; of wild beasts there is little danger, none of formidable size or disposition existing in the Levantine East. Should greater peril than ordinary be anticipated from Bedouins or the like, the protection of a company of soldiers is habitually pre-engaged,—an expensive and ordinarily a useless adjunct. A leader or director, called "Karawan-Bashi" (headman), or, out of compliment "Karawan-Seraskier" (general), both terms of Perso-Turkish composition, but most often simply designated as "Reïs" (chief), is before starting appointed by common consent. His duties are those of general manager, spokesman, arbitrator, and so forth: his remuneration indefinite. But in the matter of sales or purchases, either on the way or at destination, each member of the caravan manages as best he can for himself.

The number of camels or mules in a single caravan varies from forty or so up to six hundred and more; sometimes, as on the reopening of a long-closed route, it reaches a thousand. The movements of caravans are chiefly regulated by the seasons,—the summer and early autumn, when the heat is at its fiercest and water scarce, being, when possible, avoided, as also, though for opposite reasons, the brief but severe cold of a Levantine winter. Hence the ordinary caravan-seasons are the months of spring, early summer, and later autumn. Friday, in accordance with a recommendation made in the Koran itself, is the favorite day for setting out, the most auspicious hour being that immediately following noonday prayer. The first day's march never does more than just clear the starting-point by a couple of miles, or thereabouts. Subsequently each day's route is divided into two stages,—the first being from

3 or 4 A.M. to about 10 in the forenoon; a halt follows, then travelling is resumed between 2 and 3 P.M. and continued till 6 or even 8 in the evening. Thus the time passed daily on the road averages from ten to twelve hours, and, as the ordinary pace of a laden camel does not exceed 2 miles an hour, that of a mule being $2\frac{3}{4}$, it follows that a distance varying from 23 to 28 miles is gone over every marching day. But prolonged halts of two, three, four, and even more days are often interpolated, as business, fatigue, or fear of danger may suggest.

The hours of halt, start, and movement, the precise lines of route, and the selection or avoidance of particular localities are determined by common consent and the necessity of acting in concert, influences to which the "Reïs" himself, apart from his personal recommendations, is indebted for whatever authority he may possess. But if, as sometimes happens, the services of a professional guide, or those of a military officer have been engaged, his will has to be deferred to in such matters. Indeed many a caravan has been plundered, or even totally destroyed, through the treachery of a hired guide. Partnership may unite interests in the East, but paid hire more certainly disunites them,—a hint worth a traveller's remembrance. While the caravan is on its way, the five stated daily prayers are, within certain limits, anticipated, deferred, or even curtailed, so as the better to coincide with the regular and necessary halts,—a practice authorized by the most orthodox Mahometan custom and tradition.

Two caravans, the one of Ishmeelites, probably "Must'-arebs," or semi-Syro-Arabs of early times, to whom also Joseph was sold, the other of Midianites, or natives of the Hawran district, are mentioned in Genesis ch. xxxvii.; the route on which they were passing seems to have coincided with that nowadays travelled by Syrian caravans on their way to Egypt. Other allusions to caravans may be found in the Hebrew records, *e.g.*, in the book of Job, in Isaiah, and in the Psalms. Eastern literature is, of course, full of mention of them.

The yearly pilgrim-bands, bound from various quarters of the Mahometan world to their common destination Mecca, are sometimes, but inaccurately, styled by European writers caravans; their proper designation is "Hajj," a collective word for pilgrimages and pilgrims. Some description of them may however not unsuitably find a place here.

The two principal pilgrim-caravans, or "Hajj," start yearly, the one from Damascus, or, to speak more exactly, from Mozareeb, a village station three days' journey to the south of the Syrian capital, the other from Cairo in Egypt. This latter is joined on its route, near Akabah of the Red Sea, by the Moghrebee, or North African "Hajj," collected from Tripoli, Marocco, and Tunis; the former gathers up bands from Anatolia, Kurdistan, Mesopotamia, and Syria. Besides these a third, but smaller "Hajj" of Persians, chiefly sets out from Sook-esh-Sheyoukh, in the neighborhood of Meshed Alee, on the lower Euphrates; a fourth of Negroes, Nubians, Darfurees, &c., unites at Yembo on the Hejaz coast, whither they have crossed from Koseyr in Upper Egypt; a fifth of Indians and Malays, centres at Jiddah; a sixth and seventh, of southern or eastern Arabs arrive, the former from Yemen, the latter from Nejd.

The Syrian "Hajj" is headed by the Pasha of Damascus, either in person or by a vicarious official of high rank, and is further accompanied by the "Sorrah Ameer," or "Guardian of the Purse," a Turkish officer from Constantinople, charged with the imperial contribution to the expense of the route, but chiefly with presents, or, to put it more truly, black mail, for the benefit of the independent Arab tribes, through whose lands the wayfarers must pass. The Egyptian company is commanded by an "Ameer," or ruler, appointed by the Cairene Government, and is accompanied by the famous "Mahmal," or sacred pavilion. The other bands above mentioned have each their own "Ameer," besides their "Mekowwams" or agents, whose business it is to see after provisions, water, and the like, and are not seldom encumbered with a numerous retinue of servants and other attendants. Lastly, a considerable force of soldiery, one, two, or more regiments strong, accompanies both the Syrian and the Egyptian "Hajj."

No guides properly so called attend these pilgrim-caravans, the routes followed being invariably the same, and well known. But Bedouin bands generally offer themselves by way of escort, and not seldom designedly lead their clients into the identical dangers from which they bargained to keep them safe. This they are the readier to do that, in addition to the personal luxuries with which many of the pilgrims provide themselves for the journey, a large amount of wealth, both in merchandise and coins, is habitually to be found among the travellers, who, in accordance with Mahometan tradition, consider it not merely lawful but praiseworthy to unite mercantile speculation with religious duty. Nor has any one, the Pasha himself or the Ameer and the military, when present, excepted, any acknowledged authority or general control in the pilgrim-caravans; nor is there any orderly subdivision of management of service. The pilgrims do, indeed, often coalesce in companies among themselves for mutual help, but necessity, circumstance, or caprice governs all details, and thus it happens that numbers, sometimes as many as a third of the entire "Hajj," yearly perish by their own negligence or by misfortune,—dying, some of thirst, others of fatigue and sickness, others by robbers on the way. In fact the principal routes are in many places lined for miles together with the bones of camels and men.

The numbers which compose these pilgrim-caravans are much exaggerated by popular rumor; yet it is certain that the Syrian and Egyptian sometimes amount to 5000 each, with twenty-five or thirty thousand camels in train. Large supplies of food and water have to be carried, the more so at times that the pilgrim season, following as it does the Mahometan calendar, which is lunar, falls for years together in the very hottest season, though, indeed, the Hejaz portion of the route is always hot enough even in winter. Hence, too, the journey is usually accomplished by night marches, the hours being from 3 or 4 P.M. to 6 or 7 A.M. of the following day. Torches are lighted on the road; the pace is slower than that of an ordinary caravan, and does not exceed two miles an hour.

For the ceremonial and religious peculiarities of these pilgrim-caravans, or "Hajj," see Burckhardt's *Travels in Arabia*, and Lane's *Modern Egyptians*, cc. xxiv. and xxv. In other respects the "Hajj" does not differ materially from an ordinary caravan, and it is from this point of view that it finds place in the present notice. (W. G. P.)

CARAVANSERAI, a public building for the shelter of caravans and of wayfarers generally. It is commonly constructed in the neighborhood, but not within the walls, of some town or village, and bears the form of a quadrangle, with a dead wall outside, only pierced below by a few narrow air-holes, but with smaller windows higher up. Within, a cloister-like arcade, surrounded by cellular storerooms, forms the ground-floor; and a somewhat lighter arcade, giving access to little dwelling-rooms, runs round it above. Broad, open flights of stone steps connect the stories. The central court is open to the sky, and generally has in its centre a well with a fountain-basin beside it; but sometimes the well is outside the building. A spacious portal, high and wide enough to admit the passage of a loaded camel, forms the sole entrance, which is furnished with heavy iron-plated folding doors, and is further guarded within by massive iron chains, drawn across at night. Each side of the entry is also provided with stone seats, and the entry paved with flagstones. The court itself is most often paved also, and large enough to admit of three or four hundred crouching camels or tethered mules; the bales of merchandise are piled away under the lower arcade, or stored up in the cellars behind it; the upstairs apartments are for human lodging; but cooking is usually carried on in one or more corners of the quadrangle below. Should the caravanserai be a small one, the merchants and their goods alone find place within, the beasts of burden being left outside. A porter, appointed by the municipal authority of the place, is always present, lodged just within the gate, and sometimes one or more assistants. These form a guard of the building and of the goods and persons in it, and have the right to maintain order and, within certain limits, decorum; but they have no further control over the temporary occupants of the place, which is always kept open from prayer-time at early dawn till late in the evening for all arrivals. A small gratuity is expected by, and is generally given by the guests to, the porter, but he has no legal claim for payment from travellers, his maintenance being provided for out of the funds of the institution. Neither food nor provender is supplied in a caravanserai, water and shelter only; the rest the caravan has to find for itself. Many caravanserais in Syria,

Mesopotamia, and Anatolia are possessed of considerable architectural merit; their style of construction is in general that known as Saracenic; their walls are massive, and of hewn stone; their proportions apt and grand. The portals especially are often decorated with intricate carving; so also is the prayer-niche within, that indicates the direction of the Meccan Kibleh. These buildings, with their belongings, are works of charity, and are supported, repaired, and so forth, out of funds derived from pious legacies, most often of land or rentals. Sometimes a municipality takes on itself to construct and maintain a caravanserai; but in any case the institution is registered as tax-free, and its revenues as inalienable. When, as sometimes happens, those revenues have been dissipated by peculation, neglect, or change of times, the caravanserai passes through downward stages of dilapidation to total ruin (of which only too many examples may be seen by the Eastern traveller), unless some new charity intervene to repair and renew it. In the general decline of wealth, public spirit, and prosperity actually prevailing throughout the Mahometan Levant, such better fortune is, however, rare. "Khans," or places more analogous to our own town-inns and hotels, where not lodging only, but often food and other necessaries or comforts may be had for payment, are sometimes by inaccurate writers confounded with caravanserais, though having really nothing in common with them, except that they are also for the use of travellers. These "Khans" are generally to be found within the town or village precincts, and are of much smaller dimensions than caravanserais. The "Khan" called that of Asaad Pasha at Damascus is a model of constructive skill and architectural beauty. (W. G. P.)

CARAVELLAS, a seaport town of Brazil, in the province of Espiritu Santo, on a river, and not far from a bay, to which it gives its name, in 17° 49′ S. lat. and 39° 26′ W. long. It is the principal port of the neighboring country, and serves as the headquarters of the whale fishery of the Abrolhos Islands which lie off the coast. Population, about 5000.

CARAWAY, the fruit, or so-called seed, of *Carum carui*, an umbelliferous plant growing throughout the northern and central parts of Europe and Asia. The plant has finely-cut leaves and compound umbels, and fruits laterally compressed and ovate,—the mericarps being subcylindrical, slightly arched, and marked with five distinct pale ridges. Caraways evolve a pleasant aromatic odor when bruised, and they have an agreeable spicy taste. They yield from 3 to 6 per cent. of a volatile oil, which is a compound of carvol (a mobile liquid isomeric with the menthol of spearmint) and carvene. The plant is cultivated in the northern parts of Norway, in Finland, Russia, Germany, Holland, and in Marocco, as well as in the south of England, the produce of more northerly latitudes being richer in essential oil than that grown in southern regions. The essential oil is largely obtained by distillation for use in medicine as an aromatic stimulant and carminative, and as a flavoring material in cookery and in liqueurs for drinking. Caraways are, however, more extensively consumed entire in certain kinds of cheese, cakes, and bread, and they form the basis of a popular article of confectionery known as caraway comfits.

CARBOLIC ACID, or PHENOL (C_6H_6O), an acid substance forming one of the numerous constituents of coal-tar, was first described by Runge in 1834. Its constitution was investigated by Laurent in 1841, who, regarding it as a hydrate oxide of the compound radical phenyl, termed it the hydrate of phenyl. Among other names it has received are phenic acid, phenyl alcohol, and creosote; but though the latter is popularly applied to an impure mixture of carbolic acid and the allied cresylic acid, it properly belongs to an altogether distinct substance. In addition to being an abundant constituent of coal-tar, carbolic acid is formed by the action of heat upon salicylic acid; it can be obtained by the dry distillation of gum-benzoin and other resinous substances; traces of it are found in the urine of the horse, the ox, and man; and to it castoreum owes its peculiar odor.

Commercial carbolic acid is prepared solely from coal-tar by a method of which the following is an outline: When coal-tar is distilled the most volatile products—benzol, toluol, cumol, &c., first come away, after which when the temperature rises from 150° C. to 200° C. crude carbolic acid distils over. This distillate is mixed with a strong solution of caustic potash, and the resulting carbolate of potash is in its turn treated with sulphuric acid, which decomposes the carbolate, liberating carbolic acid, which rises to the surface as an oily layer, and is removed by a syphon. The product is purified by washing and repeated rectification, and finally cooled down to 10° C., when it forms whitish acicular crystals, from which the unsolidified acid is drained away. Crystallized carbolic acid of commerce retains a strong naphthalic odor, from which it may be freed for medicinal or other purposes by a method recommended by Professor Church. Into 1 lb of the crystallized acid he pours 20 lb of cold distilled water, care being taken that the whole of the acid shall not be dissolved. The mixture is repeatedly shaken till from 2 to 3 ounces of the acid only remain undissolved, in which residue the whole of the impurities are retained. From this, the aqueous solution is syphoned off, and if necessary, filtered, and then pure powdered common salt is added to it till the salt will no longer dissolve. After standing some time the whole of the carbolic acid rises to the surface, and floats as a yellow oily layer, which as it contains 5 per cent. of water will not crystallize. It may be crystallized by distilling from a little lime, and the product collected up to 185° C. will possess only a faint pleasant aromatic odor. Pure carbolic acid crystallizes in long colorless needles; it melts at 35° C., and boils about 187° C. It is soluble in all proportions in alcohol, ether, and strong acetic acid, but dissolves only sparingly in water. It does not redden litmus paper; it exerts a powerful corrosive action on the skin; its aqueous solution coagulates albumen; and it unites with animal substances, preserving them from decomposition, and removing the offensive odor from putrefying matter.

The extensive manufacture and employment of carbolic acid are, in a large degree, owing to the exertions of the late professor Crace Calvert, who was the first to manufacture it in the crystalline form. The development of the aniline color industry also communicated an impetus to the manufacture of carbolic acid, as the one is, in a sense, a secondary product of the other. A great many useful applications have opened up for the employment of the acid in addition to its extensive medicinal and antiseptic uses (see ANTISEPTICS). For domestic, sanitary, and medicinal use, carbolic acid is prepared in various states of purity and strength. Toilet and medicated soaps, tooth powder, disinfecting powder, &c., are all prepared containing definite proportions of the acid. A large quantity of crude carbolic acid is employed under the name of creosote for impregnating wood for railway sleepers and piles, and for engineering purposes generally,—a method of preserving wood discovered and patented by Mr. John Bethell.

Carbolic acid is, however, most largely consumed in the preparation of several dyeing materials, which are second only in importance to the colors derived from aniline. Picric or carbazotic acid is a brilliant yellow dye-stuff, much used for wool and silk dyeing, prepared by very cautiously adding in small quantities nitric acid to crystallized carbolic acid, or to a mixture of carbolic acid with sulphuric acid. From picric acid in its turn two derivatives are obtained, isopurpuric acid and picramic acid, but these have only a limited application in dyeing. Coralline, a dye in extensive use, yielding a variety of fine red shades, is obtained by heating together two parts of oxalic acid, three of carbolic acid, and four of sulphuric acid to a temperature of from 140° C. to 150° C. Peonine, or red coralline, is a product of coralline obtained by acting on it at a temperature of about 130° C. with a concentrated solution of ammonia. It yields on wool and silk a very rich durable Turkey-red-like shade. Aurine, or yellow coralline, is made by mixing together oxalic acid, carbolic acid and sulphuric acid, the same as for ordinary coralline, but the mixture is submitted to a less elevated temperature. It dyes fine yellow and orange shades on animal fibres. Phenicienne, or rothine, is a dye producing shades varying from a deep garnet red to a chamois color, made by adding to carbolic acid a mixture of nitric and sulphuric acids. Fol's yellow is manufactured by heating to 100° C. a mixture of five parts of carbolic acid and three of powdered arsenic acid. Besides these various other dyes having carbolic acid for their basis have been introduced and some of them are commercially established.

CARBON (*symbol*, C; *atomic weight*, 12) is one of the

most important of the chemical elements. It occurs pure in the diamond, and nearly pure as graphite or plumbago; it is a constituent of all animal and vegetable tissues and of coal; and it also enters into the composition of many minerals, such as chalk and dolomite.

Carbon is a solid substance, destitute of taste and odor; but it occurs in several modifications which exhibit very diverse physical properties. Thus, it is met with in the form of the diamond in transparent crystals belonging to the regular or cubical system, which conduct electricity but slowly; and in the form of graphite in opaque crystals belonging to the hexagonal system, which conduct electricity nearly as well as the metals. The diamond is the hardest substance known, and has a relatively high specific gravity (3·33 to 3·55), but graphite is comparatively soft, producing a black shining streak when rubbed upon paper, and has a much lower specific gravity (2·15 to 2·35). In addition to these two crystalline modifications of carbon there are a number of varieties of non-crystalline or amorphous carbon, which, however, exhibit the greatest differences in physical properties.

By heating to the high temperature afforded by a powerful galvanic battery, both the diamond and amorphous carbon are converted into graphite. In the electric arc carbon appears to be converted into vapor; but the temperature which is required to volatilize it is extremely high; in fact, it has been calculated[1] that the boiling-point of carbon is not less than about 7000° on the centigrade scale.

Although the various allotropic modifications of carbon cannot always be satisfactorily distinguished by their physical properties, they may readily be distinguished, as Berthelot has shown, by their behavior on treatment with certain oxidizing agents. The diamond is not affected thereby even after prolonged and reiterated treatment. The different varieties of amorphous carbon, however, are more or less readily entirely converted into humus-like substances, or "humic acids," *soluble* in water, whereas the different varieties of graphite furnish "graphitic oxides," which are *insoluble* in water, and especially characterized by the property of undergoing decomposition with deflagration when heated. The method of treatment adopted by Berthelot is as follows: The carbon in the form of an impalpable powder is mixed with the aid of a card with five times its weight of pulverized potassic chlorate, and this mixture is then formed little by little into a paste with fuming nitric acid. In performing these operations great care is necessary in order to avoid explosions, and at most five grams of carbon should be taken. The mixture, contained in a small open flask, is allowed to stand several hours, and is then heated for three or four days without interruption to a temperature not higher than 50° or 60° C.; the mass is then diluted with water and washed by decantation with tepid water. It is necessary as a rule to repeat this series of operations several times in order entirely to dissolve the amorphous carbons, or to convert the graphites into graphitic oxides.

Berthelot has examined a very large number of varieties of carbon in this manner with the following results: The carbon of wood charcoal, animal charcoal, coke, the so-called metallic carbon obtained by decomposing hydrocarbons by passing their vapors through a red-hot tube, gas-retort carbon, and various specimens of anthracite from different sources, all dissolved entirely with more or less readiness when treated in the above manner; lamp black, however, furnished a small amount of graphitic oxide. The amorphous carbon of the meteorite of Cranbourne (Australia) furnished a graphitic oxide identical with that obtained by similarly treating graphite from cast-iron, but the carbon of the Orgueil meteorite was entirely soluble. The carbon of the Greenland meteoric rock discovered by Nordenskiold also dissolved entirely with the exception of a very insignificant residue.

Berthelot also examined the action of various agents on carbon, and finds that heat alone is without influence; that is to say, the graphites are not changed into amorphous carbon, or the amorphous carbons into graphite, when heated to whiteness in an atmosphere of hydrogen or of chlorine. When, however, a pencil of gas-retort carbon is inflamed in an atmosphere of oxygen, and then as soon as the point is fully incandescent plunged into water, the part which has been heated contains a small quantity of graphite. On examining the pencils of carbon employed in producing the electric light it was found that the spongy mass of carbon collected on the negative pole contained a large proportion of graphite, but that only traces were present in the pencil employed as positive pole, which appears to indicate that it is necessary for the carbon to undergo volatilization in order that it may be converted into graphite. The graphite thus produced is not identical with that contained in cast-iron, nor with natural plumbago; the same variety of graphite is produced, however, when the diamond is heated in the electric arc. The carbon separated from the various hydrocarbons by heat alone consists entirely of amorphous carbon, but that obtained on decomposing marsh gas by the electric spark contains a small quantity of graphite, and the carbon resulting from the decomposition of perchloride of carbon and bisulphide of carbon at a red heat contains a considerable proportion of graphite; that resulting from the decomposition of cyanogen by the electric spark contains only traces of graphite.

The specific heats of the several modifications of carbon also differ considerably; that is to say, the amounts of heat required to raise equal weights through the same number of degrees of temperature are different. The diamond has the lowest, and amorphous carbon the highest specific heat; or to raise the temperature of a given weight of the diamond from the temperature *a* to the temperature *b* will require less heat than to raise the temperature of the same weight of amorphous carbon from the temperature *a* to *b*.

Graphite.—Graphite is found native near Travancore in Ceylon, and near Moreton Bay in Australia, in several parts of the United States, in South Siberia, and in Germany, principally at Griessbach near Passau, always in rocks belonging to the earliest formations. It occurs in two distinct modifications, one of which, like the Borrowdale graphite, is fine-grained and amorphous; the other, like the Ceylon variety, is composed of small flat plates. Native graphite contains from 95 to nearly 100 per cent. of carbon, the impurity being usually small quantities of silicates. Graphite, also called plumbago or black lead, is used for making so-called lead pencils, for polishing iron work, for lubricating machinery, for making crucibles, and in the electrotype process for coating the surfaces of wood, plaster-of-paris, gutta percha, and other non-conducting materials, so as to render them conductive.

The behavior of graphite on treatment with a mixture of potassic chlorate and nitric acid has been carefully studied by Brodie; but our knowledge of its oxidation products is still very incomplete. He has shown that it is converted into a body to which he attributes the composition indicated by the formula $C_{11}H_4O_5$; *graphitic acid*, as this compound is termed, forms yellow silky plates, insoluble in water and acids. It does not form salts, and Berthelot therefore prefers to call it *graphitic oxide*. When this substance is heated it decomposes almost with explosive violence, leaving a residue which still contains hydrogen and oxygen, but which is not distinguishable from finely divided graphite. When the graphite which crystallizes from cast-iron and that obtained by heating amorphous carbon in the electric arc are similarly treated, graphitic oxides are produced which differ from each other, and from the oxide formed from native graphite; it is therefore supposed that these graphites are distinct substances (Berthelot, *Ann. Ch. Phys.* [4] xix. 399).

Amorphous Carbon.—Pure amorphous carbon is only obtained with great difficulty. That produced by heating pure organic substances, such as sugar and starch, still contains traces of hydrogen and oxygen, from which it can only be freed by long-continued ignition at a white heat in an atmosphere of chlorine. The purest amorphous carbon ordinarily met with is *lamp black*, which is prepared by the imperfect combustion of highly carbonized bodies, such as resin. An amorphous carbon of considerable purity, known as *gas-retort carbon*, is obtained in the manufacture of coal-gas. The parts of the retort which are exposed to the highest temperature partially decompose the gas as it escapes, and by degrees a layer of very dense carbon is deposited in the upper parts of the retorts. It is a good conductor of heat and electricity, and burns with difficulty, and is therefore employed in producing the electric light, and to form the negative element in Bunsen's voltaic battery. *Wood charcoal* and *coke* are very impure forms of amorphous carbon, containing in addition to small quanti-

[1] Dewar, *Phil. Mag.* (4), xliv. p. 461. 1872.

ties of hydrogen and oxygen a considerable proportion of mineral matters, which remain as ashes when the charcoal or coke is burnt. *Animal charcoal* is a still more impure form of amorphous carbon.

Oxides of Carbon.—When carbon is burnt in oxygen *carbonic dioxide* or *carbonic anhydride*, or, as it is commonly termed, *carbonic acid*, CO_2, is formed; if the supply of oxygen is deficient the lower oxide, *carbonic oxide*, CO, is also produced, and the latter may be obtained in a pure state by passing the dioxide over red-hot carbon. Both are colorless, odorless gases. The union of carbon with oxygen gives rise to the evolution of a very large amount of heat, but much less heat is produced by the union of the first half of the oxygen than by the union of the second half. Thus the combination of 12 grams of carbon with 16 grams of oxygen to form 28 grams of carbonic oxide gives rise to the evolution of about 25,000 units of heat, but no less than 69,000 units are produced by the addition of a second 16 grams of oxygen to form carbonic dioxide. It is supposed that in the first instance very much less heat is evolved because energy, which otherwise would appear in the form of heat, is expended in converting the solid carbon into the state in which it exists in gaseous carbonic oxide and dioxide, since it is observed that in those cases in which two oxides are formed, both of which are solid, sensibly equal quantities of heat are evolved in the fixation of each successive 16 grams of oxygen.

In the conversion, however, of the different varieties of carbon into carbonic dioxide, CO_2, by combustion in oxygen different amounts of heat are produced. The following table represents the number of units of heat (the unit of heat being the amount required to raise the temperature of 1 gram of water from 0° to 1° C.) evolved in the conversion of 12 grams of each of the varieties of carbon into 44 grams of carbonic dioxide:—

	Units.
Diamond	93,240
Iron graphite	93,144
Natural graphite	93,564
Gas-retort carbon	96,564
Wood charcoal	96,960

Carbonic oxide burns in the air or oxygen with a blue flame, forming carbonic dioxide. It is an extremely poisonous gas, being capable of displacing the oxygen in blood, owing to the formation of a compound with the hæmoglobin with which the oxygen is ordinarily combined. It is very sparingly soluble in water, which dissolves only about $\frac{1}{40}$th of its bulk at 15° C. When a mixture of equal volumes of carbonic oxide and chlorine gas is exposed to sunlight, the two gases combine, forming chloro-carbonic oxide or phosgene gas, $COCl_2$.

Carbonic dioxide will not burn, neither does it support combustion. Under the pressure of 36 atmospheres at 0° C., it is converted into a colorless mobile liquid. When the liquid is suddenly relieved from the pressure under which alone it can exist, part of it at once passes back into the state of gas, and heat is abstracted so rapidly that the remaining portion of the liquid solidifies. By allowing a jet of the liquid dioxide to pass into a cylindrical metal box, having within it an inclined metal tongue against which the jet of liquid impinges, a considerable quantity of the solid may be collected in the form of a white flocculent mass like snow. Like all flocculent substances, it conducts heat but slowly, and may be preserved for a considerable time. By mixing it with ether its heat-conducting power is greatly increased; it therefore evaporates much more quickly, and a much lower temperature is obtained than with the solid alone, and by placing the mixture under the receiver of an air-pump and exhausting, a still greater degree of cold is produced. According to Faraday, an alcohol thermometer plunged into a bath of the solid carbonic dioxide and ether in air indicates a temperature of −76° C., and in the same bath under a receiver exhausted to within 12 inches of the atmospheric pressure it fell to −110° C.; at the latter temperature alcohol assumes the consistence of a thick oil.

Recent experiments of Sir B. Brodie (*Royal Society Proceedings*, xxi. p. 483, 1873) show that carbonic oxide and dioxide are not the only oxides of carbon which are capable of existing. When a current of pure and dry carbonic oxide is circulated through a Siemens induction-tube, and there submitted to the action of electricity, a decomposition of the gas occurs. Carbonic dioxide is formed, and simultaneously with its formation a solid deposit may be observed in the induction-tube; this deposit appears as a transparent film of a red-brown color. It is entirely soluble in water, which is strongly colored by it, and the solution has an intensely acid reaction. In the dry condition, before it has been in contact with water, it is an oxide of carbon. Samples, however, made in different experiments do not present precisely the same composition; but nevertheless they appear to belong to a certain limited number of forms, which repeatedly occur and may invariably be referred to the same general order or system. This system is, or appears to be, what may be termed an homologous series of "oxycarbons," of which the unit of carbon with the weight 12 may be regarded as the first term, and of which the adjacent terms differ by an increment of carbonic oxide, CO, weighing 28, precisely as homologous series of hydrocarbons differ by the increment CH_2. Two at least of these substances have been identified by analysis, namely, the adjacent terms C_4O_3 and C_5O_4.

Carbonic Acid.—Carbonic dioxide dissolves in about its own volume of water at ordinary temperatures, forming *carbonic acid*, H_2CO_3; the solution has a sharp and slightly acid taste, and turns the blue color of litmus to wine-red. The volume of carbonic dioxide dissolved by water diminishes as the temperature rises, and at the boiling heat the whole is expelled from solution; the volume dissolved by water at a given temperature is nearly the same, however, under all pressures, so that the weight of gas absorbed increases in nearly the same proportion as the pressure. On removing the pressure the gas is given off with effervescence. Ordinary soda-water consists merely of water impregnated with carbonic dioxide by mechanical pressure. When lime water is added to a solution of carbonic acid, or carbonic dioxide is passed into lime water, a white precipitate of calcic carbonate or carbonate of lime, the chief constituent of ordinary chalk, is produced:—

$$CaO_2H_2 + H_2CO_3 = CaCO_3 + 2H_2O.$$

Calcic hydrate. Carbonic acid. Calcic carbonate. Water.

On continuing to pass the gas the precipitate becomes dissolved owing to the formation of an acid carbonate or bicarbonate, which is fairly soluble in water, the carbonate being almost insoluble:—

$$CaCO_3 + H_3CO_2 = H_3Ca(CO_3)_2$$

Calcic carbonate. Carbonic acid. Calcic bicarbonate.

If the solution of the bicarbonate be heated, carbonic dioxide is given off and the calcic carbonate is precipitated, the bicarbonate being decomposed. The lime salt may also be removed from the solution, with the exception of the small amount of calcic carbonate which the water is capable of dissolving, by carefully adding lime water or a solution of ordinary washing soda as long as a precipitate is produced. The action of lime water in this case is to convert the soluble bicarbonate into the insoluble carbonate; thus:—

$$H_3Ca(CO_3)_2 + CaH_2O_2 = 2CaCO_3 + 2H_2O.$$

Calcic bicarbonate. Calcic hydrate. Calcic carbonate.

These facts serve to explain the "hardness," as it is termed, of many natural waters, and the methods employed to render such waters soft. A water which, like rain water, readily produces a lather with soap is said to be a soft water, whereas one which does not readily yield a lather, but forms a large amount of curd, is said to be a hard water. The hardness of most natural spring waters is chiefly due to dissolved calcic bicarbonate, which is formed by the action of the carbonic acid dissolved in rain upon the calcareous materials with which the water comes in contact during its passage through the earth. Ordinary soap consists of the sodic salts of certain fatty acids, and is soluble in water; but the lime salts of these acids are insoluble, so that when the soap is used with the hard water a double decomposition takes place, the calcic bicarbonate being converted into sodic bicarbonate and the soda-soap into a lime soap or curd. Such waters may be rendered soft, that is to say, the calcic bicarbonate may be removed, in a variety of ways, viz., by heating the water, which causes the decomposition of the bicarbonate and the precipitation of the carbonate, and it is in this way that the fur is produced in our kettles and boilers; by adding washing soda or sodic carbonate, a common practice in all

households where hard water is used; and lastly, by adding lime water. (H. E. A.)

CARBONARI, The (from the Italian *carbonaro*, charcoal-maker), were certain secret societies of a liberal and even revolutionary tendency that took an active part in some events of Italian and French history during the first three decades of this century. Secret societies, calling themselves by this or a similar name, had indeed previously existed in various parts of Europe; but it was in Italy, towards the close of the Napoleonic wars, that these first began to assume an historic importance. In 1808 many republicans, discontented alike with the Bourbon and the Bonapartist government in Naples, had retired to the mountain recesses of the Abruzzi and Calabria. At first engaged only in an isolated resistance to the authorities, they began to organize themselves. They took the name of Carbonari, a name suggested by the trade of charcoal-burning extensively pursued in those regions, in which many of them were engaged. From this trade, too, but especially from the Christian religion, and above all from the crucifixion of Christ, they adopted a system of mystic rites and a symbolic phraseology, by which they concealed from the uninitiated, but all the more vividly expressed to the initiated, the real political aims of the society, while its apparently religious character served to attract many whom its revolutionary secrecy might have repelled. A lodge of Carbonari was *baracca* (a hut); an ordinary meeting, *vendita* (a sale); a meeting of importance, *alta vendita*;—these terms being borrowed from the trade of charcoal-burning. But for words to express the inner purpose of the society they borrowed from religion. Christ, as the highest victim of tyranny, was the lamb that had been put to death by the wolf; they were sworn to avenge his death; and so the destruction of the wolf to avenge the slaughter of the lamb became the symbolic watchword of the society. There were four grades in the society; and the ceremonies of initiation were characterized by many mystic rites, through which the real meaning began only gradually to appear. Many efforts were made to bring about a complete organization of the Carbonari in Italy, by the institution of a central power which should control the separate societies of the various provinces, but they failed. Politicians soon discovered how easily capital could be made of such societies, and negotiations were entered into by the Bourbons to unite the Carbonari in an effort to overthrow the French Government in Naples. Accordingly, for two years they carried on a desultory warfare with King Murat, who at last, taking the matter thoroughly in hand, drove them into the mountains, from which they had emerged, and suppressed them for a time. Capobianco, their leader, was treacherously arrested and put to death. Ere long, the Carbonari reappeared and helped towards the final overthrow of the French power in Naples. But Ferdinand, who had courted them during his misfortunes, proved false to them on his return to power, though they were moderate enough in their political aims, being ready to content themselves with the establishment in Naples of the constitution that had been enjoyed in Sicily under English supremacy. Henceforward they began to conspire against the Bourbon Government, and indeed soon spread over the whole of Italy, being more and more regarded as the champions of the liberal and national cause. They were the principal authors of the Neapolitan revolution of 1820, of the disturbances in the Papal States of the same year, and of the Piedmontese revolution of 1821. Previously recruited chiefly from the lower classes, the Carbonari now counted in their ranks almost all the intelligent and patriotic population of Italy, especially the middle classes, the officers of the army, the students at the universities, the artists, and even the priests,—to the number, it is said, of nearly 700,000. Unable, however, to resist the military power of Austria, backed by a European congress, the revolution and the Carbonari along with it were crushed, and many, such as Silvio Pellico, implicated or supposed to be implicated in their conspiracies, perished or languished in Austrian dungeons. They never quite revived in Italy; though active again in 1830 and 1831, they were forthwith superseded by the more energetic and more extreme "young Italy" of Mazzini.

It was about 1820 that Carbonarism began to take root in France. There the organization was more perfect, as in addition to what had been attained in Italy, there was a supreme board, presided over by the veteran Lafayette, and a complete hierarchy of societies, by which the will of the chief was communicated from higher to lower, to the smallest lodges in the extremities of France; these were *ventes particulières*, *ventes centrales*, *hautes ventes*, *ventes suprêmes*. It made great progress in France, especially among the students and sub-officers of the army. The example of Spain and Italy having incited the French Carbonari to immediate action, attempts to raise an insurrection were made in 1821 at Belfort, Thouars, La Rochelle, and other towns. They were all immediately suppressed, but not without revealing to what extent the Carbonari had spread over France. It was at the trial of Boriès, one of those concerned in the rising at La Rochelle, that the nature and organization of the Carbonari in France became publicly known, and attention was drawn to the mutual fidelity prevalent among them, as none but those immediately concerned in the insurrection could be brought to trial. Though completely defeated in 1821, French Carbonarism did not die out, but continued to be an active centre of revolutionary discontent till 1830, when, after contributing to the July revolution, most of the members adhered to the government of Louis Philippe. For several years after, traces of it existed in some French towns, but these are of no importance.

Heckethorn's *Secret Societies*; Botta's *History of Italy*, vol. ii.; Alison's *History of Europe*, vol. ii.; *Annuaire Historique*.

CARBONDALE, a city of the United States, in the county of Lackawanna in Pennsylvania, near the source of the Lackawanna River, on the Delaware and Hudson Railway, about 110 miles N.N.W. of Philadelphia. Its incorporation only dates from 1851, and (as its name implies) its principal importance consists in the fact that it is the centre of an extensive coal-field. About 900,000 tons are obtained annually from the neighboring mines. Population in 1850, 4945; in 1870, 6393.

CARBUNCLE is the name applied in modern times to the various kinds of garnet employed by jewellers when cut *en cabochon*, that is, with a smooth convex surface, and the back either flat or hollowed out. On account of the deep red color of most garnets it is necessary to adopt this kind of cutting, especially when the stones are of any considerable size, in order to exhibit their rich hues by the light passing through a comparatively thin stratum of the material. The carbuncle is frequently mentioned in the Bible, although it is impossible to define the precise stone referred to under that name in the Authorized Version of the Scriptures. The stone in the breast-plate of the High Priest, which is translated carbuncle (Exodus xxviii. 17), is in the original called Bareketh, literally meaning flashing, while again, in Isaiah liv. 12, the term Kadkod, equivalent to the glowing of fire, is also rendered by carbuncle. The *carbunculus* of Pliny appears to have included all the deep-red colored stones which were suitable for jewelry and gems, such as the ruby and the spinel, as well as the various kinds of garnet. It is remarkable that among the varieties distinguished by classical writers were the *lychnis* or lamp stone, and the *ἀνθραξ* or live coal, both in common with the scriptural names indicating stones with a fiery glow. In the setting of carbuncles, a ruby-like glow is frequently communicated to the stones by a backing of colored metallic foil which modifies their hue, a practice which is found to have prevailed in Roman times, *tanta est in illis occasio artis, subditis per quæ translucere cogantur*. The finest carbuncles come from Pegu and Ceylon, and they are sometimes found in masses of such dimensions that cups measuring as much as one and a half or two inches in height and diameter are cut out of them. See under Garnet.

CARBUNCLE, an acute local inflammation of the deeper layers of the skin, followed by sloughing. It is met with in those who are weakened by any cause, and in certain unhealthy constitutional states. It is accompanied by great constitutional disturbance; in the early stages of the disease the pain is considerable. A hard flattened swelling of a deep red color is noticed on the back, face or extremities. This gradually extends until in some instances it may become as large as a dinner-plate. Towards the centre of the mass numerous small openings form on the surface. From them blood and matter escape, and through these openings a yellow slough, of leathery consistence, can be seen. The treatment generally adopted is free incisions through the mass, relieving the tension

and alleviating the pain. Poultices are then applied to encourage the separation of the slough. After this comes away a healthy ulcer is left which heals rapidly, leaving an indelible scar. Opium is given in order to relieve the pain. The patient requires supporting diet, stimulants, good food, and the administration of iron. Occurring as it does in people of an unhealthy tendency, it may in severe cases occasion death. Some surgeons do not interfere with the knife, but give opium in large doses, and allow the slough to separate by natural processes.

CARCAJENTE, a town of Spain, in the province of Valencia, 2½ miles from the right bank of the Jucar, in 39° 4′ N. lat. and 3° 31′ W. long., with a station on the railway between Valencia and Almansa. It is inhabited chiefly by an agricultural population, but has a considerable manufacture of linen and woollen stuffs, and silk thread from the silk produced in the neighborhood. The town-house (a modern building), the parish church, and the palace of the marquis of Calzada are its principal buildings. Roman remains have been found in the vicinity. Population, 8850.

CARCASSONNE, the chief town of the department of Aude, in France, is situated on both sides of the River Aude, and in the immediate neighborhood of the Canal du Sud, about 55 miles S.E. of Toulouse, on the railway between that city and Narbonne, in 43° 12′ 54″ N. lat. and 2° 20′ 55″ E. long. On an abrupt elevation on the right bank of the river stands the old city, enclosed by a double line of ramparts and towers, and retaining the aspect of a mediæval fortress. A portion of the inner line is attributed to the Visigoths; the rest, including the castle, seems to belong to the 11th or 12th century, while the outer circuit has been referred mainly to the end of the 13th. The old cathedral of St. Nazaire, which partly dates from the 11th century, and contains magnificent stained-glass windows of the Renaissance period, has been restored under the superintendence of M. Viollet-le-Duc. On the left bank of the river, but connected with the city by a bridge of twelve arches, lies the new town, clean, well-built, and flourishing, with streets intersecting each other at right angles. It is surrounded by boulevards occupying the site of its ramparts, and has a large esplanade for military manœuvres, as well as numerous fountains and planted walks. As chief town of a department, and the seat of a bishop, Carcassonne contains court-houses and various public offices, an episcopal palace, and a theological seminary; and among its other public buildings and institutions may be mentioned the new cathedral of St. Michael, the town-hall, the library with upwards of 15,000 volumes, the exchange, the theatre, the barracks, the hospital, the college, the school of design, the museum, the chamber of commerce, and the agricultural society. Of the various industrial establishments the most important are the woollen factories,—not less than 2000 people being engaged in the manufacture of cloth, which is chiefly exported to the Levant, Barbary, and South America. Wadding, paper, leather, pottery, and iron wares are also produced; and there is a trade in wine, brandy, and fruit. A large fair is held in November and another on Whit-Tuesday. Population in 1872, 20,808 in the town, and 23,644 in the commune.

Carcassonne occupies the site of *Carcaso*, an ancient city of Gallia Narbonensis, which belonged to the Volcæ Tectosages. It was a place of some importance at the time of Cæsar's invasion, but makes almost no appearance in Roman history. On the disintegration of the empire, it fell into the hands of the Visigoths, who, in spite of the attacks of the Franks, especially in 585, retained possession till 724, when they were expelled by the Saracens, destined in turn to yield before long to Charles Martel. From the 9th to the beginning of the 13th century Carcassonne formed a separate countship, which was brought to ruin by the attachment of Count Raymond Roger to the cause of the Albigenses. The city, in spite of a noble defence, was taken by the Crusaders of Simon de Montfort in 1209, and the unfortunate count perished in captivity. In 1224, his son, Raymond Trencavel II., recovered his estates, but in 1247 he was forced to yield all his rights to Philip Augustus. A revolt of the city against the royal authority was severely punished in 1262, by the expulsion of its principal inhabitants, who were, however, permitted to take up their quarters on the other side of the river. This was the origin of the new town, which was fortified in 1347. During the religious wars Carcassonne several times changed hands, and it did not recognize Henry IV. till 1596.

CARDAMOM, the fruit of several plants of the genera *Elettaria* and *Amomum*, belonging to the natural order *Zingiberaceæ*, the principal of which is *Elettaria Cardamomum*, from which the true officinal or Malabar cardamom is derived. The Malabar cardamom plant has flag-like leaves, springing from an erect perennial stem, and rising to a height of from 6 to 12 feet. The fruit is an ovate-triangular three-celled three-valved capsule of a dirty yellow color, enclosing numerous angular seeds, which form the valuable part of the plant. It is a native of the mountainous parts of the Malabar coast of India, and the fruits are procured either from wild plants or by cultivation throughout Travancore, Western Mysore, and along the Western Ghauts. A cardamom of much larger size found growing in Ceylon was formerly regarded as belonging to a distinct species, and described as under the name of *Elettaria major;* but it is now known to be only a variety of the Malabar cardamom. In commerce, several varieties are distinguished according to their size and flavor. The most esteemed are known as "shorts," a name given to such capsules as are from a quarter to half an inch long and about a quarter broad. Following these come "short-longs" and "long-longs," also distinguished by their size, the largest reaching to about an inch in length. The Ceylon cardamom attains a length of an inch and a half and is about a third of an inch broad, with a brownish pericarp and a distinct aromatic odor. Among the other plants, the fruits of which pass in commerce as cardamoms, are the round or cluster cardamom, *Amomum Cardamomum*, a native of Siam and Java; the bastard cardamom of Siam, *A. xanthioides:* the Bengal cardamom, which is the fruit of *A. aromaticum;* the Java cardamom, produced by *A. maximum;* the Nepal cardamom, and the Korarima cardamom of East Africa, the last two not being yet botanically described. Cardamoms generally are possessed of pleasant aromatic odor, and an agreeable spicy taste. On account of their flavor and stimulant properties they are much used with other medicines, and they form a principal ingredient in curries and compounded spices. In the North of Europe they are much used as a spice and flavoring material for cakes and liqueurs; and they are very extensively employed in the East for chewing with betel, &c.

CARDAN (or, in the Italian form of the name, CARDANO), GIROLAMO (1501–1576), famous as a mathematician, a physician, and an astrologer, born at Pavia, September 24, 1501, was the illegitimate son of Fazio Cardano, a learned jurist of Milan, himself distinguished by a taste for mathematics. After a sickly childhood and a stormy boyhood, during which he received a very irregular education, he was sent to the university of Pavia, and subsequently to that of Padua, where he graduated in medicine. He was, however, excluded from the College of Physicians at Milan on account of his illegitimate birth, and his first endeavors to establish himself in practice had so little success that he and his young wife were at one time compelled to take refuge in the workhouse. It is not surprising that his first book should have been an exposure of the fallacies of the faculty. A fortunate cure of the child of the Milanese senator Sfondrato now brought him into notice, and the interest of his patron procured him admission into the medical body. About this time (1539) he obtained additional celebrity by the publication of his *Practice of Arithmetic*, a work of great merit for the time, which indirectly led to his renown as a mathematician by engaging him in a correspondence with Nicolo Tartaglia, an ingenious calculator who had discovered an important improvement in the method of cubic equations. This discovery Tartaglia had kept to himself, but he was ultimately induced to communicate it to Cardan under a solemn promise that it should never be divulged. Cardan observed this promise in publishing his arithmetic, but when, several years afterwards, the isolated rule of Tartaglia had developed itself in his mind into a principle capable of transforming algebraical science, he thought himself justified in disclosing it as the ground-work of his own comprehensive treatise on algebra, which appeared at Nuremberg in 1545. This memorable volume marks an era in the history of mathematics, being the first in which the principle of cubic equations was fully explained, and the first example of the application of algebraical reasoning to geometrical problems. Its publication naturally involved Cardan in a violent controversy with Tartaglia, and it must be admitted that his conduct cannot be strictly justified, notwithstanding his ample acknow-

ledgment of his obligations to his original instructor. Two years previously he had published a work even more highly regarded by his contemporaries, his celebrated treatise on astrology. This will hardly be enumerated in our day among his titles to fame, but it would be exceedingly unjust to regard it as a proof of superstition or weakness of mind. As a believer in astrology Cardan was on a level with the best minds of his age; the distinction consisted in the comparatively cautious spirit of his inquiries and his disposition to confirm his assertions by an appeal to facts, or what he believed to be such. A very considerable part of his treatise is based upon observations carefully collected by himself, and, it must in candor be owned, seemingly well calculated to support his theory so far as they extend. If the testimony is nevertheless quite inadequate to its purpose, it must in fairness be considered that the proposition of the influence of the heavenly bodies on human affairs appeared to Cardan's contemporaries almost a truism. From this point of view it may be understood that the book should have been intended by the author as a contribution to natural science, and should be almost entirely free from the superstitious whims and hallucinations which, while leaving his faculties as a thinker and a natural philosopher almost unaffected, frequently misled him in the affairs of practical life. Numerous instances of his belief in dreams and omens may be collected from his writings, and he especially valued himself on being one of the five or six celebrated men to whom, as to Socrates, had been vouchsafed the assistance of a guardian dæmon.

Cardan's authorship may have interfered with his medical practice, and he himself ingenuously confesses that he and his family were mainly supported during a considerable part of this period by the complaisance of a Milanese patrician, who allowed him to win of him at play. The sudden loss of this resource reduced him for a time to penury, from which he was extricated by receiving the appointment of professor of medicine at Pavia. The publication of his works on algebra and astrology at this juncture gave him a European renown, and procured him flattering offers from Pope Paul III. and the king of Denmark, both of which he declined. In 1551 his reputation was crowned by the publication of his great work *De Subtilitate Rerum*, which, crude and fanciful as it may now appear, in his own age embodied the soundest physical learning of the time and simultaneously represented its most advanced spirit of speculation. It was followed some years later by a similar treatise, *De Varietate Rerum*, the two making in effect but one book. A great portion of this is occupied by endeavors, commonly futile, to explain ordinary natural phenomena, but its chief interest for us consists in the hints and glimpses it affords of principles beyond the full comprehension of the writer himself, and which the world was then by no means ready to entertain. The inorganic realm of Nature he asserts to be animated no less than the organic; all creation is progressive development; all animals were originally worms; the inferior metals must be regarded as *conatus naturæ* towards the production of gold. The indefinite variability of species is implied in the remark that Nature is seldom content with a single variation from a customary type. The oviparous habits of birds are explained by their tendency to favor the perpetuation of the species, precisely in the manner of modern naturalists. Animals were not created for the use of man, but exist for their own sakes. The origin of life depends upon cosmic laws, which Cardan naturally connects with his favorite study of astrology. The physical divergencies of mankind arise from the effects of climate, and the variety of human circumstances in general. Cardan's views on the dissimilarity of languages are much more philosophical than usual at his time; and his treatise altogether, though weak in particular details, is strong in its pervading sense of the unity and omnipotence of natural law, which renders it in some degree an adumbration of the course of science since the author's day. It was attacked by J. C. Scaliger, whom Cardan refuted without difficulty.

The celebrity which Cardan had acquired led in the same year (1551) to one of the most interesting episodes of his life, his journey to Scotland as the medical adviser of Archbishop Hamilton of St. Andrews. The archbishop was supposed to be suffering from consumption, a complaint which Cardan, under a false impression, as he frankly admits, had represented himself as competent to cure. Failing to meet his patient at Lyons as had been arranged, he was induced to continue his journey to Scotland. He was of great service to the archbishop, whose complaint proved to be asthmatical; but the principal interest attaching to his expedition is derived from his account of the disputes of the medical faculty at Paris, and of the court of Edward VI. of England, particulars which he had an opportunity of observing in going and returning. The Parisian doctors were disturbed by the heresies of Vesalius, who was beginning to introduce anatomical study from the human subject. Cardan's liberality of temper led him to sympathize with the innovator. His account of Edward VI.'s disposition and understanding is extremely favorable, and is entitled to credit as that of a competent observer without bias towards either side of the religious question. He cast the king's nativity, and indulged in a number of predictions which were effectually confuted by the royal youth's death in the following year. His impressions of England seem to have been very pleasant.

Cardan had now attained the summit of his prosperity, and the rest of his life was little but a series of disasters. His principal misfortunes arose from the crimes and calamities of his sons, one of whom was an utter reprobate, while the tragic fate of the other overwhelmed the father with anguish. This son, Giovanni Battista, also a physician, had contracted an imprudent marriage with a girl of indifferent character, Brandonia Seroni, who subsequently proved unfaithful to him. The injured husband revenged himself in the Italian fashion with poison; the deed was detected, and the exceptional severity of the punishment seems to justify Cardan in attributing it to the rancor of his medical rivals, with whom he had never at any time been on good terms. He exerted himself greatly as his son's advocate, but to no purpose. The blow all but crushed him; his reputation and his practice waned; he addicted himself to gaming, a vice to which he had always been prone; his mind became unhinged, and filled with distempered imaginations. He was ultimately banished from Milan on some accusation not specified, and although the decree was ultimately rescinded, he found it advisable to accept a professorship at Bologna (1563). While residing there in moderate comfort, and mainly occupied with the composition of supplements to his former works, he was suddenly arrested on a charge not stated, but in all probability heresy. Though he had always been careful to keep on terms with the Church, the bent of his mind had been palpably towards free thought, and the circumstance had probably attracted the attention of Pius V., who then ruled the Church in the spirit, as he had formerly exercised the functions, of an inquisitor. Through the intercession, as would appear, of some influential cardinals, Cardan was released, but was deprived of his professorship, prohibited from teaching and publishing any further, and removed to Rome, where he spent his remaining years in receipt of a pension from the Pope. It seems to have been urged in his favor that his intellect had been disturbed by grief for the loss of his son,—an assertion to which his frequent hallucinations lent some countenance, though the existence of any serious derangement is disproved by the lucidity and coherence of his last writings. He occupied his time at Rome in the composition of his commentaries *De Vita Propria*, which, along with a companion treatise *De Libris Propriis*, is our principal authority for his biography. Though he had burned much, he left behind him more than a hundred MSS., not 20 of which have been printed. He died on September 20, 1576.

Alike intellectually and morally, Cardan is one of the most interesting personages connected with the revival of science in Europe. He had no especial bent towards any scientific pursuit, but appears as the man of versatile ability, delighting in research for its own sake, and capable of prosecuting it to great lengths by dint of perseverance and sagacity. He possessed the true scientific spirit in perfection; nothing, he tells us, among the king of France's treasures appeared to him so worthy of admiration as a certain natural curiosity which he took for the horn of a unicorn. It has been injurious to his fame to have been compelled to labor, partly in fields of research where no important discovery was then attainable, partly in those where his discoveries could only serve as the stepping-stones to others, by which they were inevitably eclipsed. His medical career serves as an illustration of the former

case, and his mathematical of the latter. His medical knowledge was wholly empirical; restrained by the authority of Galen, and debarred from the practice of anatomy, nothing more could be expected than that he should stumble on some fortunate nostrums. As a mathematician, on the other hand, he effected most important advances in science, but such as merely paved the way for discoveries which have obscured his own. From his astrology no results could be expected; but even here the scientific character of his mind is displayed in his common sense treatment of what usually passed for a mystical and occult study. His prognostications are as strictly empirical as his prescriptions, and rest quite as much upon the observations which he supposed himself to have made in his practice. As frequently is the case with men incapable of rightly ordering their own lives, he is full of wisdom and sound advice for others; his ethical precepts and practical rules are frequently excellent. To complete the catalogue of his accomplishments, he is no contemptible poet.

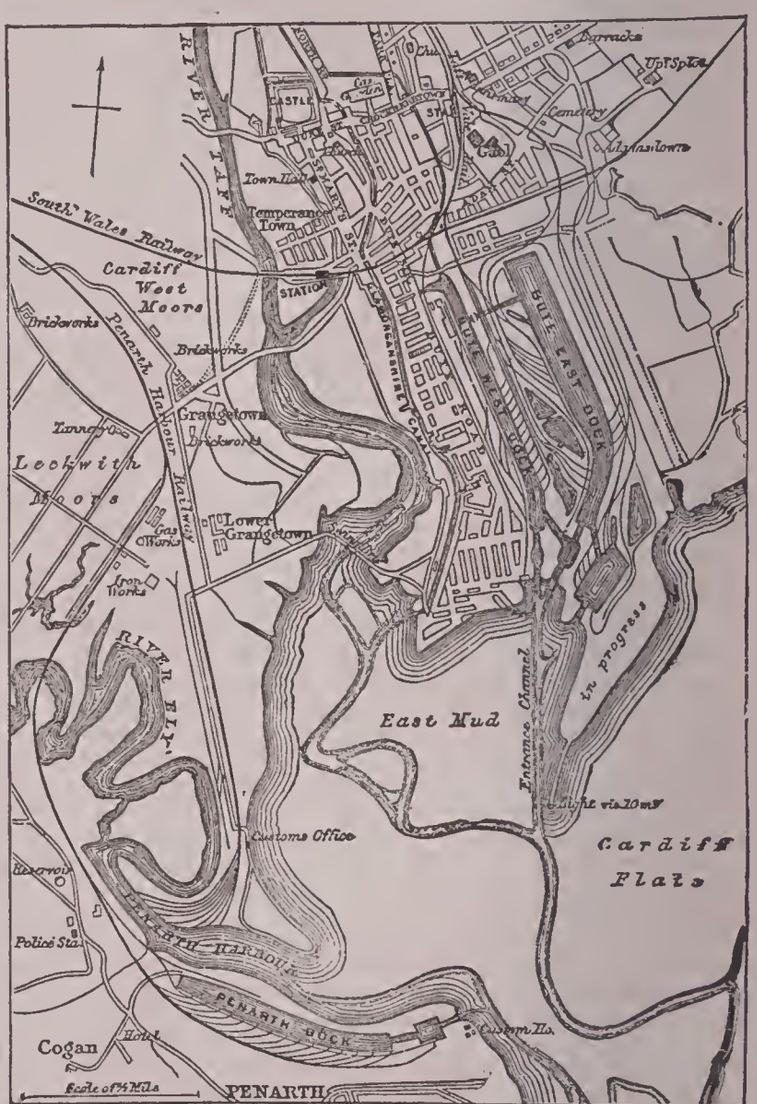
The work of Cardan's, however, which retains most interest for this generation is his autobiography, *De Vita Propria*. In its clearness and frankness of self-revelation this book stands almost alone among records of its class. It may be compared with the autobiography of another celebrated Italian of the age, Benvenuto Cellini, but is much more free from vanity and self-consciousness, unless the extreme candor with which Cardan reveals his own errors is to be regarded as vanity in a more subtle form. The general impression is highly favorable to the writer, whose impetuosity and fits of reckless dissipation appear as mere exaggerations of the warmth of heart which imparted such strength to his domestic affections, and in the region of science imparted that passionate devotion to research which could alone have enabled him to persevere so resolutely, and effect such marked advances in such multifarious fields of inquiry.

Cardan's autobiography has been most ably condensed, and at the same time supplemented by information from the general body of his writings and other sources, by Professor Henry Morley (*Jerome Cardan*, 1854, 2 vols.). His capital treatises *De Subtilitate* and *De Varietate Rerum* are combined and fully analyzed in vol. ii. of Rixner and Siber's *Leben und Lehrmeinungen berühmter Physiker am Ende des* xvi. *und am Anfange des* xvii. *Jahrhunderts* (Sulzbach, 1820). Cardan's works were edited in ten volumes by Sponius (Lyons, 1663). A biography was prefixed by Gabriel Naudé, whose unreasonable depreciation has unduly lowered Cardan's character with posterity. (R. G.)

CARDENAS, a maritime town of the island of Cuba, capital of a district in the western department, is situated 105 miles E. of Havana, on a bay of the northern coast, and has railway communication with Matanzas and Montalvo. There is good anchorage in the harbor, and a number of long wharves stretch out from the shore. The most important article of export is the sugar from the neighboring district,—of which, in 1873, 13,096 tons were sent to Europe, and 69,364 to America. Though only founded in 1828, Cardenas had in 1861 12,910 inhabitants; and at present, in spite of the troubled condition of the island, the number is calculated at about 11,000, of whom 7700 are whites, 2800 slaves, and the rest free negroes. In 1850 the town was plundered by General Lopez.

CARDIFF (the "Caer," or castle on the Taff), a municipal and parliamentary borough in the county of Glamorgan, 170 miles from London by the Great Western Railway, in 51° 28′ N. lat. and 3° 10′ W. long. This town is the chief emporium of the coal and iron trade of South Wales, and is remarkable for its rapid progress and development. The population of the parliamentary borough, by the census of 1871, was 56,911, and since that date it has largely increased. There is a striking contrast of dirty narrow thoroughfares and the wide streets of new houses now opening up in the modern quarter of the town.

Historically, Cardiff is well known, but the castle remains and the old church of St. John and its noble pinnacled tower are almost the only remnants of antiquity. The ancient walls and gates, Blackfriars and Greyfriars, have been swept away, and the old church of St. Mary, finer than any local churches that succeeded, was washed away by the sea. The Arthurian legend of the Sparrowhawk refers to Cardiff. Its position between the rivers Taff and Rhymney, and also between the mountains and the sea, marked it out, probably for the Romans, certainly for the Normans, as a fortified station. In the year 1108 Henry I. having taken prisoner his brother Robert duke of Normandy, imprisoned him in Cardiff Castle for twenty-six years until his death in 1134. Contrary to the prevalent tradition he was most probably treated with kindness, and permitted at times to change his abode. In the time of the Civil War Charles I. came to Cardiff, and the castle was alternately occupied by Royalists and Parliamentarians. There was severe fighting at St. Fagan's in the neighborhood. In 1661 we find the Cardiff authorities complaining of being ruined by the competition of the neighboring town of Caerphilly, but Caerphilly Castle is ruined and the town decayed, while Cardiff has greatly



Plan of Cardiff.

flourished. The local histories are full of the succession of different owners of the castle until the lordship of Glamorgan passed by marriage to the Bute family. The castle occupies a quadrangular space, and was probably once surrounded by earthworks, except towards the river. The area within the walls was 10 acres, within the counterscarp of the moat 13 acres. The mound within the great enclosures has the remains of the keep, or the White Tower. On the town or south side of the court are the Black or Curthose tower, the scene of Duke Robert's imprisonment, and the gateway. The castle was once of enormous strength, and so constructed to resist the incursions of the Welsh. The Lodgings or habitable part are now undergoing extensive demolition and reconstruction. Under the advice of "Capability Brown" the whole structure was modernized, and many precious remains swept away. A thorough restoration is now in progress under the care of Mr. Burgess. The new clock tower is a gorgeous example of most thorough ornamentation. On the side of the Taff, oppo-

site to the castle grounds, are the Sophia Gardens, given to the town by the late marchioness of Bute.

There is a great deal of activity and public spirit in Cardiff. The gas, sanitary, and water arrangements are excellent. There are both public library and infirmary, and plans for new and enlarged buildings for both institutions are in progress. The exports of Cardiff are almost entirely coal and iron; the imports, insignificant in comparison, are mainly iron ore, esparto fibre for paper-making, timber, and corn.

At the commencement of the present century Cardiff possessed a population which scarcely amounted to 1000, and was not even called a port. It was simply designated as a "creek" attached to the great port of Bristol. The peculiar resources of the district were not unknown or neglected, and it is interesting to notice the first rudimentary steps in their development. Coal was brought down from the hills and valleys on the backs of mules. The burdens were laid down at a primitive quay, where vessels of small tonnage awaited them to carry the cargo to Bristol or other ports. The iron was transported in wagons of 2 tons, and to avoid delays from frost, snow, and storms, the minerals, as much as possible, were brought down in the summer and stocked for the winter. In the American War guns made by contract were brought down to the primitive quay which long retained the name of Cannon Wharf. The first stage in the progress of the town was marked by the construction of the Glamorganshire Canal from Merthyr Tydvil to the sea. It dropped from lock to lock some 500 feet in the course of its 25 mile journey to a certain seapond capable of holding vessels of 200 tons burden. The dock had only been formed a few years when the second Marquis of Bute came into possession of his Welsh property. He held some 25,000 acres of the Glamorganshire Hills, teeming with mineral treasures, and between Cardiff and the shore line he owned a tract of marshy waste. It is to the Bute family that Cardiff is mainly indebted for its prosperity. Lord Bute contemplated the construction of large docks, and in the course of twenty years he made great progress with his plans, staking, it is said, the whole of his fortune on the result.

In 1830 the first bill was obtained for the construction of a dock, which has been truly termed the "cradle" of Cardiff. The waters of the Taff were partially diverted as a "feeder" for an artificial stream. There was considerable difficulty in connecting the dock, which was considerably above low-water mark, with the waters of the channel, but these were overcome by Sir William Cubitt. In 1839 the west dock was opened with great rejoicings. It became evident that additional accommodation would soon be required. The lucrative Taff Vale Railway had been formed, incessantly pouring the mineral treasures of the hills into the harbor of Cardiff, and the western side of the dock was ceded to their use. This company also promoted a dock under the headland of Penarth. Later, the Rhymney Railway was constructed, and gave additional development to the coal trade. The great marquis, the second founder of Cardiff, who died somewhat suddenly in 1848, provided that the contingency of his death should not disturb his schemes. He left his estates in trust, nominally for fifteen hundred years, for carrying out his design for making Cardiff a great seaport. The trustees during the twenty years' minority of his successor achieved great works. It was resolved in 1851 that the east dock should be commenced. The demand for accommodation increased so rapidly that the plan of the dock was repeatedly enlarged. This second dock covers 45 acres; the width is partly 300 and partly 500 feet; the total length is 4300 feet, the width of the sealock is 55 feet; the length between the gates is 220 feet. In 1864 further schemes of enlargement were brought forward. In 1868 a low-water pier was opened by Lord Bute on his coming of age. In 1874 a south basin was opened; its area is twelve acres, and the iron-wrought gates have a larger superficial area than any similar works in existence. The new basin acts as a dock, and in some degree relieves the pressure for accommodation until the contemplated additional dock is constructed. The scene on the wharves is very stirring. There is a network of railways about the docks, giving direct communication to every part of the kingdom. The railways bring the minerals from the mouths of the pits; there are enormous staiths, hydraulic lifts being often used for shipping the coals, and steam-cranes to discharge the enormous ballast of arriving ships. What Cardiff needs for its full development is an import trade, in the place of the ballasts, but attempts in this way have not hitherto been very successful, and the New York line of steamers has been given up. Cardiff remains the greatest entrepôt for the smokeless coal which has been found the best for steamers in all the navies of the world, and in export ranks next to Newcastle. The docks owe all their importance to the minerals on the hills, and the means of transit that have been devised from the hills to the shore. The expenditure on the docks, including the new works, will be from two to three millions; the expenditure on railways is about the same, and the capital invested in the collieries is about twenty-five millions. The business of the port, though subject to fluctuations, steadily increases. In 1839 the amount of iron shipped at the port was 1200 tons, and of coal 4562. In 1848 the shipments of iron had advanced to 70,805 tons, and those of coal to 615,111 tons. In 1870, however, the weight of iron loaded at Cardiff amounted to 315,649 tons, and that of coal and patent fuel, which in the meantime had become an article of export, to 2,177,518 tons. The amount of coal exported in 1871 was 2,979,843 tons, and in 1872, 3,557,246 tons.

The villages in the neighborhood of Cardiff,—Roath, Maindu, Canton, Llandaff,—are now its suburbs and nearly absorbed in the town. Of these the most interesting is Llandaff, a kind of minor Clifton to Cardiff. The remarkable cathedral, the seat of the earliest English bishopric, gives the tiniest city in Britain its title. It is a little old-world village on the outskirts of Cardiff, with the Coplestone cross, the remains of the bishop's fortified palace, superseded by a modern country-house and a group of neat ecclesiastical buildings. For more than a hundred years the cathedral was left to neglect and decay. The aisles were roofless, grass grew in the nave, the ivy came through the windows, and storms were increasingly laying waste the edifice. At the expense of many thousand pounds a satisfactory restoration was effected, and a reopening took place in 1869. The cathedral is nobly situated near the Taff, where it is broad and wooded, and almost entirely screened by the ridges. (F. A.)

CARDIGAN, County of, or Cardiganshire, a maritime county in South Wales, is bounded on the N. by Merioneth, on the E. by Montgomery, Radnor, and Brecon, on the S. by Carmarthen and Pembroke, and on the W. by the Irish Sea. Its greatest length from south to north is about 30 miles, and its greatest breadth from east to west about 40 miles; but these dimensions give a very imperfect idea of its size, as it almost exactly represents in figure a "half-boot," the line of the sole being from east to west, with the toe at the extreme west. It possesses an area of 693 square miles, or 443,387 acres, and is, therefore, the fifth in size of the Welsh counties.

The whole area of this county is occupied by the lower Silurian geological formation. It does not, therefore, possess mines of coal, or iron, or limestone; but, as if to compensate for this want, it is the richest of all the Welsh counties in its metalliferous lodes. Its lead mines have long been famous; and it was from the profits of his mining speculations, carried on chiefly in this county, that the celebrated Sir Hugh Myddelton was enabled to carry out his gigantic project for supplying London with water by means of the New River. The Lisburne, Goginan, Cwm Ystwith, and other mines still yield largely, and have been sources of great profit to the adventurers. Some of the lead raised is very rich in silver; and in the 17th century the quantity of silver obtained was so considerable, that, by virtue of letters-patent, a mint existed for coining it on the spot.

Cardiganshire is exceedingly wild and mountainous; but the mountains generally have little of grandeur in their character, Plinlimmon itself, in spite of its height, being singularly deficient in boldness of outline. There is a considerable tract of flat land lying along the sea coast, especially towards the south-west, the general aspect of which is so dreary and desolate, that it has been called, and with good reason, the desert of Wales. In that district it is almost possible to travel 30 miles in a straight line without seeing a house, or a road, or a human being. The principal mountains are Plinlimmon, just within the county boundary on the north-east, rising to the height of 2469 feet, and Tregaron mountain, near Tregaron, in the south-east, 1778 feet in height. Few of the others exceed 1000 feet in elevation.

The vale of Teifi presents views of great beauty and interest, especially as it approaches the sea. The valleys of the Aeron, the Ystwith, and the Rheidol, also present scenes of great beauty, especially the last, in which is the famous Devil's Bridge, with the falls of the Rheidol, one of the most celebrated pieces of Welsh scenery.

The county abounds in lakes and rivers. The chief of the latter is the Teifi, which rises in a lake of the same name (Llyn Teifi), about 8 miles north-east of Tregaron; flowing through the centre of the county, in a south-west direction, till it reaches Lampeter, it becomes from that point the county boundary, separating it from Carmarthen and Pembroke, and, after a course of about 50 miles from its source, falls into the sea at Cardigan. The Aeron takes its rise in some lakes in a low range of hills called Mynydd Bach, and first flowing in a southerly direction, and afterwards nearly west, falls into the sea at Aberaeron. The Ystwith and Rheidol both rise in Plinlimmon, and flowing west, cross the county, falling into the sea at Aberystwith; and the Towy forms the county boundary, separating it from Brecknockshire on the south-east.

Cardiganshire has been called the lake county of Wales, an appellation which it well deserves. The most important are Llyn Teifi, Llyn Fyrddyn Fawr, Llyn Egnant, Llyn Gynon, and Llyn Eiddwen; but hardly any of them exceeds three-quarters of a mile in length. They abound in trout, and are now a good deal resorted to by anglers.

The climate on the coast is mild and salubrious, but suffers from an excess of rain. The climate of the hill country is cold, wet, and bleak. The cultivated crops consist of wheat, oats, barley, turnips, and potatoes; and in the lower districts on the coast, especially in the neighborhood of Aberaeron, Llanrhystyd, and Cardigan, good crops are raised; and at the last-named, as well as at Lampeter, great improvements are now being effected, by means of the Government Drainage Bill, in draining and improving several large estates. In 1873 there were 2038 holdings of an acre and upwards, and 1278 of less size,—the average extent being 118 acres, while that of all Wales is 74½ acres. Seven holdings exceeded 5000 acres, and none extended to 30,000 acres. It is calculated that one-half of the lands are enclosed. The hill district is entirely occupied with wild heathy pastures, which are stocked with the small mountain sheep of the country, and with herds of ponies and cattle, which are annually drafted off by dealers to be fattened in the more fertile districts of Wales or England. Cardiganshire has long been famous for its breed of horses, and for these high prices are obtained from English dealers, who now visit the farms in considerable numbers.

The following tables show the acreage of particular crops, and the numbers of live stock in the years 1872 and 1875:—

	Oats.	Barley.	Wheat.	Green Crops.	Grass under rotation.
1872.....	31,411	25,849	8430	14,739	40,505
1875.....	30,540	24,366	8459	13,653	37,991

	Horses.	Cattle.	Sheep.	Pigs.
1872.....	11,762	56,565	203,619	23,739
1875.....	12,745	61,535	205,346	20,688

Black cattle, sheep, pigs, butter, barley, oats, woollen manufactures, slates, and lead and lead ore form the principal articles of export.

The railways within the county are the Cambrian, by means of which access is given to Aberystwith from all parts of the kingdom, and a line through Tregaron and Lampeter, and by way of Pencader to Carmarthen. At present the county town is without any railway communication.

The principal towns are—Cardigan, Aberaeron (at which, in consequence of its central situation, the county sessions are held), Aberystwith, Llanbadarn Fawr, Tregaron, Lampeter, and Adpar,—which last is the name given to the portion of Newcastle Emlyn on the Cardigan side of the Teifi. The county, which contains 97 parishes, is in the diocese of St. David's; and at Lampeter there is a college for the education of the Welsh clergy. It returns one member to Parliament, and has done so since 1536. The political influence is divided between the families of Powell of Nant-Eos (Conservative) and Pryse of Gogerddan, Pryse of Peithyll, Lloyd of Coedmore, and the earl of Lisburne (Liberal). Constituency in 1875, 4563. The annual value of real property paying income tax is £256,078.

The population of the county by the census of 1871 was 73,441, giving an average of 105·2 persons to a square mile, or 6·3 acres to each person. Of the total number 33,396 were males, and 40,045 females, showing an unusual disproportion of the sexes, in the great excess of females. This may be perhaps accounted for by the emigration of men to the mining districts, especially Glamorganshire, where the excess of males would just balance the deficiency in Cardigan, Carmarthen, and Pembroke. The number of inhabited houses in 1871 was 16,420, uninhabited 741, and building 76,—giving an average of 23·6 inhabited houses to a square mile, and 4·4 persons to each house. The following table gives the census returns for the last fifty years:—

1821.....	57,784	1851.....	70,796
1831.....	64,780	1861.....	72,245
1841.....	68,766	1871.....	73,441

The women may often be seen dressed in the picturesque costume of Wales, and having their heads surmounted by the high-crowned broad-brimmed hat. Many curious customs and superstitions still survive. On the occasion of a marriage, a "bidder" goes from house to house inviting the inmates to the wedding. It is expected that all the guests are to bring presents of money and provisions. The marriage always takes place on a Saturday; but the guests assemble on Friday with their presents. All these are set down on paper, that repayment may be made if demanded; but this seldom happens. The furnishing of the bride is also brought home on this day. On Saturday ten or twenty of the man's friends who are best mounted go to demand the bride. She is placed on a horse, behind her father, who rides off as fast as he can. He is soon, however, overtaken. Presents continue to be received on Saturday and Sunday, and on Monday they are sold, and sometimes with the money received realize £50 or £60.

There are numerous British and Roman antiquities in the county, consisting of cromlechs, tumuli, camps, and stations, and also the remains of a Roman road (the Sarn Helen) about four miles from Tregaron, and the Roman town *Loventium* at Llanio.

The castles of Aberystwith, Cardigan, and Newcastle Emlyn are interesting ruins, and the remains of Strata Florida Abbey are among the most beautiful of the ecclesiastical antiquities of South Wales. The church of Llanbadarn Fawr (once the seat of a bishopric) is a fine example of a severe type of Early English architecture, and the collegiate church of Llanddewi Brefi marks the site of the synod in which, according to the legend, St. David confuted the Pelagians.

The early history of the district is obscure, but at the time of the Roman invasion it was tenanted by the Demetæ, a Celtic tribe, within whose limits was comprised the greater portion of the south-west of Wales. Mingled with it, though living at perpetual variance, was a Gaelic population (drawn, probably, from Ireland), which in the 6th century had got the upper hand, and in turn was subdued by the sons of Cunedda, who came as liberators from North Britain. One of these sons was Caredig, who conquered and gave the name to the province of Caredigion, which was nearly co-extensive with the present county of Cardigan. In the 8th century it formed part of the dominion of Sitsylt (from whom it received the name of Seissyltwg), and was hotly disputed by the descendants of his sons and daughter. Ultimately it fell to the latter, and at the close of the 11th century had been reduced to submission to the Norman sway, from which, in spite of short-lived successes, it never escaped.

Cardigan was one of the counties involved in the singular disturbances known as the Rebecca riots.

CARDIGAN, a market town and municipal and parliamentary borough of England, the capital of the county of the same name, is situated on the south-east of Cardigan Bay, about 36 miles by rail from Carmarthen, at the mouth of the Teifi, which there divides the county from Pembrokeshire. The houses are mostly constructed of slate rock, and the streets are narrow, steep, and irregular. The principal structures are the church of St. Mary's, a fine and spacious edifice of considerable antiquity, the county jail, erected in 1793, the national school, dating from 1848, and a large block of buildings, which includes a town hall, an exchange, a grammar school, a public library, and various markets. Besides being the commercial centre of a pretty extensive district, Cardigan engages in the coasting trade and the fisheries, and exports slates, oats, barley, and but-

ter. Its harbor is unfortunately obstructed by a bar, so that the entrance is dangerous for vessels of more than 300 tons burden, except at high spring tides, when it is passable for vessels drawing 15 to 18 feet of water. The imports in 1874 were valued at £3035, the exports at £52. The borough, in conjunction with Aberystwith, Lampeter, and Adpar, has returned one member to Parliament since 1836; and in 1874 the district had a constituency of 1981. The population in 1871 was 3461 in the municipal borough, and 4939 in the parliamentary, which is partly in Pembrokeshire.

Cardigan, called by the Welsh Aberteifi, from its position at the mouth of the river, first rose into importance about the time of the Norman conquest. In 1136 the English army, under Randolph, earl of Chester, suffered a severe defeat in the neighborhood at the hands of the Welsh. The town was fortified by Rhys ap Gryffydd, prince of South Wales, to whom was also ascribed the foundation of the castle, which is still represented by a few ruins near the bridge. His grandson Maelgwn razed the castle to the ground, and ravaged the town; but the effects of his vengeance were not long afterwards repaired, and the castle continued to be a post of some importance down to the Parliamentary wars, when it was held for a while by the Royalist forces. In the neighborhood there was, before the Reformation, a small priory of Benedictine monks, which, as a private dwelling in the 17th century, obtained some celebrity as the residence of Orinda (Catherine Philips), the friend of Jeremy Taylor. About a mile and a half distant was the more important priory of St. Dogmael; and about three miles up the river are the ruins of Cilgerran Castle.

CARDIGAN, James Thomas Brudenell, seventh earl of (1797–1868), and Baron Brudenell in the peerage of England, lieutenant-general, was the eldest surviving son of the sixth earl, and was born at Hambledon in Hampshire, October 16, 1797. He studied for several terms at Christ Church, Oxford; and in 1818 entered Parliament as member for the borough of Marlborough under the patronage of Lord Ailesbury. He entered the army in 1824 as cornet in the 8th Hussars, and was promoted in 1832 to be lieutenant-colonel in the 15th Hussars. With this regiment he made himself one of the most unpopular of commanding officers. He gave the reins to his natural overbearing and quarrelsome temper, treating his men with excessive rigor and indulging in unscrupulous licentiousness. Within two years he held 105 courts-martial, and made more than 700 arrests, although the actual strength of his regiment was only 350 men. In consequence of one of his numerous personal quarrels, he left the regiment in 1834; but two years later, at the urgent entreaty of his father, he was reinstated in the army, and appointed to the command of the 11th Hussars. He played the same part as before, and was censured for it; but he was allowed to retain his post, and the discipline and equipment of his regiment, in which he took great pride, received high commendation from the duke of Wellington. He succeeded to the peerage on the death of his father in August, 1837. In September, 1840, Lord Cardigan fought a duel, on Wimbledon Common, with Captain Tuckett, an officer of his regiment. The latter was wounded, and Lord Cardigan was tried before the House of Lords on a charge of feloniously shooting his adversary. But the trial was a mere sham, and on a trivial technical ground he was acquitted. In 1854, at the outbreak of the Crimean War, the earl of Cardigan was appointed to the command of the light cavalry brigade, with the rank of major-general, and he spent a very large sum in the purchase of horses and on the equipment of his regiment. He took a prominent part in the early actions of the campaign, and displayed throughout the greatest personal courage and the greatest recklessness in exposing his men. The feat which made his name famous was the charge of his brigade, numbering 600 men, on a body of Russian heavy cavalry, 3600 in number, at the battle of Balaclava (October 25, 1854). He forced his way through the enemy, but half his men and horses were left dead on the field. The charge, celebrated by Tennyson in his well-known lyric, has been the subject of much controversy,—some critics having an eye only to the splendid daring and unquestioning obedience to orders, and others seeing only a foolhardy and unjustifiable throwing away of valuable lives. At the close of the war the earl was created K.C.B., and was appointed inspector-general of cavalry, and this post he held till 1860. In 1859 he was promoted colonel of the 5th Dragoon Guards, but was transferred in the following year to the command of his former regiment, the 11th Hussars. He attained the rank of lieutenant-general in 1861. He was twice married, in 1826 and in 1858, but had no children. On his death, which took place at Deene Park, Northamptonshire, on the 28th of March, 1868, the titles passed to his relative, the marquis of Ailesbury.

CARDINAL, the name of the highest dignity in the Roman Catholic hierarchy. Very varying statements are found in the ecclesiastical historians respecting the origin of the name, the period at which it was first used, and the persons to whom it was applied in the earliest time of its use. This uncertainty is easily explained by the fact that both the thing and the name were at no time appointed and created, but grew up by successive and mainly abusive encroachments legitimatized by usance, and from time to time more formally by Papal briefs and bulls. There can be little doubt that the word was originally applied to priests in the same sense in which it was and is applied to other things, as synonymous with "principal," that on which a thing hinges (*cardo*, a hinge).[1] The other ideas which have been put forward,—as that the priests so termed attended the pontiff when celebrating mass, standing at the corners (*cardines*) of the altar, that cardinal priests were those refugees from persecution who were received and "incardinated" into the clerical body of churches more happily circumstanced, and some others—may be deemed the fanciful inventions of later writers in search of originality. What priests those were, who in fact or by privilege used this title in the earliest ages of the church, is a much larger and more debatable question, on which scores of volumes have been written. If, however, a guide is to be chosen, no safer can be found than Bingham,[2] who says, when pointing out that archpresbyters were by no means the same thing as cardinal presbyters, that the use of the term cardinal cannot be found in any genuine writer before the time of Gregory the Great († 604). For, says he, the Roman Council, on which alone Bellarmine relies to prove the word to have had a greater antiquity, is a mere figment. For the authorities for an earlier use of the term, such as they are, the reader may consult Gaetano Moroni's *Dizionario* at the word Cardinal. As regards the term "genuine" in Bingham's statement, it may be mentioned that both Baronius and Bellarmine regard the council said to have been held at Rome by Sylvester I. in 324 as genuine. Van Espen, on the other hand, considers it to be apocryphal. Further, in alluding to the origin of the name, Bingham notices the opinion of Bellarmine that the word was first applied to certain principal churches, and remarks that others have supposed that those among the priests in populous cities who were chosen from among the rest to be a council for the bishop were first called cardinals. And Stillingfleet[3] says,—"When afterwards these titles[4] were much increased, those presbyters that were placed in the ancient titles, which were the chief among them, were called Cardinales Presbyteri, which were looked on as the chief of the clergy, and therefore were the chief members of the council of presbyters to the bishop." Stillingfleet appears, however, to have been thinking exclusively of Rome. Various other churches in France, Italy, Germany, and Spain—as Bourges, Metz, Ravenna, Fermo, Salerno, Naples, Cologne, Compostella, &c.,—claimed the title of cardinal for their canons as by privilege, in most cases probably usurped and not granted. But the name appears gradually to have been understood to appertain only to those whom the pope specially created cardinals. And at last, in 1567, Pope Pius V. definitively decreed that none should assume the title of cardinal save those created such by the Roman pontiff, and the word from that time to this has been exclusively so applied.

If the origin and early use of the term cardinal is ob-

[1] Pope Eugenius IV. writing in 1431, says, "As the door of a house turns upon its hinges, so the See of the Universal Apostolical Church rests and is supported on this institution." Cave, in his article on Anastasius, the Roman librarian (*Scr. Eccl.*, vol. ii. p. 56, col. ii.), quotes the words of Pope Leo (about 848) respecting him—"*Presbyter cardinis nostri quem nos in titulo B. Marcelli Mart. atque Pont. ordinavimus;*" that is to say, continues Cave, that that Church was specially entrusted to him, that he might continually be busied in the care of it, *tanquam janua in cardine suo.*

[2] *Eccl. Antiq.*, bk. ii. ch. 19, sec. 18.

[3] *Irenicon*, pt. ii. ch. 6.

[4] *I.e.*, those principal incumbencies which from the earliest ages of the Church of Rome had been so called,—a use of the word of which a curious survival may be traced in the common phrase "a title to holy orders."

Sacred college.

scure, the institution of a collegiate body consisting of cardinals and of none other is yet more so. There seem to be traces of such a conception in the Life of Leo III. († 816) written by Anastasius the librarian. And Moroni cites many passages from various authors and documents between the above date and 1100, with a view of showing that, at all events, by the end of that time the body of cardinals was recognized as a collegiate corporation. But his citations seem to prove rather the reverse. Nor do we reach solid ground in this respect till we come to the bull "Postquam"[1] of Sixtus V. (3d December, 1585) which finally regulates the composition of the *Sagro Collegio*. By this instrument seventy is fixed as the maximum number of the sacred college "after the example of the seventy elders appointed by God as counsellors of Moses." Nor has the number ever been exceeded since that time, though it is expressly laid down by the authorities on the subject, that no canonical disability exists to prevent the Pope from exceeding that number should he see fit to do so. By the same bull "Postquam," it is also provided that the seventy of the Sacred College should consist of six cardinal bishops, fifty cardinal priests, and fourteen cardinal deacons. The six cardinal bishops are the bishops of the sees lying immediately around Rome. The fifty cardinal priests take their "titles" from the principal churches in Rome, but are many of them bishops or archbishops of distant sees, and four must be by regulation members (usually the "generals") of the monastic orders. The fourteen deacons take their titles from the "deaconries" established in the earliest ages of the Church for the assistance and protection of the widows and orphans of the faithful. It may be added here that Sixtus V., by the above-mentioned bull, decrees that if any person created a cardinal be not in deacon's orders, he must receive them within the year. But "dispensations," by virtue of which the dignity has been held for many years by men not even in deacon's orders, have been common. If any cardinal should be in such a position at the time of the pope's death, he cannot enter conclave or participate in the election, unless by immediately qualifying himself by taking orders.

Number and ages of cardinals in past times.

As the institution of cardinals was entirely arbitrary and an abuse, so, despite the shadow of an attempt to find or make a *raison d'être* for their existence in the assignment of such dignities to certain special sees and churches in and around Rome, their connection with those churches very soon became purely nominal and formal; and everything connected with the selection of them depended wholly on the will of the pontiff. Not so, as will be seen presently, their prerogatives when they had been created. And the limits, which might be supposed to have bounded the field from which the Pope could select the objects of his favor, became constantly enlarged. A few only of the many instances of creations illustrating this fact which are on record can be here mentioned. Clement VI., in 1348, created his nephew Peter Roger cardinal when he was seventeen. Sixtus IV., in 1477, created John of Aragon cardinal at the age of fourteen, and at the same time his nephew Raffaelle Riario who was seventeen. Innocent VIII. († 1492) created Giovanni de' Medici, afterwards Leo X., cardinal at fourteen, his eminence having been Apostolic Prothonotary ever since he was seven! Ippolite d'Este had been an archbishop for the last nine years, when Alexander VI. created him cardinal in his seventeenth year. Alfred of Portugal was made cardinal by Leo X. when he was seven years old, on condition, however, that he should not assume the outward insignia of the dignity till he should be fourteen. The same pontiff made John of Lorraine cardinal at twenty, Alexander VI. having previously made him coadjutor of the bishop of Metz at four years old. Clement VII. made Odet di Coligny cardinal at twelve. Paul III. Farnese († 1549) created his nephew Alexander Farnese cardinal at fourteen; his grandson Guido Ascanio Sforza, the son of his daughter Costanza, at sixteen; his cousin Nicolò Gaetani at twelve; his relative Giulio Feltre della Rovere, at eleven; and a second grandson, Ranuccio Farnese, at fifteen, having made him archbishop of Naples the year before. Paul also created Charles of Lorraine, brother of Mary Queen of Scots, cardinal at twenty-two, although he had a brother in the Sacred College at the time, which is contrary to the constitutions and the decree of one of the Pope's predecessors. But this is only one out of a hundred facts which demonstrate the futility of the attempt to bind the hands of one infallible autocrat by the rules enacted by his predecessors. Sixtus V. († 1590), a great reformer of abuses, made his nephew Alexander Peretti cardinal at fourteen. Paul V. († 1621) created Maurice of Savoy cardinal at fourteen, Carlo de' Medici at nineteen, and Ferdinand of Austria at ten. Clement XII. († 1740) made Luigi di Borbone archbishop of Toledo and cardinal at the age of eight. And, lastly, Pius VII. († 1823) created a second Luigi di Borbone, the son of the above-mentioned archbishop of Toledo, cardinal at twenty-three. The list of such creations might be much extended. Previously to the publication of the bull "Postquam" by Sixtus V. the number of the Sacred College was extremely variable. John XXII., requested in 1331 to make two French cardinals, replied that there were only twenty cardinals' hats, that seventeen of these were already French, and that he could, therefore, only make one more. At the death of Clement VI. (1352) the cardinals determined that their number should not exceed twenty. Urban VI. († 1389) created a great number; and we find the college making representations to Pius II. († 1464) to the effect that the dignity of the purple was diminished by such excess. Sixtus IV († 1484), however, multiplied the number of his creations to an unexampled extent; and Alexander VI. († 1503) exceeded him. Leo X. created thirty-one cardinals at one batch, leaving at his death sixty-five, a number unprecedented up to that time. Paul III., however, created seventy-one. But Paul IV. († 1559) issued the bull called "Compactum," by which it was decreed that the number of cardinals should never exceed forty. His immediate successor, however, Pius IV. († 1565) raised the number to forty-six. In 1590 came the final settlement at seventy by Sixtus V., as has been said.

Manner and ceremonial of creation.

Many volumes have been written on the different forms used by the popes in the creation of cardinals in different ages, and many more still larger treatises *ex professo* on the strictly ecclesiastical, as well as what may be more properly called the social, portions of the accustomed ceremonial. But it must suffice here to characterize very generally the differences which have prevailed from age to age in the first respect, and to say but a few words on the second head.

The general tendency of the changes which have taken place in the methods used for the creation of cardinals may be very shortly stated. They have been such as indicate the steadily increasing absolutism of the pontiffs. A proclamation to the congregation including an invitation to any person to state any ground of objection known to him soon gave place to a real consultation of the college by the Pope, and a real assent on the part of the cardinals to the proposed new nominations, which in its turn dwindled off at a very early period to a mere form of asking and receiving consent. In the earlier centuries the creations almost always took place on the first Wednesday of the *Quattro Tempora*,[2] and generally in the Basilica of Santa Maria Maggiore. There, after the *Introit* and collect of the Mass had been said, a reader ascended the pulpit and proclaimed the intended creation of such and such persons, ending with an invitation precisely similar to that used in our churches in the publication of banns of marriage, and a real inquiry followed the statement of any objector. At a later period the Pope asked of the cardinals assembled in secret consistory whether in their opinion there should be a creation of cardinals, and of how many? And a deputation was sent to the residence of any cardinals who might be ill to bring back their replies to the same questions. Then, satisfactory answers having been obtained from at least the majority, the Pope said "*Portetur nuda cathedra.*" The chair was brought, and placed at his right hand. Thereupon all the cardinals rose, and stood ranged against the wall at a distance out of earshot of the Papal throne. The dean of the Sacred College placed himself in the empty chair, and the Pope told him in a low voice whom he proposed to create, adding "*Quid vobis videtur?*" One by one all present were similarly interrogated, and then the Pope said aloud, "*Deo*

[1] See, however, Cave, *Script. Eccl. Hist. Lit.*, vol. ii. p. 124, who says that about the middle of the 11th century they were enrolled (*asciti sunt*), in an Apostolic College.

[2] The *Quattro Tempora* were the fasts with which each quarter of the year commenced.

gratias habemus de personis creandis concordiam omnium fratrum," or "*quasi omnium,*" or "*majoris partis,*" as the case might be. And then the pontiff at once proclaimed the new dignitaries:—"*Auctoritate Dei Omnipotentis, Sanctorum Apostolorum Petri et Pauli, et nostra creamus Sanctæ Romanæ Ecclesiæ Cardinales Presbyteros quidem. . . N. N. . . . Diaconos vero . . . N. N. . . . cum dispensationibus, derogationibus, et clausulis necessariis et opportunis.*" He then thrice made the sign of the cross, saying as he did so, "*In nomine Patris, &c., Amen,*" and the consistory was at an end.

In later times the proclamation having been made in consistory by the simple announcement, "*Habemus fratres*" so and so, the act of conferring the dignity with its insignia on the new recipients was performed at the Papal palace, and was accompanied by a mass of minutely ordered ceremonial which rendered it one of the most pompous and gorgeous scenic performances of the Roman Church and court. It would need many pages to describe the form and order of the ceremony, the intricacies of which no one was ever expected to remember or understand save the professional masters of the ceremonies, whose business it was to have mastered the science. And a description of it would serve no purpose, save that of causing amazement at the overgrown mass of frivolity which the constant tendency to extinguish significance under heaps of material forms and show, has led the old men who compose the Roman court to accumulate.

The social portion, as it may be called, of the ceremonial attendant on the creation of a cardinal, in which the city and all the inhabitants are concerned, is as pompous, and as much regulated by a whole code of traditional uses and customs, as the more purely ecclesiastical part of the business. The making of presents and payment of fees to persons of all sorts of conditions, from the high and reverend officials of the Curia to the Cardinal's lackeys, makes a great part of it. And the amount of all these payments is minutely regulated. Great illuminations[1] take place in the city, and especially on the façade of the new dignitary's palace. Bands of music parade the city, and are specially stationed before the residences of the foreign ministers. The new cardinal opens his palace for a great full-dress reception, where all who have a decent coat, and specially all strangers, are welcomed. These are great and noted occasions for the display of the diamonds and toilettes of the Roman patrician ladies.

Cardinals in Petto.

Before quitting the subject of the method of creating cardinals, the custom of reserving cardinals "*in Pectore*" must be briefly noticed. Various causes occasionally arose to lead a pontiff to deem it undesirable to declare to the world the person whom it was his purpose to create a cardinal. Martin V. († 1431) was the first who thus secretly created cardinals. But the practice then and subsequently differed essentially from that which the ever-increasing despotism of the popes brought it to under Paul III. and thenceforward. Martin and his successors, till Paul III., took the members of the college into their confidence, only strictly enjoining them not to divulge the fact that such and such persons were in fact cardinals. He died leaving four cardinals thus unpublished, having taken the oaths of the other cardinals that they would in case of his death recognize them. Notwithstanding their oaths, however, they refused when the Pope died to do so. And the popes have never been able to secure the admission to the college of those whose creation has been left by their deaths in this inchoate state. Sometimes the college has recognized them, and admitted them to the conclave; sometimes the succeeding Pope has re-created them out of respect for the wishes of his predecessor. Sometimes they have altogether lost the promotion intended for them. The change which Paul III. introduced consisted in confining the secret of the unpublished nominations to his own breast, keeping it "*in pectore.*" His practice was, and that of his successors has been, to add to the form of proclamation in consistory, "*Alios duos* (or more or less) *in pectore reservamus arbitrio nostro quandocumque declarandos.*"

Shutting and opening of the new Cardinal's mouth.

Before quitting the subject of ceremonial, a word or two may be said of the singular practice of closing and subsequently opening the mouth of a newly created cardinal. Like almost everything else connected with the subject this form had once a real significance, but has become a mere meaningless formality. Some reasonable time was originally allowed to elapse before the pontiff in one consistory formally pronounced the mouth to be opened which he had declared to be closed in a previous consistory. Now the form of opening is pronounced within a few minutes of the form of closing. As may be readily understood the cardinal whose mouth was closed could not speak or vote in any assembly of the cardinals, but only hear. When it has occurred that a cardinal has been left at the death of a Pope with closed mouth, the college have usually empowered one of their number to open the mouth of the cardinal so circumstanced. But it is a great mistake to suppose, as many have imagined, that a cardinal, whose mouth remained closed, was ineligible to the Papal throne. For not only any such cardinal, but any person whatever, clerk or lay, not being an avowed heretic, and not laboring under any canonical impediment to holy orders, is perfectly eligible as pope.

Insignia and titles.

The chief of the insignia of a cardinal's dignity is the scarlet hat,—the original significance of which was, we are told, to remind the wearer that he was to be at all times ready to shed his blood in martyrdom for the faith. At an early period it became, and has since continued to be, a huge unwearable construction of silk and hanging tassels, such as may be seen suspended from the roofs of cathedrals over the tombs of cardinals. So much is the hat the main mark of a cardinal's dignity, that "to receive the hat" is in common parlance equivalent to being made a cardinal. The canonical vestments of a cardinal are scarlet,[2] and in the city and in their homes the hems and such like of their coats, and also their stockings, are of the same color,—in Italian parlance "purple." Hence, "to aspire to the purple," "to receive the purple," is also equivalent to being a candidate for or being made a cardinal. Their Eminences also wear a scarlet "beretta," a four-cornered cap of the shape well known in pictures and engravings, and a scarlet "berettina," or skull-cap. Until the time of Urban VIII. the cardinals were styled "Illustrissimi;" but that pope decreed that they should for the future be called "Eminentissimi," and addressed as "your Eminence."

Cardinals as Papal electors.

It remains to add a few words on the privilege of a cardinal as an elector of the pontiff; and though the subject is a large one, a very few words will suffice, because the treatment of it falls more properly and conveniently under other headings. In perfect consistency with every other portion of the history of the institution, the right and privilege of the cardinals to elect the Pope is an abuse, and has been attained by a long series of encroachments which have gradually eliminated the originally democratic constitution of the Church. The popes were at first chosen by the whole body of the faithful; then by the whole body of the clergy; then by the cardinals with the consent of the clergy, and, ultimately, absolutely and exclusively by the cardinals. That the mode of election has passed through these phases is certain; but the chronological details of the changes are extremely obscure. The methods pursued in the election belong to another place. And this article may be concluded by a statement of the fact, often misapprehended, that the right of a cardinal to enter conclave with his brethren and vote for the new Pope is indefeasible; and he is not to be deprived of it by any declaration of the late Pope or deposition by him, or by any amount of unworthiness, however patent. Cases are on record in which popes have sought by every means in their power to prevent certain cardinals from taking part in the election that would follow their death, and some in which monstrous crimes have rendered such exclusion reasonable and right in every point of view. But in every such case the college has overruled the provisions of the deceased pontiff, and admitted the acknowledged member of their body to take part in the election. (T. A. T.)

CARDONA (perhaps the ancient *Udura*), a fortified town of Spain, in the province of Catalonia, about 55 miles N.W. of Barcelona, in 41° 57′ N. lat. and 1° 37′ E. long. It occupies the summit of a hill near the banks of the Cardonera, a branch of the Llobregat, and from the strength

[1] It is to be understood that all this applies to the state of things before the Italian Government took possession of Rome. The Church now considers herself to be under eclipse, and all exterior pomp and magnificence are suppressed.

[2] Save in the case of members of the monastic orders, whose dress, similar in form to the others, is in color that enjoined by their special rule.

of its position has been able to bid defiance to repeated attacks. Besides its citadel and ramparts, it possesses the ruins of the palace of Ramon Folch, the church of San Vicente, and the church in which the famous Catalonian saint Ramon Nonato expired. It is still more celebrated, however, for the extensive deposit of rock salt in its vicinity, which forms a mountain mass about 500 feet high in the head of a valley, covered by a thick bed of a reddish brown clay, and apparently resting on a yellowish grey sandstone. The salt is generally more or less translucent, but large masses of it are quite transparent; and pieces cut from it are worked by artists in Cardona into images, crucifixes, and many articles of an ornamental kind. Population about 3000.

CARDS, Playing (*χάρτης*, paper, probably, as Chatto thinks, *square* paper), rectangular pieces of pasteboard, used at games. The invention of playing cards has been attributed to various nations. In the Chinese dictionary, *Ching-tszetung* (1678), it is said that cards were invented in the reign of Sèun-ho, 1120 A.D., for the amusement of his numerous concubines. There is a tradition that cards have existed in India from time immemorial, and that they were invented by the Brahmans. A pack of cards, said to be a thousand years old, is preserved in the museum of the Royal Asiatic Society; but modern critics are of opinion that these cards are of recent date. The invention of cards has also been assigned to the Egyptians, but apparently on no better authority than the belief that the representations on tarots may be so interpreted as to connect them with Egyptian philosophy. To the Arabs, Germans, Spaniards, and French have also been ascribed the invention of cards, but on grounds of varying feebleness.

There are numerous singular resemblances between the ancient game of chess (*chaturanga*, the four *angas* or members of an army) and cards (see "Essay on the Indian Game of Chess," by Sir William Jones, *Asiatic Researches*, vol. ii.), from which it has been conjectured, with some show of reason, that cards were suggested by chess. The presumption, then, is in favor of the Asiatic origin of cards.

The time and manner of the introduction of cards into Europe are also moot points. The 38th canon of the council of Worcester (1240) is often quoted as evidence of cards having been known in England in the middle of the 13th century; but the games "de rege et regina" there mentioned were a kind of mumming exhibition (Strutt says chess). No queen is found in the earliest European cards.

In the wardrobe accounts of Edward I. (1278), Walter Stourton is paid 8s. 5d. "ad opus regis ad ludendum ad quatuor reges." This passage has been translated to mean cards; but as chess was known in the East by a term signifying the four kings (*chaturaji*), it is now believed that this entry relates to chess. If cards were known in Europe in 1278, it is very remarkable that Petrarch, in his dialogue which treats of gaming, never mentions them; and that though Boccaccio and Chaucer and contemporary writers notice various games, there is not a single passage in any one of them that can be fairly construed to refer to cards. Passages are quoted from various works, of or relative to this period, but modern research leads to the belief that in every instance the word rendered "cards" has either been mistranslated or interpolated.

The earliest unquestionable mention of a distinct series of playing cards is the well-known entry of Charles or Charbot Poupart, treasurer of the household of Charles VI. of France, in his book of accounts for 1392 or 1393. It runs thus—"Donné à Jacquemin Gringonneur, peintre, pour trois jeux de cartes, à or et à diverses couleurs, ornés de plusieurs devises, pour porter devers le Seigneur Roi, pour son ébatement, cinquante-six sols parisis." From this entry it has hastily been concluded that Jacquemin Gringonneur (it is not certain whether Gringonneur was the painter's surname, or only his designation as a maker of *grangons*) invented cards; but the payment is clearly for painting, not for inventing them.

The safe conclusion with regard to the introduction of cards is that, though they may possibly have been known to a few persons in Europe about the middle of the 14th century, they did not come into general use until the end of the century, and that whence they were brought has not yet been ascertained. But if the testimony of Covelluzzo can be relied on, cards were introduced into Italy from Arabia in the year 1379. Covelluzzo, who wrote in the 15th century, gives as his authority the chronicle of one of his ancestors. His words are—"Anno 1379, fu recato in Viterbo el gioco delle carte, che venne de Seracinia, e chiamisi tra loro naib." (In the year 1379 was brought into Viterbo the game of cards, which comes from the country of the Saracens, and is with them called naib. See "*Istoria della Citta di Viterbo*," Feliciano Bussi, Roma, 1743.)

Soon after the date of Poupart's entry, cards it would seem became common; for in an edict of the provost of Paris, 1397, working people are forbidden to play at tennis, bowls, dice, cards, or nine-pins on working days. From the omission of cards in an ordonnance of Charles V. (1369), forbidding certain games, it may reasonably be concluded, that cards became popular in France between 1369 and the end of the century.

It does not follow that because the earliest positive mention of a series of cards is French, they were not previously known in other parts of Europe. It seems more likely, if their Eastern origin is accepted, that they travelled quickly through Europe to France. Early in the 15th century card-making had become a regular trade in Germany, whence cards were sent in small casks to other countries. Cards were also manufactured in Italy at least as early as 1425, and in England before 1463; for by an Act of Parliament of 3 Edw. IV. the importation of playing cards is forbidden, in consequence, it is said, of the complaints of manufacturers that importation obstructed their business. No cards of undoubted English manufacture have been discovered of so early a date; and there is reason to believe, notwithstanding the Act of Edward IV., that our chief supplies came from France or the Netherlands. In the reign of Elizabeth the importation of cards was a monopoly; but from the time of James I. most of the cards used in this country were of home manufacture. In the reign of James I. a duty was first levied on cards; since when they have always been taxed.

It has been much disputed whether the earliest cards were printed from wood blocks. This is a question of some importance, as, if answered in the affirmative, it would appear that the art of wood engraving, which led to that of printing, may have been developed through the demand for the multiplication of implements of play. The belief that the early card-makers or card-painters of Ulm, Nuremberg, and Angsburg, from about 1418–1450, were also wood-engravers, is founded on the assumption that the cards of that period were printed from wood-blocks. It is, however, clear that the earliest cards were executed by hand, like those designed for Charles VI. Many of the earliest woodcuts were colored by means of a stencil, so it would seem that at the time wood-engraving was first introduced, the art of depicting and coloring figures by means of stencil plates was well known. There are no playing cards engraved on wood to which so early a date as 1423 (that of the earliest dated wood-engraving generally accepted) can be fairly assigned; and as at this period there were professional card-makers established in Germany, it is probable that wood-engraving was employed to produce cuts for sacred subjects before it was applied to cards, and that here were hand-painted and stencilled cards before there were wood-engravings of saints. The German *Briefmaler* or card-painter probably progressed into the wood-engraver; but there is no proof that the earliest wood-engravers were the card-makers.

It is undecided whether the earliest cards were of the kind now common, called *numeral* cards, or whether they were *tarocchi* or *tarots*, which are still used in some parts of France, Germany, and Italy, but the probability is that the tarots were the earlier. A pack of tarots consists of seventy-eight cards, four suits of numeral cards and twenty-two emblematic cards, called *atutti* or *atouts*. Each suit consists of fourteen cards, ten of which are the pip cards, and four court (or more properly *coat* cards), viz., king, queen, chevalier, and valet. The atouts are numbered from 1 to 21; the unnumbered card, called the *fou*, has no positive value, but augments that of the other atouts. (See *Académie des Jeux*, Corbet, Paris, 1814, for an account of the mode of playing tarocchino or tarots.)

The marks of the suits on the earliest cards (German) are hearts, bells, leaves, and acorns. No ace has been discovered corresponding to the earliest known pack, but other packs of about the same date have aces, and it seems unlikely that the suits commenced with the deuces.

Next in antiquity to the marks mentioned are swords, batons, cups, and money. These are the most common on Italian cards of the late 15th century, and are now used both in Italy and in Spain. French cards of the 16th century bear the marks now generally used in France and England, viz., cœur, trèfle, pique, and carreau.

The French trèfle, though so named from its resemblance to the trefoil leaf, was in all probability copied from the acorn; and the pique similarly from the leaf (grün) of the German suits, while its name is derived from the sword of the Italian suits. It is not derived from its resemblance to a pike head, as commonly supposed. In England the French marks are used, and are named—hearts, clubs (corresponding to trèfle, the French symbol being joined to the Italian name, bastoni), spades (corresponding to the French pique, but having the Italian name, spade [dissyl.]), and diamonds. This confusion of names and symbols is accounted for by Chatto thus: "If cards were actually known in Italy and Spain in the latter part of the 14th century, it is not unlikely that the game was introduced into this country by some of the English soldiers who had served, under the banners of Hawkwood and other free captains, in the wars of Italy and Spain. However this may be, it seems certain that the earliest cards commonly used in this country were of the same kind, with respect to the marks of the suits, as those used in Italy and Spain.

About the last quarter of the 15th century, packs with animals, flowers, and human figures, for marks of the suits, were engraved upon copper; and later, numerous variations appeared, dictated by the caprice of individual cardmakers; but they never came into general use.

The court cards of the early packs were king, chevalier, and knave. The Italians were probably the first to substitute a queen for the chevalier, who in French cards is altogether superseded by the queen. The court cards of French packs received fanciful names, which varied from time to time.

Abbé Rive, *Éclaircissements sur l'Invention des Cartes à jouer*, Paris, 1780; J. G. I. Breitkopf, *Versuch den Ursprung der Spielkarten zu erforchen*, Leipsic, 1784; Samuel Weller Singer, *Researches into the History of Playing Cards, with Illustrations of the Origin of Printing and Engraving on Wood*, London, 1816; G. Peignot, *Analyse Critique et raisonnée de toutes les Recherches publiées jusqu'à ce jour, sur l'Origine des Cartes à jouer*, Dijon, 1826; M. C. Leber, *Etudes historiques sur les Cartes à jouer, principalement sur les Cartes Françaises*, Paris, 1842; William Andrew Chatto, *Facts and Speculations on the Origin and History of Playing Cards*, London, 1848; P. Boiteau D'Ambly, *Les Cartes à jouer et la Cartomancie*, Paris, 1854, translated into English with additions under the title of *The History of Playing Cards, with Anecdotes of their use in Conjuring, Fortune-telling, and Card-sharping*, edited by the Rev. E. S. Taylor, B.A., London, 1865; W. Hughes Willshire, M.D., *A Descriptive Catalogue of Playing and other Cards in the British Museum*, printed by order of the Trustees, London, 1876. (H. J.)

CARDUCCI, Bartolommeo (1560–1610), better known as Carducho, the Spanish corruption of his Italian patronymic, was born in Florence, where he studied architecture and sculpture under Ammanati, and painting under Zucchero. The latter master he accompanied to Madrid, where he painted the ceiling of the Escorial Library, assisting also in the production of the frescoes that adorn the cloisters of that famous palace. He was a great favorite with Philip III., and lived and died in Spain, where most of his works are to be found. The most celebrated of them is a Descent from the Cross, in the church of San Felipe el Real, in Madrid.

CARDUCCI, or Carducho, Vincenzo (1568–1638), was born in Florence, and was trained as a painter by his brother Bartolommeo, whom he followed to Madrid. He worked a great deal for Philip III. and Philip IV., and his best pictures are those he executed for the former monarch as decorations in the Pardo Gallery. Examples of him are preserved at Toledo, at Valladolid, at Segovia, and at several other Spanish cities. For many years he labored in Madrid as a teacher of his art, and from his *atelier* issued Giovanni Ricci, Pedro Obregon, Vela, Collantes, and other distinguished representatives of the Spanish school during the 17th century. He was also author of a treatise, or dialogue, *De las Excelencias de la Pintura*, which was published in 1633.

CARDWELL, Edward (1787–1861), a learned divine and ecclesiastical historian, was born at Blackburn in Lancashire in 1787. He was educated at Brasenose College, Oxford, where, in 1809, he took his degree of B.A. as first class in classics and second class in mathematics, and became a fellow of his college. He took his master's degree in 1812. After being for several years engaged as tutor and lecturer he was appointed, in 1814, one of the examiners to the university. In 1826 he was chosen Camden Professor of Ancient History; and during his five years' professorship he published an edition of the *Ethics* of Aristotle with selected notes for the use of students, and a course of his lectures on *The Coinage of the Greeks and Romans*. In 1831 he took his degree of D.D., and was called to the post of principal of St. Alban's Hall, which he held till his death. He published in 1837 a student's edition of the Greek Testament, with the text divided into paragraphs, and furnished with various readings and notes, and accompanied page for page by the English authorized version. In the same year appeared his edition of the Greek and Latin texts of the *History of the Jewish War*, by Josephus, with illustrative notes. But his most important labors were in the field of English Church History. He projected an extensive work, which was to embrace the entire synodical history of the church in England, and was to be founded on Wilkins's *Concilia*. Of this work he executed some portions only. The first published of these was *Documentary Annals of the Reformed Church of England from* 1546 *to* 1716, which appeared in 1839 and soon reached a second edition. It was followed by a *History of Conferences, &c., connected with the Revision of the Book of Common Prayer from* 1550 *to* 1690 (1840), which reached a third edition within ten years. In 1848 appeared *Synodalia, a Collection of Articles of Religion, Canons, and Proceedings of Convocation from* 1547 *to* 1717, completing the series for that period. Closely connected with these works is the *Reformatio Legum Ecclesiasticarum* (1850), which treats of the changes proposed and attempted in the direction of reform during the reigns of Henry VIII., Edward VI., and Elizabeth. As a supplement to the foregoing, Dr. Cardwell published in 1854 a new edition of Bishop Gibson's *Synodus Anglicana*. Dr. Cardwell, as one of the best men of business in the university, held various important posts, among which were those of delegate of the press, curator of the university galleries, manager of the Bible department of the press, and private secretary to successive chancellors of the university. He died at Oxford, 23d May, 1861.

CAREW, George (died about 1613), second son of Sir Wymond Carew of Antony, was educated at Oxford, entered the Inns of Court, and passed some years in Continental travel. At the recommendation of Queen Elizabeth, who conferred on him the honor of knighthood, he was appointed secretary to Sir Christopher Hatton, and afterwards, having been promoted to a mastership in chancery, was sent as ambassador to the king of Poland. In the reign of James he was employed in negotiating the treaty of union with Scotland, and for several years was ambassador to the Court of France. On his return he wrote a *Relation of the State of France*, with sketches of the leading persons at the court of Henry IV. It is written in the classical style of the Elizabethan age, and was appended by Dr. Birch to his *Historical View of the Negotiations between the Courts of England, France, and Brussels, from* 1592 *to* 1617. Much of the information regarding Poland contained in De Thou's *History of His Own Times* was furnished by Carew.

CAREW, George (1557–1629), Earl of Totness, and Baron Carew of Clopton, Warwickshire, was born in 1557. After completing his studies at Oxford, he joined the army, and held an important command in the Irish wars against the Earl of Desmond and the rebels. He was successively appointed governor of Askeaton castle, lieutenant-general of artillery, and, after the successful expedition to Cadiz (1596), lord-president of Munster, treasurer to the army, and ultimately one of the lords judges of Ireland. When he entered on his duties, the whole country was in open rebellion; but by a prudent and vigorous policy, backed by his own intrepidity in the field, he soon reduced the rebels to submission. His greatest exploit was the capture of Dunboy castle, a success which disappointed the Spanish allies, and in reality put an end to the war. For his services in Ireland he was made governor of Guernsey, and was raised to the peerage. He was afterwards made privy-

councillor to James I., and died at London in 1629. Carew wrote an account of the wars in Ireland in a book called *Hibernia Pacata*, published after his death; and made several collections for the history of Henry V., which were afterwards digested into Speed's *History of Great Britain*. Some of his letters have been printed by the Camden Society, 1860.

CAREW, Richard (1555–1620), author of the *Survey of Cornwall*, was born in 1555. At an early age he became a distinguished student of Christ Church, Oxford, and when only fourteen was chosen to dispute extemporaneously with Sir Philip Sidney, in presence of the earls of Leicester and Warwick and other noblemen. From Oxford he removed to the Middle Temple, where he spent three years, and then went abroad. On his return he was appointed sheriff of Cornwall, and published his *Survey* of the county, a work which enjoyed a high reputation, and has been several times reprinted. His other works are entitled—*The Examination of Men's Wits*, a translation from the Italian, part of which is said to have been executed by his father; *The True and Ready Way to learn the Latin Tongue*, a tract included in Hartlib's book on the same subject; and *A Translation of the first Five Cantos of Tasso's Gerusalemme*. He died in 1620.

CAREW, Thomas (1589–1639), an English poet, was born about the year 1589. He studied at Oxford, and on the completion of his course was made gentleman of the privy chamber to Charles I. At court he was highly esteemed for the vivacity of his wit and the elegance of his manners; and his poetical tastes gained him the friendship of Ben Jonson, Sir William Davenant, and other celebrated literary men. He wrote several sonnets, amorous pieces, and masques, which were set to music by Henry Lawes and other eminent masters. Most of his smaller pieces are distinguished by peculiar sweetness and gracefulness, by light gayety, and by felicitous expression. They are generally occasional poems, *vers de société*, addressed to ladies, and are sometimes exquisite of their kind. His longest and best known work is a masque called *Cœlum Britannicum*, performed by the king and several of the nobles at Whitehall on Shrove Tuesday, 1633. Parts in this masque were taken by Lord Brackley and his brother, who acted in the following year in Milton's *Comus*. The *Cœlum* is founded on the *Spaccio della Bestia* of Bruno (*q.v.*), and is a work of very considerable poetic merit. Some of the introductory verses remind strongly of Milton. Carew died in the prime of life about the year 1639. The best edition of his works is that of W. C. Hazlitt.

CAREY, Henry (died 1743), a humorous poet and musical composer, was an illegitimate son of George Savile, Marquis of Halifax, and was born towards the end of the 17th century. He studied music under Lennert, Roseingrave, and Geminiani, but never attained to excellence in the higher departments of composition. His ballads and songs, however, were exceedingly popular at the time. He wrote several dramatic pieces for Covent Garden theatre, among which may be mentioned a burlesque tragedy called *Chrononhotonthologos* (1734); an operetta called the *Honest Yorkshireman;* two interludes, called *Nancy* and *Thomas and Sally;* and two burlesque operas, called *The Dragon of Wantley* (1737) and *Margery, or the Dragoness*. His songs were collected and published by himself in a work called *The Musical Century* (1740); and one of them, *Sally in our Alley*, the most graceful and natural of English lyrics, is yet popular. His dramatic works were published in 1743. Carey died at an advanced age the same year. It has often been said that he put an end to his own life, but the story had no good foundation.

CAREY, William, D.D. (1761–1834), a Baptist missionary and Oriental scholar, was born at Paulerspury, Northamptonshire, in 1761. When a youth he worked with his father, who was a shoemaker; but before he was twenty years of age he joined the Baptists, and devoted a large portion of his time to village preaching. In 1787 he became pastor of a Baptist congregation in Leicester, and five years after was chosen by a Baptist missionary association to proceed to India as their missionary. On reaching Bengal, Carey and his companions lost all their property in the Hugli; but having received the charge of an indigo factory at Malda, he was soon able to prosecute the work of translating the Bible into Bengali. In 1799 he quitted Malda for Serampore, where he established a church, a school, and a printing press for the publication of the Scriptures and philological works. In 1801 Carey was appointed professor of Oriental languages in a college founded at Fort-William by the Marquis of Wellesley. From this time to his death he devoted himself to the preparation of numerous philological works, consisting of grammars and dictionaries in the Mahratta, Sanskrit, Punjabi, Telinga, Bengali, and Bhotanta dialects. The Sanskrit dictionary was unfortunately destroyed by a fire which broke out in the printing establishment. From the Serampore press there issued no fewer than twenty-four different translations of the Scriptures, all edited by Dr. Carey. He died in 1834.

CARGILL, Donald (1610–1681), one of the leaders of the Covenanters, was born in 1610. He was educated at St. Andrews, and afterwards attached himself to the Protesters. After his appointment to one of the churches in Glasgow, he made himself obnoxious to Government by his open resistance to their measures. Compelled to remain at a distance from his charge, he ventured back to celebrate the communion, and was arrested, but was liberated at the instance of some of his private friends. He was afterwards wounded at the battle of Bothwell Bridge, and fled to Holland, where he remained a few months. On his return he joined Richard Cameron in publishing the Sanquhar declaration, and boldly excommunicated the king and his officials. He was soon afterwards apprehended, and brought to Edinburgh, where he was beheaded on the 27th July, 1681.

CARIA, a maritime province of Asia Minor, forming the south-western angle of the whole peninsula. It was bounded on the N. by Ionia and Lydia, on the W. and S. by the Ægean Sea, and on the E. by Lycia and a small part of Phrygia. Its limit to the north was the river Mæander, except near the mouth, where its cities of Miletus and Myus, with their territories, though on the south side of the Mæander, were included in Ionia. Its precise eastern limit is not so clearly fixed, but may be considered as an arbitrary line drawn from the Mæander a little east of Antiochia to the lofty mountain mass of Mount Cadmus (Baba-dagh), and thence along the great ridge of Salbacum (Boz-dagh) in a direction nearly south to the sea, where the promontory on the west of the Gulf of Macri constitutes the limit between it and Lycia. The coast-line of Caria is very peculiar, being wholly formed by a succession of great promontories advancing far out into the sea, and alternating with deep inlets or gulfs, running far up into the mainland. The largest and most important of these, known as the Ceramic Gulf or Gulf of Cos, extends inland for fully 70 miles, between the great mountain promontory terminating at Myndus on the north, and that which extends to Cnidus and the remarkable headland of Cape Krio on the south. North of this is found the deep bay called in ancient times the Gulf of Jasus (now known as the Gulf of Mendeliyah), and beyond this again was the deeper inlet which formerly extended inland between Miletus and Priene, but of which the outer part has been entirely filled up by the alluvial deposits of the Mæander, while the innermost arm, called in ancient times the Latmic Gulf, is thus converted into a lake. South of Cape Krio again is the gulf known as the Gulf of Doris, with several minor arms and subordinate inlets, bounded on the south by a mountainous and rugged promontory called by the ancients Cynossema (now Cape Alupo) and erroneously regarded by them as forming the S.W. angle of Asia Minor. Between this headland and the frontier of Lycia is the deep and sheltered bay of Marmarice, noted in modern times as one of the finest harbors in the Mediterranean.

Almost the whole of Caria has more or less of a mountain character. The two great mountain masses of Cadmus (Baba-dagh) and Salbacum (Boz-dagh), which are in fact portions of the great chain of Taurus (see Asia Minor), form as it were the nucleus to which the whole physical framework of the country is attached. From these lofty ranges there extends a broad table-land in many parts retaining a height of more than 3000 feet, while it sends down offshoots or arms of a rugged and mountainous character, on the north towards the valley of the Mæander, and on the west towards the Ægean. None of these ranges, however, attain a height of more than 4000 feet, with the exception of Mount Latmus, of which the highest summit, now known as Besh Parmak, rises to about 4500 feet.

This deeply indented coast is accompanied, as in most similar cases, by numerous islands, in some instances separated only by narrow straits from the mainland. Of these the most celebrated are the two great islands of Rhodes and Cos. But besides these there are Syme, Telos, Nisyros, Calymnos, Leros, and Patmos, all of which have been inhabited, both in ancient and modern times, and some of which contain excellent harbors. Of these Nisyros alone is of volcanic origin; the others belong to the same limestone formation with the rocky headlands of the coast, of which they are in fact mere detached portions.

Like most of the provinces of Asia Minor, Caria was not merely a territorial division, but an ethnographical district, and the Carians are spoken of by all ancient writers as a distinct nation from their neighbors, the Lydians, Phrygians, and Lycians. But their origin and early history is very uncertain. According to a tradition generally adopted by the Greeks, they were originally called Leleges, and inhabited the islands of the Ægean, where they were subject to Minos, king of Crete, and formed the strength of his navy; and it was not till they were driven out of the islands by the Greeks that they settled on the mainland. It is much more probable that they were originally established on the continent, and from thence extended their power over the islands of the Ægean. That they were in very early times a powerful and warlike people, distinguished for their maritime skill and enterprise, may be considered as clearly proved, and was indeed a natural result of the peculiar configuration of their coasts. But at the period when we first obtain definite historical information concerning them, they had not only been expelled from the Cyclades and outlying islands of the Ægean, but had been driven back into the interior, from the coasts and islands of their own country, which had been occupied by Greeks of Dorian race, who had formed a Hexapolis or league of six cities, including three on the island of Rhodes, together with Cos, and Cnidus and Halicarnassus on the mainland. Besides these principal settlements the Greeks gradually colonized the whole of the coast region, which was hence sometimes designated by the name of Doris. But the Carians always maintained themselves in the interior of the country, and continued to be recognized as a distinct race, like the Lydians and Phrygians. Some writers indeed are inclined to believe that the people called Zeybeks or Xebeks, who occupy the inland mountain districts of Caria, and are distinguished from their neighbors by certain peculiarities, are lineal descendants of the ancient Carians.

Caria passed with little resistance under the Persian yoke, but afterwards joined in the Ionic revolt, and fought hard against the Persian generals before it again submitted. From this time till its conquest by Alexander, it continued to be subject to Persia, but under princes or rulers of its own, who resided at Halicarnassus, and were strongly imbued with the principles of Greek civilization (see HALICARNASSUS). The last of these native princes was named Pixodarus, and after his death the throne was usurped by a Persian named Orontobates, who offered a vigorous resistance to Alexander the Great. But after the capture of the capital, Halicarnassus, which sustained a long siege, the rest of Caria was quickly subdued. Alexander at first bestowed it upon Ada, a princess of the native dynasty, but it was soon incorporated with the Macedonian kingdom by his successors, and in common with the adjoining districts of Asia Minor passed successively under the Syrian kings and those of Pergamus. It was united with the Roman empire after the extinction of the latter dynasty, and became a part of the Roman province of Asia. From this period it has no separate history of its own, and in common with the rest of Asia Minor became a part of the monarchy, first of the Seljukian and afterwards of the Ottoman Turks.

The principal cities of Caria in ancient times were Cnidus and Halicarnassus on the sea-coast, and Alabanda, Mylasa, and Stratonicea in the interior. At the present day, Budrum, which occupies the site of Halicarnassus, is still a place of some importance; while the two most considerable towns in the interior are Melassa (the ancient Mylasa) and Mughla, in the centre of the high inland plateau. The portions of the province adjoining the valley of the Mæander are fertile, and produce excellent figs and raisins; while the mountains near the sea-coast are for the most part clothed with forests, which render the scenery of the district among the most beautiful in Asia Minor. (E. H. B.)

CARIACO, or SAN FELIPE DE AUSTRIA, a town on the north coast of Venezuela, in the state of Cumana, situated at the east end of the gulf to which it gives its name, in 10° 27′ 45″ N. lat. and 63° 13′ 21″ W. long. The surrounding district produces cotton of the finest quality. Population about 7000.

CARIBBEAN SEA, that part of the Atlantic Ocean lying between the coasts of Central and South America and the islands of Cuba, Hayti, and Porto Rico, and the Leeward and Windward Islands.

CARIBBEE ISLANDS, in its more extended sense, is a name applied to the whole of the West Indies; but strictly, it only comprehends that cluster of islands stretching from Porto Rico to the coast of South America, and known as the Leeward and Windward Islands. See WEST INDIES.

CARIBS (in German *Karaiben*), a people of Red Indian race, which, at the time of the discovery of America by Columbus, was the most important along the northern coast of the southern continent, and in a number of the islands of what is still known as the Caribbean Sea. They were a strongly built, warlike, and aggressive people, and offered a pertinacious resistance to the advances of the Europeans, before whose arrival they had rendered themselves an object of terror to the other inhabitants of the region. They appear to have been addicted to cannibalism, and the very word cannibal is not improbably derived from a corruption of their name. From the islands they have for the most part disappeared, and their principal settlement is now in the republic of Honduras, where they form a very industrious and prosperous part of the population, while still retaining their original language and many of their peculiar customs. They are to be found principally in the district between the Paitook river and the Belize. Their immigration into Honduras dates only from about 1796, when the English, weary of the continual disturbances which they occasioned, transported them in a body from Dominica and St. Vincent to the island of Ruotan. In these islands they divided into two great tribes, known as the Red and the Black Caribs, of whom the former were the pure descendants of the ancient stock, while the latter were largely intermingled with Negro blood. To the same race probably belong the Galibi in French Guiana, the Yaoi in Venezuela, the Cumanagotto, the Pariagotto, and various other tribes of the continent.

CARICATURE (Italian *caricatura, i.e.*, "*ritratto ridicolo*," from *caricare*, to load, to charge; French *charge*) may be defined as the art of applying the grotesque to the purposes of satire. The word "caricatura" was first used as English by Sir Thomas Browne (1605–1682), in his *Christian Morals*, a posthumous work; it is next found, still in its Italian form, in No. 537 of the *Spectator;* it was adopted by Johnson in his Dictionary (1757), and only assumed its modern guise toward the end of the 18th century, when its use and comprehension became general.

Little that is not conjectural can be written concerning caricature among the ancients. Few traces of the comic are discoverable in Egyptian art,—three papyri only of a satirical tendency being known to exist, and these appearing to belong rather to the class of ithyphallic drolleries than to that of the ironical grotesque. Among the Greeks, though but few and dubious data are extant, it seems possible that caricature may not have been altogether unknown. Their taste for pictorial parody, indeed, has been sufficiently proved by plentiful discoveries of pottery painted with burlesque subjects. Aristotle, moreover, who disapproved of the grotesque in art, condemns in strong terms the pictures of a certain Pauson, who, alluded to by Aristophanes, and the subject of one of Lucian's anecdotes, is hailed by M. Champfleury as the *doyen* of caricaturists. That the grotesque in plastic art was practised by the Romans is evident from the curious frescoes unearthed at Pompeii and Herculaneum; from the mention in Pliny of certain painters celebrated for burlesque pictures; from the curious fantasies graven in gems and called Grylli; and from the number of ithyphallic caprices that have descended to modern times. But in spite of these evidences of Greek and Roman humor, in spite of the famous comic statuettes of Caracalla, and of the more famous *graffito* of the Crucifixion, the caricaturists of the old world must be sought for, not among its painters and sculptors, but

among its poets and dramatists. The comedies of Aristophanes and the epigrams of Martial were, to the Athens of Pericles and the Rome of Domitian, what the etchings of Gillray and the lithographs of Daumier were to the London of George III. and the Paris of the Citizen King.

During the long dusk of the Middle Ages a vast mass of material was accumulated for the study of the grotesque, but selection becomes even more difficult than with the scarce relics of antiquity. With the building of the cathedrals originated a new style of art; a strange mixture of memories of paganism and Christian imaginings was called into being for the adornment of those great strongholds of urban Catholicism, and in this the coarse and brutal materialism of the popular humor found its largest and freest expression. On missal-marge and sign-board, on stall and entablature, in gurgoyle and initial, the grotesque displayed itself in an infinite variety of forms. Often obscene and horrible, often quaint and fantastic, it is difficult, if not absolutely impossible, to determine the import of this inextricable tangle of imagery. It has been pretended that it constituted an immense network of symbolism, in which the truths of the Church were set forth in forms intelligible to the popular mind. A second interpretation is that it is merely the result of the decorative artist's caprice. A third school has sought to discover in much of it the evidences of the struggle for supremacy between the secular clergy and the friars. Leaving all this on one side, however, until the application to archæology of the comparative method shall have made the matter somewhat clearer, it will be sufficient in this place to remark the prevalence of three great popular types or figures, each of which may be credited with a satirical intention,—of Reynard the Fox, the hero of the famous mediæval romance; of the Devil, that peculiarly mediæval antithesis of God; and of Death, the sarcastic and irreverent skeleton. The popularity of the last is evidenced by the fact that no less than forty-three towns in England, France, and Germany are enumerated as possessing sets of the Dance of Death, that grandiose all-leveling series of caprices in the contemplation of which the Middle Ages found so much consolation. It was reserved for Holbein (1497–1554), seizing the idea and resuming all that his contemporaries thought and felt on the subject, to produce, in his fifty-three magnificent etchings of the Danse Macabre, the first, and perhaps the greatest, set of satirical moralities known to the modern world.

It is in the tumult of the Renaissance, indeed, that caricature in its modern sense may be said to have been born. The great popular movements required some such vehicle of comment or censure; the perfection to which the arts of design were attaining supplied the means; the invention of printing ensured its dissemination. The earliest genuine piece of pictorial irony that has been discovered is a caricature (1499) relating to Louis XII. and his Italian War. But it was the Reformation that produced the first full crop of satirical ephemeræ, and the heads of Luther and Alexander VI. are therefore the direct ancestors of the masks that smirk and frown from the "cartoons" of *Punch* and the *Charivari*. Fairly started by Lucas Cranach, a friend of Luther, in his *Passionale of Christ and Antichrist* (1521), caricature was naturalized in France under the League, but only to pass into the hands of the Dutch, who supplied the rest of Europe with more or less satirical prints during the whole of the next century. A curious reaction is visible in the work of Peter Breughel (1510–1570) towards the grotesque *diablerie* and macabresque morality of mediæval art, the last original and striking note of which is caught in the compositions of Jacques Callot (1593–1635), and, in a less degree, in those of his followers, Stefano della Bella (1610–1664) and Salvator Rosa (1615–1673). On the other hand, however, Callot, one of the greatest masters of the grotesque that ever lived, in certain of his *Caprices*, and in his two famous sets of prints, the *Misères de la guerre*, may be said to anticipate certain productions of Hogarth and Goya, and so to have founded the school of ironical *genre* which now-a-days does duty for caricature.

In England, during the 16th century, caricature can hardly be said to have existed at all,—a grotesque of Mary Stuart as a mermaid, a pen and ink sketch of which is yet to be seen in the Rolls Office, being the only example of it known. The Great Rebellion, however, acted as the Reformation had done in Germany, and Cavaliers and Roundheads caricatured each other freely. At this period satirical pictures usually did duty as the title pages of sourrilous pamphlets; but one instance is known of the employment during the war of a grotesque allegory as a banner, while the end of the Commonwealth produced a satirical pack of playing cards, probably of Dutch origin. The Dutch, indeed, as already has been stated, were the great purveyors of pictorial satire at this time and during the early part of the next century. In England the wit of the victorious party was rather vocal than pictorial; in France the spirit of caricature was sternly repressed; and it was from Holland, bold in its republican freedom, and rich in painters and etchers, that issued the flood of prints and medals which illustrate, through cumbrous allegories and elaborate symbolization, the principal political passages of both the former countries, from the Restoration (1660) to the South Sea Bubble (1720). The most distinguished of the Dutch artists was Romain de Hooghe (1638–1720), a follower of Callot, who, without any of the weird power of his master, possessed a certain skill in grouping and faculty of grotesque suggestiveness that made his point a most useful weapon to William of Orange during the long struggle with Louis XIV.

The 18th century, however, may be called emphatically the Age of Caricature. The spirit is evident in letters as in art; in the fierce grotesques of Swift, in the coarser *charges* of Smollett, in the keen ironies of Henry Fielding, in the Aristophanic tendency of Foote's farces, no less than in the masterly moralities of Hogarth and the truculent satires of Gillray. The first event that called forth caricatures in any number was the prosecution (1710) of Dr. Sacheverell; most of these, however, were importations from Holland, and only in the excitement attendant on the South Sea Bubble, some ten years later, can the English school be said to have begun. Starting into active being with the ministry of Walpole (1721), it flourished under that statesman for some twenty years,—the "hieroglyphics," as its prints were named, graphically enough, often circulating on fans. It continued to increase in importance and audacity till the reign of Pitt (1757–1761), when its activity was somewhat abated. It rose, however, to a greater height than ever during the rule of Bute (1761–1763), and since that time its influence has extended without a single check. The artists whose combinations amused the public during this earlier period are, with few exceptions, but little known, and not greatly esteemed. Among them were two amateurs, the countess of Burlington and General Townshend; Goupy, Boitard, and Liotard were Frenchmen; Vandergucht and Vanderbank were Dutchmen. But it must not be forgotten that this period witnessed also the rise of William Hogarth (1697–1764). As a political caricaturist this great man was not successful, save in a few isolated examples, as in the portraits of Wilkes and Churchill; but as a moralist and social satirist he has not yet been equalled. The publication, in 1732, of his *Modern Midnight Conversation* may be said to mark an epoch in the history of caricature. Mention must also be made of Paul Sandby (1725–1809), who was not a professional caricaturist, though he joined in the pictorial hue-and-cry against Hogarth and Lord Bute, and who is best remembered as the founder of the English school of water-color; and of John Collet (1723–1788), said to have been a pupil of Hogarth, a kindly and industrious humorist, rarely venturing into the arena of politics. During the latter half of the century, however, political caricature began to be somewhat more skilfully handled than of old by James Sayer, a satirist in the pay of the younger Pitt, while social grotesques were pleasantly treated by Henry William Bunbury (1750–1811) and Woodward. These personalities, however, interesting as they are, are dwarfed into insignificance by the great figure of James Gillray (1757–1815), in whose hands political caricature became almost epic for grandeur of conception and far-reaching suggestiveness. It is to the works of this man of genius, indeed, and (in a less degree) to those of his contemporary, Thomas Rowlandson (1756–1827), an artist of great and varied powers, that historians must turn for the popular reflection of all the political notabilia of the end of the 18th and the beginning of the 19th centuries. England may be said to have been the chosen home of caricature during this period. In France, timid and futile under the monarchy, it had assumed an immense importance under the Revolution and a cloud of hideous

pictorial libels was the result; but even the Revolution left no such notes through its own artists, though Fragonard (1732–1806) himself was of the number, as came from the gravers of Gillray and Rowlandson. In Germany caricature did not exist. Only in Spain was there to be found an artist capable of entering into competition with the masters of the satirical grotesque of whom England could boast. The works of Francisco Goya y Lucientes (1746–1828) are described by Théophile Gautier as "a mixture of those of Rembrandt, Watteau, and the comical dreams of Rabelais," and Champfleury discovers analogies between him and Honoré Daumier, the greatest caricaturist of modern France.

The satirical grotesque of the 18th century had been characterized by a sort of grandiose brutality, by a certain vigorous obscenity, by a violence of expression and intention, that appear monstrous in these days of reserve and restraint, but that doubtless sorted well enough with the strong party feelings and fierce political passions of the age. After the downfall of Napoleon (1815), however, when strife was over, and men were weary and satisfied, a change in matter and manner came over the caricature of the period. In connection with this change the name of George Cruikshank (1792–1878), an artist who stretches hands on the one side towards Hogarth and Gillray, and on the other towards Leech and Tenniel, deserves honorable mention. Cruikshank's political caricatures, some of which were designed for the squibs of William Hone (1779–1842), are, comparatively speaking, uninteresting; his ambition was that of Hogarth—the production of "moral comedies." Much of his work, therefore, may be said to form a link in the chain of development through which has passed that ironical *genre* to which reference has already been made. In 1829, however, began to appear the famous series of lithographs, signed H. B., the work of John Doyle (1798–1868). These apt but feeble jocularities are interesting other than politically; thin and weakly as they are, they inaugurate the style of political caricature which obtains, with but few and slight variations, at the present date. In France, meanwhile, with the farcical designs of Pigal and the realistic sketches of Henri Monnier, the admirable portrait-busts of Dantan the younger, and the fine military and low-life drolleries of Charlet (1792–1845) were appearing, and in these modern social caricature may be said to be fairly embodied. Up to this date, though journalism and caricature had sometimes joined hands (as in the case of the *Craftsman* and the *Anti-jacobin*, and particularly in *Les Révolutions de France et de Brabant* and *Les Actes des Apôtres*), the alliance had been but brief; it was reserved for Charles Philipon (1802–1862), who may be called the father of comic journalism, to make it lasting. *La Caricature*, founded by Philipon in 1831, and suppressed in 1833 after a brief but glorious career, was followed by *Le Charivari*, which is perhaps the most renowned of the innumerable enterprises of this extraordinary man. Among the artists he assembled round him, the highest place is held by Honoré Daumier, a draughtsman of great skill, and a caricaturist of immense vigor and audacity. Another of Philipon's band was Sulpice Paul Chevalier (1801–1866), better known as Gavarni, in whose hands modern social caricature, advanced by Cruikshank and Charlet, assumed its present guise, and became elegant. Mention must also be made of Grandville (1803–1847), the illustrator of La Fontaine, and a modern patron of the mediæval skeleton; of Traviés, the father of the famous hunchback "Mayeux;" and of Amedée de Noé, or "Cham," the wittiest and most ephemeral of pictorial satirists. In 1840, the pleasantries of "H. B." having come to an end, there was founded, in imitation of this enterprise of Philipon, a comic journal which, under the title of *Punch, or the London Charivari*, has since become famous all over the world. Its earliest illustrators were John Leech (1817–1864) and Richard Doyle, whose drawings were full of the richest grotesque humor. It is in the pages of *Punch* that the growth of modern pictorial pleasantry may best be traced. Of late years all the "cartoons," or political caricatures, have been the work of John Tenniel; they exhibit few of the features of caricature as it was understood by Gillray and Daumier; their object is not to excite hatred or contempt, but at most to raise a smile. In social subjects, George Dumaurier, a fine draughtsman, though somewhat mannered and fond of a single type of face and figure, has carried the ironical *genre*, received by Leech from Gavarni and Charlet, to the highest point of elegance it has attained.

Of caricature, in the primitive sense of the word, there is but little. The fall of the French Empire and the subsequent siege of Paris, together with the reign of the Commune—a popular movement, though confined to a single city—produced a plentiful crop of genuine caricatures, remarkable both for bitterness and for ability. Among the few caricatures that now find favor may be mentioned the graceful and genial caprices of Sambourne, the clever portraits of "Gill," a Parisian artist, and especially the remarkable series of portraits published in London since 1862, in *Vanity Fair*, the work of Pellegrini, which are certainly the most remarkable of their kind that have appeared since the superb grotesques of Honoré Daumier.

See Grose, *Rules for Drawing Caricature, with an Essay on Comic Painting*, London, 1788, 8vo; Malcolm, *Historical Sketch of the Art of Caricaturing*, London, 1813, 4to; Wright, *History of Caricature and Grotesque in Literature and Art*, London, 1865; Jaime, *Musée de la Caricature;* Champfleury, *Histoire de la Caricature Antique*, Paris, 8vo; *Histoire de la Caricature Moderne*, Paris, 8vo; *Histoire de la Caricature au Moyen Âge*, 8vo; *Histoire de la Caricature sous la République, La Restauration, et l'Empire*, Paris, 8vo.

CARIES, ulceration of bone, is the result of inflammation, and resembles in its chief characteristics ulceration in soft tissues, as skin and muscle. Situated in a tissue largely composed of inorganic material, it is chronic in its course, and cured with difficulty. The exciting cause is generally an injury. It is frequently associated with scrofula. The cancellated tissue of bone is specially liable; the short bones of the hand and foot, the articular extremities of the long bones, and the bones forming the vertebral column are its chief seats. It is preceded by the formation of matter, and when this escapes, either by natural processes or by the assistance of the surgeon, the diseased bone can be felt by the aid of a probe, passed through the sinus or channel which leads to the carious bone. This sinus does not heal until the disease heals or is removed. The treatment generally adopted consists in removing the diseased bone by gouging or by excision. If the primary abscess is opened and dressed antiseptically for a lengthened period, the ulcerated bone often heals without further operation. This method of treatment is most valuable in cases of caries of the vertebral column, in which it would be impossible to remove the disease by gouging or excision.

CARIGNANO, a town of northern Italy, in the province of Turin, and about 20 miles south of that city, is situated on the left bank of the Po, here crossed by a wooden bridge. It is surrounded by old walls, and has a handsome church, built in 1766, according to the design of Alfieri, a communal college, and several convents. The population, numbering about 8000, is chiefly engaged in the spinning of silk and the manufacture of confectionery, the principal department in the latter industry being the preparation of the citron rind.

Carignano, known in the early part of the Middle Ages as Carnianum and Carganum, passed in 1418 into the hands of the counts of Savoy, who fortified it with rampart and ditch. In 1630 it was bestowed by Charles Emmanuel I. on his son Tommaso Francesco, who thus became known as prince of Carignano. The title continued in the possession of his family, until they were called to the throne in the person of Charles Albert. It was bestowed in 1834 on Eugene Emmanuel Joseph, who now holds the rank of admiral and commander-in-chief of the Italian National Guards.

CARIMATA ISLANDS, a group in the East Indian Archipelago, lying to the west of Borneo, between that island and Billiton, in the channel to which they give their name. They are about sixty in number, but their united area is not more than 170 square miles. The most important are Great Carimata (with a peak rising to about 2000 feet), Panumbangan, the Pelapis Islands, Lissing, Bessi, Maledang, Surutu, and Pulu Lima. Their principal productions are edible nests, honey, wax, gutta percha, turtles, trepang, and shellfish. At one time the cluster formed a small independent principality; but it afterwards became subject to Matan, and it is now attached to Pontianak. Several of the islands are altogether uninhabited, and the whole population is very small. See Veth's *Woordenboek van Nederl. Indië.*

CARINI a town in Sicily, in the province of Palermo,

on a rivulet of the same name, 12 miles W.N.W. of Palermo. It is pleasantly situated on an elevation, and is a neat, clean town, with a Gothic castle. On the coast, about three miles distant, are ruins of the ancient *Hyccara*, which was chiefly famous as the birthplace of Lais. Population about 9500.

CARINOLA, a town of Italy, in the province of Terra di Lavoro, a district of Gaeta, in 41° 11′ 16″ N. lat. and 13° 58′ 32″ E. long. It was formerly the see of a bishop, and is believed to occupy the site of the Lombard city of Foro Claudio, which was founded in 1058. Its principal buildings are the cathedral, the convents, and the seminary. Population, 7640.

CARINTHIA (in German, *Kärnten* or *Kärnthen*), a duchy, and since 1849 a crown-land of Austria, is bounded on the E. by Styria, on the N. by Styria and Salzburg, on the W. by Tyrol, and on the S. by Italy, Görtz, and Carniola. It has an area of 4006 English square miles, and the population in 1869 amounted to 336,400. The surface is for the most part mountainous, being occupied in the north by part of the Norian Alps, and in the south by those named the Carinthian Mountains, or the Karawanken. The principal river is the Drave, which flows from W. to E. through the length of the duchy, and receives in its course the waters of all the other streams, except the Fella, which reaches the Adriatic by junction with the Tagliamento. In its eastern half, the valley opens out into a considerable plain, which contains the important lakes of the Wörthersee and the Ossiachersee. According to official statistics, 337,246 acres of arable land were in cultivation in 1870; 280,581 acres were occupied by gardens and meadows, 593,040 by pasture, and 1,033,807 were under wood. In the same year there were in the duchy 22,979 horses, 232,791 head of cattle, 176,832 sheep, and 36,630 goats, while the bee-stocks amounted to 62,615. The mineral produce consisted of 145,940 tons of iron ore, 5047 of lead ore, 71,264 of coal, 4220 of zinc ore, and nearly 26 of graphite. The duchy is divided into the seven districts of Hermagor, Klagenfurt, Spittal, St. Veit, Villach, Völkermarkt, and Wolfsberg,—the capital Klagenfurt forming an independent and eighth division. There are in all ten towns, twenty-eight market villages, and 2911 hamlets,—the most populous places, besides the chief towns of the districts, being Bleiberg, Friesach, and Feldkirchen. With the exception of 19,000 Lutherans, the inhabitants are Roman Catholics; and more than two-thirds of them are of German race. The rest are of Slavonic origin, and for the most part occupy the districts conterminous with Carniola and Styria, though a considerable Slavonic enclave is situated in the heart of the German area between Malborget and Tarvis. German is used in 255 of the village schools, and Slavonic in 24, while both are employed in 70. The Carinthian diet consists, according to the law of 1861, of thirty-seven members, including, besides the bishop of Gurk, ten appointed by the landed proprietors, seven by the towns, fourteen by the rural communes, and three by the commercial authorities at Klagenfurt. Five members are sent to the imperial diet.

Carinthia is so called from the Carni, a Celtic people who have perhaps also left their name to the neighboring district of Carniola; and in the time of Augustus it formed part of Noricum. After the fall of the Roman empire, it was the nucleus of the kingdom of Carentania, which was founded by Samo, a Frankish adventurer, but soon fell to pieces after his death. Under Charlemagne it constituted a margravate, which in 843 passed into the hands of Louis the German, whose grandson Arnulf was the first to bear the title of Duke of Carinthia. The duchy was held by various families during the 11th, 12th, and 13th centuries, and at length in 1335 was bestowed by Louis the Bavarian on the Dukes of Austria. It was divided into Upper or Western Carinthia and Lower or Eastern; of these the former fell to France in 1809, but was reconquered in 1813, and joined in 1814 to the kingdom of Illyria. See AUSTRIA, vol. iii.

CARIPE, or CARIBE, a town of Venezuela, in the state of Cumana, and about 40 miles from the city of that name, in 10° 10′ 14″ N. lat. and 28° 33′ 54″ W. long. It is the chief station of the mission to the Chayma Indians, and is famous for the extensive system of caves in the limestone rock in the neighborhood, which have been described by Humboldt. These extend inwards a distance of 2800 feet, and have a height of 70 or 80 feet. They are frequented by a species of night hawk, which builds in the recesses of the rocks. The young are killed in great numbers for the sake of their oil. The population of the town and valley is estimated at 5000.

CARISBROOKE, a village in the Isle of Wight, about a mile S. of Newport, at the base of a steep conical hill crowned by the castle, to which its celebrity is principally due. It was at one time a considerable market-town, and under the independent lords of Wight it ranked as the capital of the island. The original fortress is supposed to have been built by the Saxons as early as the 6th century; and, indeed, according to the annals, it was besieged by Cerdic in 530. It was enlarged by William Fitzosborne, the first lord of Wight, in the 11th century, was captured by Stephen in 1136, and in the reign of Richard II. resisted an attack by the French. Further additions were made to it at different times, till, in the reign of Elizabeth, it reached its greatest dimensions, and comprised within its outer walls a space of 20 acres. The most interesting incident in its history is the captivity of Charles I., who took refuge with its governor, Colonel Hammond, in November, 1647, but soon found his asylum converted into a prison. After his execution his two youngest children were confined in the castle, and the princess Elizabeth died there. The remains are still extensive and imposing, but the king's apartments are in ruins. Within the walls is a well 200 feet deep; and another in the centre of the keep is reputed to have been still deeper. Opposite the castle-hill are the remains of a Cistercian priory founded in the 11th century, and the parish church, which boasts of even greater antiquity. The population of the parish in 1871 was 8198.

CARISSIMI, GIACOMO, one of the most celebrated masters of the Italian, or, more accurately, the Roman school of music. Of his life almost nothing is known, and Fétis, who has made his biography a subject of special study, has been able to do little more than correct inaccurate or fictitious statements of previous writers. The only authenticated facts are the following. Carissimi was born about 1604, at Marino, near Rome, and received his first musical education at home. At the age of 20 he became chapel-master at Assisi, and in 1628 he obtained the same position at the church of St. Apollinaris, belonging to the Collegium Germanicum in Rome, which he held till his death in 1674. He never seems to have left Italy, the rumor of his prolonged stay in Paris, mentioned by De Fresneux, being entirely unfounded. By his education he belonged to the old Roman school of music, but his compositions show little of the severe grandeur of the earlier masters. He marks indeed the turning-point from the traditions of the Renaissance period to the incipient aspirations of modern music, and for that reason his name is representative in the history of art. The two great achievements generally ascribed to him are the further development of the recitative, lately introduced by Monteverde, and of infinite importance in the history of dramatic music, and the invention of the cantata, a smaller form of the oratorio, by which Carissimi superseded the madrigals formerly in use. He also may claim the merit of having given greater variety and interest to the instrumental accompaniments of vocal compositions. Carissimi's numerous compositions consist of masses, cantatas, motets, and oratorios. The complete collection of his works, formerly said to have existed in the musical archives of the church of St. Apollinaris, has entirely disappeared. Several English musical scholars deserve honorable mention for having rescued Carissimi's works from oblivion. Dr. Burney and Hawkins have published specimens of his compositions in their works on the history of music; and Dr. Aldrich collected an almost complete set of his compositions, at present in the library of Christ Church, Oxford. The British Museum also possesses numerous valuable works by this great Italian master.

CARLETON, SIR DUDLEY (1573–1651), an English statesman, was born in Oxfordshire in 1573, and educated at Christ Church College, Oxford. He went in a diplomatic capacity to the Low Countries when King James resigned the cautionary towns to the States; and he was afterwards employed for twenty-nine years as ambassador to Venice, Savoy, and the United Provinces. Charles I. created him Viscount Dorchester, and appointed him one of his principal secretaries of state, an office which he held till his death in 1651. He published several works, consisting chiefly of speeches, letters, and other productions on political subjects. The most valuable appeared after his death, and consist of a selection of letters to and from Sir

Dudley Carleton during his embassy to Holland, from January, 1616, to December, 1620, 4to, 1757. A careful pedigree of the Carleton family will be found in the preface to *Chamberlaine's Letters*, Camden Society, 1861.

CARLETON, William (1798–1869), a popular Irish novelist, was born at Prillisk, Clogher, in the county of Tyrone. His father was a peasant tenant, and young Carleton passed his early life among scenes precisely similar to those he afterwards delineated with so much power and truthfulness. His parents, though of humble rank, were highly endowed by nature. The father was remarkable for his extraordinary memory, which was well stored with anecdote and tale; the mother was noted throughout the district for the rich sweetness of her voice. Both possessed in a high degree those domestic virtues so frequently found among the humbler classes of the Irish people. The beautiful character of Honor, the miser's wife in *Fardarougha*, is evidently sketched from the life by the loving hand of a son.

The education received by Carleton was of a very humble description. As his father removed from one small farm to another, he attended at various places the hedge-schools, which used to be a notable feature of Irish life. The admirable little picture of one of these schools in the *Traits and Stories* bears every mark of having been drawn from real experience. A smattering of some higher learning was picked up here and there as opportunity offered, and at the age of seventeen Carleton resolved to prosecute his education as a poor scholar. The resolution was not carried into effect; he remained at home, preparing to enter upon the training for the priesthood, and receiving the unbounded veneration of the neighboring peasantry for his supposed wonderful learning. An amusing account of this phase of his existence is given in the little sketch *Denis O'Shaughnessy*. When about the age of nineteen he undertook one of the religious pilgrimages then common in Ireland. His experiences as a pilgrim were such as at a later period made him resign for ever the thought of entering the church. His vacillating ideas as to a mode of life were determined in a definite direction by the reading of *Gil Blas*, which chance had thrown in his way. He resolved to cast himself boldly upon the world, and try what fortune had in store for him. He went to Killanny, and for six months acted as tutor in a neighboring farmer's family. Soon tiring of his occupation, he set out for Dublin, and arrived in the metropolis with 2s. 9d. in his pocket. He began to contribute to the journals, and his paper "The Lough Derg Pilgrim," which was published in the *Christian Examiner*, excited great attention. In 1830 appeared the first series of *Traits and Stories of the Irish Peasantry*, which at once placed the author in the first rank of Irish novelists. A second series appeared in 1832, and was received with equal favor both in Ireland and in England. From that time till within a few years of his death Carleton's literary activity was incessant. The best of his many productions are *Fardarougha the Miser*, perhaps on the whole the finest and most powerful of all his works; *The Tithe Proctor; Valentine M'Clutchy; The Black Prophet; The Emigrants of Ahadarra*. Some of his later writings, such as *The Squanders of Castle Squander*, were not so successful as the earlier tales. The author was not happy in describing the upper classes of Irish society, and overloaded his work with political or semi-political matter.

Carleton is *facile princeps* among Irish novelists, and it is to his pages that one must look for an adequate picture of the peculiar Irish character. His style is clear, graphic, and pleasing; the plots of his stories are generally slight but well constructed. In his pictures of peasant life he is unsurpassed; the lights and shades of Irish character, the buoyant humor and domestic virtues that under other conditions would lead their possessors to prosperity and happiness, and the fatal flaws that seem to render it impossible for Ireland ever to become capable of self-government, receive equal justice at his hands. He invariably writes from intimate acquaintance with the scenes described and from loving sympathy with the many good and noble elements in the Irish nature. He does not hesitate to point out the darker features of Irish life, nor to draw attention to the fatal system of education and priestly supremacy that did so much to produce them.

Carleton, after spending some years in America, settled in Dublin, where he died on the 30th January, 1869. For many years before his death he had enjoyed a pension of £200 from the Crown.

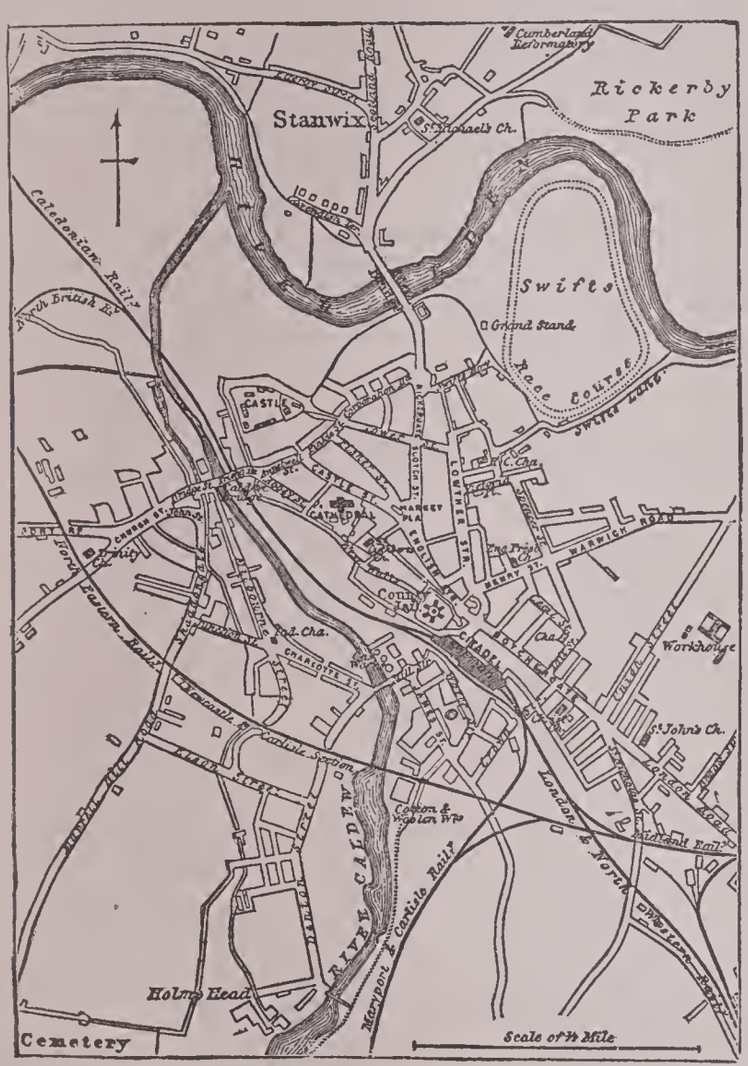
CARLI, or Carli-Rubbi, Giovanni Rinaldo, Count of (1720–1795), a celebrated Italian writer on antiquities and economics, was born at Capo d'Istria, in 1720. He was early distinguished for the extent and variety of his acquirements, and at the age of twenty-four was appointed by the senate of Venice to the newly-established professorship of astronomy and navigation in the University of Padua, and intrusted with the superintendence of the Venetian marine. After filling these offices for seven years with great credit, he resigned them, in order to devote himself to the study of antiquities and political economy. His principal economic works are his *Delle Monete, e della Instituzione delle Zecche d'Italia;* his *Ragionamento sopra i Bilanci economici delle Nazioni* (1759), in which he maintained that what is termed the balance of trade between two nations is no criterion of the prosperity of either, since both may be gainers by their reciprocal transactions; and his *Sul libero Commercio dei Grani* (1771), in which he argues that free trade in corn is not always advisable. Count Carli's merits were appreciated by Leopold of Tuscany, afterwards emperor, who, in 1765, placed him at the head of the council of public economy, and of the board of public instruction. In 1769 he became privy councillor, in 1771 president of the new council of finances. The duties of these offices he continued to discharge with ability for several years; but for some time before his death, which took place in February, 1795, he was relieved from their toils,—retaining, however, their emoluments, as a reward for his important services. It was during the leisure thus afforded that he completed and published his very valuable *Antichità Italiche*, in which the literature and arts of his country are ably discussed. Besides the above, he published many works on antiquarian, economic, and other subjects, including *L'Uomo Libero*, in confutation of Rousseau's *Contract Social;* an attack upon the Abbé Tartarotti's assertion of the existence of magicians; *Observazione sulla musica antica e moderna;* and several poems.

CARLISLE, a parliamentary and municipal borough, the capital of Cumberland, 301 miles N.N.W. from London; 54° 54′ N. lat., 2° 55′ W. long. It is situated on an eminence enclosed by the three streams—the Eden, the Caldew, and the Petteril. The Eden, which is the principal river, is joined by the Petteril on the east side of the city; about a mile further west, as it flows through fertile holms, it is joined by the Caldew, and about six miles further on it falls into the Solway Firth. A handsome stone bridge, built in 1812–15, at a cost of £70,000, spans the Eden, midway between the mouths of the Petteril and the Caldew. All the three streams are unnavigable. In the Eden there is good salmon fishing. Before the Romans invaded Great Britain a Celtic town was erected on the site of Carlisle; and when the Romans came they occupied and improved it. Archæologists consider it doubtful whether the Romans made it a military station to aid in the defence of their newly-acquired colony against the incursions of the Picts; but Roman coins, pottery, inscribed tablets, and other remains have been found in such abundance that there can be no doubt Carlisle was, if not a military post, a town of considerable importance in those days. The great wall of Severus, extending from the Solway Firth to the German Ocean, crossed the River Eden at Carlisle; and remains of this great barrier may still be seen on the outskirts of the city. The Solway end of the wall, traces of which are still to be seen, was about twelve miles from Carlisle, at Bowness; and there was an important Roman camp, the Amboglana of the *Notitæ*, about fifteen miles eastward of the city, called Birdoswald, of which interesting remains are still in existence.

Carlisle was the *Luguvallum* of the Romans. This name was afterwards abbreviated to *Luell*, and with the prefix *Caer* (a city), became *Caer-Luell*, and afterwards by easy transition, Carliol and Carlisle. After the departure of the Romans in the 5th century the Picts laid the city in ruins; but in the 7th century it was rebuilt by Egfrid, king of Northumberland. In 875 the town was attacked by the Danes, who burned the houses, pulled down the wall, and massacred the inhabitants. In this state of desolation it was left for 200 years, with no inhabitants but some few Celts who lodged themselves among the ruins. In 1092 William Rufus, impressed with the importance of Carlisle as a Border military station, ordered the town to

be rebuilt and fortified, and left a garrison there. It was not, however, until after the capture of the town in the reign of Stephen, by David, king of Scots (who died within its walls in 1153), that the castle, the walls, and the citadel were completed.

After undergoing two sieges the town was surrendered to the English Crown in 1217. Edward I. held three parliaments in Carlisle. In 1298, after the battle of Falkirk, he marched to Carlisle; and nine years later it was while crossing Burgh Marsh, about four miles from that city, with his army, to quell the third revolt which had occurred in Scotland during his reign, that he sickened and died. A monument has been erected on the spot to commemorate the event. With his last breath he enjoined his son to prosecute the enterprise, and never desist until he had completed the subjugation of Scotland. The nobles hastened to Carlisle to pay homage to the new king, Edward II., to whom, however, the legacy of vengeance against the Scots proved but a "heritage of woe." In 1315, after the independence of Scotland had been won by the decisive battle of Bannockburn, Robert Bruce, following up his success by ravaging the north of England, besieged Carlisle Castle. There he met with determined resistance on the part of the garrison and the inhabitants, under Sir Andrew Harcla, governor. Bruce, who had his headquarters at the cathedral, made a general assault on all the gates of the town on the ninth day; but the citizens defended their position with such valor that the besiegers soon beat a retreat, having only killed two of the besieged. Sir Andrew Harcla was created earl of Carlisle and Lord Warden of the Marches for this gallant defence of the city; but he was afterwards found guilty of treason and executed at Harraby Hill. In 1345 the Scots burned Carlisle and Penrith. "They were very much annoyed," says Lysons, "by small forces collected by Bishop Kirkby and Sir Thomas Lacy. The bishop and Sir Robert Ogle had a sharp skirmish with the enemy; the prelate was unhorsed during the encounter, but having recovered his saddle continued to fight valiantly, and contrived greatly to win the victory." Nor was it only the "church militant" which did the state much service in those days. In one of the sieges the women of Carlisle helped in the defence of the city by pouring boiling water and rolling heavy stones from the walls upon the heads of the beleaguering Scots below. In the 15th century Richard, duke of Gloucester, was governor of Carlisle Castle, and during his governorship extensive repairs were made in the old fortress, and in the course of time, during the reigns of Henry VIII. (who built the citadel) and Elizabeth, it was adapted to artillery. In 1568 Mary Queen of Scots, having fled from Lochleven, arrived in a fishing boat at Workington, a Cumberland seaport 32 miles from Carlisle, and was there met by the deputy-governor of Carlisle, and conducted to Carlisle Castle, where she was lodged nominally as a guest but actually as a prisoner. She remained there for two months. A little later in the same year a daring exploit was performed by the duke of Buccleuch. William Armstrong, a redoubtable Borderer, better known as "Kinmont Willie," having been taken prisoner in disregard of a truce or understanding which facilitated his capture, the "Bold Buccleuch," with 200 followers, attacked Carlisle Castle, and rescued the prisoner, an achievement which gave dire offence to Queen Elizabeth.



Plan of Carlisle.

During the civil wars Carlisle was harassed by frequent troubles; but the next event of importance occurred in 1644, when the city and castle were besieged by the Parliamentary forces under General Leslie for eight months. Sir Thomas Glenham, the commander-in-chief of the royal troops, was in charge of the garrison, who were reduced to great extremities before they surrendered on 25th June, 1645. Their valiant resistance was recognized by the besiegers, who allowed them to march out "with their arms, flying colors, drums beating, matches lighted at both ends, bullets in their mouths, and twelve charges of powder a-piece." The Parliamentary army pulled down some important portions of the cathedral buildings, and out of the materials erected a guard-house in the market-place. In 1648 Sir Philip Musgrave and Sir Thomas Glenham effected the capture of Carlisle by surprise; but in October it was again surrendered to Cromwell, according to treaty. At this time great distress prevailed in the county, considerable families having barely the necessaries of life, while numbers of the poor died on the highways.

In the Scottish rebellion of 1745 Carlisle again figured in history. The Pretender, Prince Charles Edward, laid siege to it, the three divisions of the army with which he marched from Edinburgh having converged at the city. The castle was at that time garrisoned by only two companies of invalids and some disaffected militia, and Colonel Durand, who was in command, found it necessary, with great reluctance, to surrender. "Bonnie Prince Charlie" rode into the town on a white charger, with a hundred Highland pipers playing a triumphal march in front, and made a house in English Street, which is still in existence, his headquarters. But in December of the same year the duke of Cumberland arrived and bombarded the castle, which his grace described as "an old hencoop, which he would speedily bring down about their ears," and on the 30th the garrison surrendered. The duke quartered his soldiers in the cathedral, and thirty-one of the rebels were subsequently executed at Harraby Hill. The tower in which Mary Queen of Scots was imprisoned was pulled down in 1835; but a considerable portion of the ancient castle still remains, and it is used as a garrison for the 2d Brigade Depôt. Only a small portion of the old city walls now exists, and the city gates have entirely disappeared.

Carlisle suffered in 1380 from a great fire, which destroyed 1500 houses in three of the principal streets; and the plague in 1598 carried off 1076 persons, one-third of the inhabitants.

Carlisle is the see of a bishop. The cathedral was founded by William Rufus, and completed by Henry I. The original proportions of the building have been very much curtailed. A disastrous fire, in 1292, destroyed the nave, only a small part of which now remains. The most interesting architectural feature of the cathedral is the east window, which has been pronounced by archæologists to be one of the finest in the kingdom, the harmony

of its parts and the easy flow of its lines being particularly remarkable. The remains of Dr. Paley are interred in one of its aisles, and a stone pulpit, richly carved in Caen-stone and ornamented with white alabaster, has been erected to his memory. The window in the north transept has been filled with stained glass in memory of the five children of Dr. Tait, archbishop of Canterbury, who died of scarlet fever while his grace was dean of Carlisle. The cathedral possesses many memorials of interest. A large portion of the adjacent priory, founded by William Rufus, was destroyed during the civil wars, but the remains may still be traced on the south side of the cathedral. A convent of grey friars which existed in the city was destroyed by the fire in 1292. There was also at one time a convent of black friars, and a hospital founded at St. Nicholas for lepers; the latter was destroyed in the 17th century. According to Lyson's *History*, the bowels of Richard Cœur de Lion were buried in Carlisle cathedral.

In addition to the cathedral and the castle, the chief buildings in Carlisle are the court-houses—two large round towers built upon the site of the old citadel; the county jail, contiguous thereto; the news-room, the post-office, the railway station, the infirmary, and two of the joint-stock banks. There is a market-cross in the centre of the market-place, and two marble statues adorn the principal streets. One of these, between the two court-houses (by Musgrave L. Watson), is of William, earl of Lonsdale; the other, in the market-place (by Woodington), is of James Steel, editor and proprietor of the *Carlisle Journal*, a citizen who during his lifetime took a prominent part in local public affairs. In addition to the cathedral there are eight established churches in Carlisle, and several places of worship for Independents, Methodists, Presbyterians, Baptists, and Roman Catholics. Its literary and scientific institutions include a mechanics' institution, a young men's Christian association, and several working men's reading-rooms, managed entirely by working men themselves. Its charities consist of an infirmary with 100 beds, a dispensary, and a fever hospital; and in connection with the infirmary there is a convalescent institution at the seaside of Silloth, to which patients are admitted upon payment of a small weekly sum. There is a school-board of nine members; a school of art; and a cathedral grammar school.

Carlisle is a great railway centre. The London and North-Western, the Midland, the Caledonian, the North British, and the Glasgow and South-Western Railways have each a terminus there; while the North-Eastern Company have access to the city by their Newcastle and Carlisle section. In 1876 more than sixty passenger trains left Carlisle Citadel station every week-day, and as many more entered the city.

The principal business of Carlisle is the manufacture of cotton goods, the finishing of silesias, the printing of calicoes, and the manufacture of biscuits. There are also within the city two or three large iron-works, and the manufacture of felt hats is carried on upon a large scale. A dock at and railway to Silloth, on the Solway Frith, 21 miles from Carlisle, were constructed in 1855 to facilitate the transit of the commerce of the district, and this gradually superseded Port Carlisle, which is no longer used as a harbor.

Carlisle returns two members of Parliament. Its municipal government is vested in a mayor (unpaid), ten aldermen, and thirty councillors, who also constitute the Urban Sanitary Authority. To them belong the gas-works and water-works, and by them a system of sewerage was carried out in 1854 at a cost of about £30,000. The city has a recorder and separate court of quarter sessions.

The market is held on Saturdays and Wednesdays, the former being the principal market. The grain is sold in the open street in bulk. Population in 1871, 31,074.

CARLISLE, a town of the United States, capital of Cumberland county in Pennsylvania, about 2½ miles south of the Conedogwinet Creek, and 18 miles west of Harrisburg by the Cumberland Valley Railway. The town is well built, has spacious streets, and contains thirteen churches. Of its public buildings the most interesting is Dickinson College, which was founded in 1783, and possesses an extensive library. In the immediate neighborhood are barracks, which date from 1777, and are capable of containing 2000 men; and about four miles to the north, in a pleasant valley of the Blue Mountains, is the summer resort known as Carlisle Springs. Carlisle was founded in 1751, and in 1794 it was the headquarters of Washington during the Whiskey Rebellion. On the night of 1st July, 1863, it was bombarded by the Confederate troops. Population in 1870, 6650.

CARLISLE, Frederick Howard, Fifth Earl of (1748–1825), a statesman and author, was born in 1748. During his youth he was chiefly known as a man of pleasure and fashion; and after he had reached thirty years of age, his appointment on a commission sent out by Lord North to attempt a reconciliation with the American colonies was received with sneers by the Opposition. The failure of the embassy was not, however, due to any incapacity on the part of the earl, but to the unpopularity of the Government from which it received its authority. He was, indeed, considered to have displayed so much ability that he was entrusted with the vice-royalty of Ireland in 1780. The time was one of the greatest difficulty; for while the calm of the country was disturbed by the American rebellion, it was drained of regular troops, and large bands of volunteers not under the control of the Government had been formed. Nevertheless, the two years of Carlisle's rule passed in quietness and prosperity, and the institution of a national bank and other measures which he effected left permanently beneficial results upon the commerce of the island. In 1789, in the discussions as to the regency, Carlisle took a prominent part on the side of the Prince of Wales. In 1791 he opposed Pitt's policy of resistance to the dismemberment of Turkey by Russia; but, on the outbreak of the French Revolution, he left the Opposition, and vigorously maintained the cause of war. In 1815 he opposed the enactment of the Corn Laws; but from this time till his death, which occurred in 1825, he took no important part in public life. Carlisle was the author of some political tracts, a number of poems, and two tragedies, the *Father's Revenge* and the *Stepmother*, which received high praise from his contemporaries.

CARLISLE, George William Frederick Howard, Seventh Earl of (1802–1864), Lord-Lieutenant of Ireland, was born in London, 18th April, 1802. He was the eldest son of the sixth earl by his wife Lady Georgiana Cavendish, eldest daughter of the duke of Devonshire, and bore at first the courtesy title of Lord Morpeth. He was educated at Eton and Christ Church, Oxford, where he earned a reputation as a scholar and writer of graceful verse, obtaining in 1821 both the Chancellor's and the Newdigate prizes for a Latin and an English poem. Two years later he graduated B.A. as first class in classics. In 1826 he accompanied his uncle, the duke of Devonshire, to Russia, to attend the coronation of the Emperor Nicholas, and became a great favorite in society at St. Petersburg. At the general election of the same year he was returned to parliament as member for the family borough of Morpeth. In one of his earliest speeches he undertook, at the risk of forfeiting the good opinion of the Liberal party, the defence of the Russian emperor against severe attacks made on him in reference to the suppression of the Polish insurrection of 1830. In the agitation for parliamentary reform he took the side of Earl Grey; and after the dissolution of parliament, which took place about that time, he was elected member of Yorkshire. This seat he held till after the passing of the Reform Bill in 1832. In the following year he was returned for the West Riding; and in 1835 he was appointed by Lord Melbourne Chief Secretary for Ireland, a position at that time of great difficulty, O'Connell being then at the height of his reputation. This post he held about six years, winning great popularity by his amiable manners and kindly disposition. Losing his seat at the election of 1841, he availed himself of the leisure thus afforded him to visit the United States. He afterwards gave an account of this visit in a popular lecture, first delivered at Leeds and subsequently repeated at other places. In 1846 he was again elected for the West Riding. Two years later, on the death of his father, he succeeded to the peerage and took his seat in the Upper House. He accepted office as Chief Commissioner of Woods and Forests, and afterwards as Chancellor of the Duchy of Lancaster. The great event of his life, however, was his appointment by Lord Palmerston to the Lord-Lieutenancy of Ireland in 1855. This high office he continued to hold till March, 1858, and again from June, 1859, till within a few months of his death. His retirement in August, 1864, was necessitated by failing health. Lord Carlisle was not a man of great and original

power, but he was above the average in knowledge, in acquirements, and in eloquence. As a debater he held his own in the midst of a large number of great orators, and in the stormy controversies of his Irish secretaryship he succeeded in carrying through the House of Commons several measures of great importance. His literary tastes and culture were displayed in various popular lectures and in several published works. Among these may be mentioned a lecture on *The Life and Writings of Pope* (1851); *The Last of the Greeks*, a tragedy (1828); a *Diary in Turkish and Greek Waters* (1854), the fruit of travels in the East in 1853 and 1854; and a volume of *Poems*, published after his death. He took warm interest in the reformation of juvenile criminals, and established on his own estate one of the best conducted reformatories in the country. Lord Carlisle died at Castle Howard on the 5th of December, 1864. He was never married, and was succeeded in the peerage by his brother. In 1866 appeared his *Viceregal Speeches*, collected and edited by J. Gaskin.

CARLOW, an inland county of Ireland, in the province of Leinster, situated between 52° 26′ and 52° 54′ N. lat., and 6° 30′ and 7° 12′ W. long., and comprising an area of 346 square miles, or 221,342 acres. It is bounded N. by Kildare and Wicklow, E. by Wicklow and Wexford, S. by Wexford, and W. by Queen's County and Kilkenny. Excepting Louth it is the smallest county in Ireland.

The surface of the county is in general level or gently undulating, and of pleasing appearance, except the elevated tract of land known as the ridge of Old Leighlin, forming the commencement of the coal measures of Leinster, and the south-eastern portion of the county bordering on Wexford, where the wild and barren granitic elevations of Knockroe (1746 feet) and Mount Leinster (2610 feet) present a bolder aspect.

There are no lakes or canals in the county, neither does it contain the source of any important river; but on its western side it is intersected from north to south by the Barrow, which is navigable throughout the whole extent of the county and affords means of communication with the port of Waterford; while on the eastern border the Slaney, which is not navigable in any part of its course through the county, passes out of Carlow into Wexford at Newtownbarry. Railway communication connects the county with Dublin, with Wexford, and with Kilkenny and Waterford.

The geological formation of the county is mainly granitic, but the valley of the Barrow north of Goresbridge presents the three formations of limestone observed in Ireland, and the great coal district of Leinster commences in the western edge of the county at Gallows Hill Bog (974 feet). The sandstone is frequently of such a nature as to split easily into layers, known in commerce as Carlow flags. Porcelain clay exists in the neighborhood of Tullow; but no attempt has yet been made to turn this production to use.

The soil is of great natural richness. Agriculture is the chief occupation of the inhabitants, but is not so fully developed as the capabilities of the land would suggest. It will be observed from the following table that no progress has been made within the last twenty-two years in the acreage under tillage:—

Year.	Meadow.	Potatoes.	Turnips.	Oats.	Barley, Bere, Rye.	Wheat.	Under Crops.
1853	24,837	10,608	6,306	27,707	6,700	6,687	84,422
1875	32,151	10,354	5,189	22,165	6,755	2,748	81,638

The pasture land is of excellent quality, and generally occupied as dairy farms,—the butter made in this county maintaining a high reputation in the Dublin market. The farms are frequently large, and great attention is paid to the breeding of cattle. Within the last twenty-two years a large advance has been made in the stock of the county, which was in 1852 and 1875 respectively as follows:—

Year.	Horses, Mules, Asses.	Cattle.	Sheep.	Pigs.	Goats.	Poultry.
1852	9,823	34,581	42,825	22,618	3,501	106,654
1875	10,254	48,672	77,225	23,684	3,364	164,492

The staple trade of the county is in corn, flour, meal, butter, and provisions, which are exported in large quantities. There are no manufactures.

The peasantry dwell chiefly in detached cottages, or in small villages, there being but three towns—Carlow, Bagenalstown, and Tullow—in which the inhabitants exceed 2000 persons.

The population has decreased within the twenty years ending 1871, at a slightly higher rate than that of the province of Leinster in general, owing probably to the want of manufacturing and mining industries. In 1851 the population was 68,078, and in 1871, 51,650 (males 25,464, females 26,186), showing an average decrease of 1·2 per cent. per annum.

In April, 1871, there were 6 superior and 99 primary schools in operation, attended by 6454 children, and at the same date the following was ascertained to be the state of elementary instruction:—24,496 could read and write; 9286 could read but could not write; and 17,868, or 34 per cent. of the population, could neither read nor write.

Of the whole inhabitants, 88 per cent. adhere to the Roman Catholic faith, the number professing that religion in 1871 being 45,621, while 5656 were Episcopalians, and 373 of various other denominations. As regards emigration the county has contributed more than the average of Leinster. During the five years 1871 to 1875, there emigrated 3881 persons, a number equal to 7½ per cent. of the population at the former date. The poor law union, which does not include the whole county, relieved in 1874, 3030 persons, or 6½ per cent. of the inhabitants. The county belongs to the diocese of Leighlin and to the military district of Dublin. The assizes are held at Carlow, and quarter sessions at that town and also at Bagenalstown and Tullow. Carlow returns three members to parliament, two for the county and one for the borough of Carlow.

Previous to the arrival of Strongbow, and for some time afterwards, what is now the county of Carlow was divided into the districts of Hy Cabanagh and Hy Drone, forming the northern portion of the principality of Hy Kinselagh. Its most ancient Irish families were the Kavanaghs (descended from the celebrated Macmurrough, king of Leinster), the O'Ryans, the O'Nolans, and the O'Mores. After the English settlement, the families of St. Aubin, De la Frayne, Bermingham, Carew, De la Landes, Grace, and Butler, held extensive possessions here. In the time of Queen Elizabeth appear the families of Bagnal, Eustace, Burton, O'Brien, Ponsonby, Hamilton, Coke, Bernard, Vigors, Burdett, Bunbury, Beresford, Bruen, Bagot, and Browne.

Under the name of Catherlogh, the present county was made shireground in the reign of King John. It is now divided into seven baronies,—Carlow, Forth, Idrone East and West, Rathvilly, and St. Mullins Lower and Upper, and contains forty-seven parishes and parts of parishes. The relics of antiquity in the county comprise large cromlechs at Browne's Hill near Carlow and at Hacketstown, and a rath near Leighlin Bridge, in which were found several urns of baked earth, containing only small quantities of dust. Some relics of ecclesiastical and monastic buildings exist, and also the remains of several castles built after the English settlement. The ruins of a round tower existed at the commencement of the present century near the church of Kellystown, but they are not now visible.

CARLOW, a parliamentary borough, and the capital of the county of Carlow, situated on the River Barrow, which is navigable for small craft to its junction with the Grand Canal at Athy, is 45 miles (56 by rail) south-west of Dublin. It is a neat and in some parts a well-built town, of modern aspect. The principal buildings are—the Roman Catholic College of St. Patrick, a plain but spacious building; the parish church, an old building, with a handsome steeple of modern erection; the Roman Catholic chapel or cathedral, a large and elegant structure; the court-house where the assizes are held, an octagonal stone building with a handsome Ionic portico; the lunatic asylum for this and the adjoining counties; the county jail; the union workhouse; and barracks for cavalry and infantry. The Wellington bridge over the River Barrow connects Carlow with the suburb of Graigue.

The industries of the place consist of brewing and flour-milling, and a considerable trade is carried on in the sale of butter and eggs.

Carlow was formerly of considerable importance. In the reign of Edward III. the King's exchequer was removed thither, and £500, a large sum at that period, applied towards surrounding the town with a strong wall. The castle (supposed to have been founded by Hugh de Lacy, but sometimes attributed to King John), situated on an eminence overlooking the River Barrow, is still a chief feature of attraction in the general view of the town, although there is not much of the original building left. It consisted of a hollow quadrangle, with a massive round tower at each angle. In the early part of the reign of Queen Elizabeth it was taken, and the town burned by the Irish chieftain Rory Oge O'More. When summoned to surrender by Ireton, the Commonwealth general, during

the disastrous war of 1641, Carlow submitted without resistance. In the insurrection of 1798 the castle was attacked by an undisciplined body of insurgents, many of whom were intoxicated. They were speedily repulsed, and suffered severe loss, no quarter being given; and, in the confusion of their flight, many of the insurgents took refuge in houses, which the king's troops immediately set on fire. After the slaughter, about 420 bodies were collected and buried.

The town obtained a charter of incorporation at an early period, and was re-incorporated, with enlarged privileges, by James I. The corporation, which was styled "The Sovereign, Free Burgesses, and Commonalty of the Borough of Catherlogh," and was authorized to return two members to the Irish parliament, was extinguished by the Municipal Reform Act. The borough, which is under the Towns Improvement Act, sends one member to the imperial parliament. Population in 1851, 9121, inhabiting 1375 houses, and in 1871, 7842, inhabiting 1367 houses.

CARLOWITZ, a town of Hungary, in the former Slavonian military frontier and circle of Peterwardein, is situated on the right bank of the Danube, eight miles south-east of Peterwardein. Population in 1873, 4419. It is the seat of the Greek archbishop in the Austrian dominions, and has, besides the cathedral, two Greek churches, a Roman Catholic church, Servian and German schools, seminaries for the Greek and Catholic clergy, a gymnasium, a lyceum, and a hospital. There is important wine cultivation. The peace between Austria, Turkey, Poland, and Venice was concluded here in 1699.

CARLSBAD, or KAISERKARLSBAD, formerly WARY, a royal free town of Bohemia, on the Tepel, near its junction with the Eger, 70 miles W.N.W. of Prague. It is situated in a beautiful narrow valley between steep granite mountains, and consists chiefly of lodging-houses and hotels for the accommodation of visitors, but has also some good shops and private houses, a theatre, hospital, as well as schools, reading-rooms, &c. It is the seat of the district judge, custom-house, and excise. Carlsbad is the most aristocratic watering-place in Europe. It is most frequented from the middle of June to the middle of August, and the number of visitors averaging from 12,000 to 20,000. The permanent population is nearly 9000 (1873). The warm springs differ but little from each other in their component parts, the principal ingredients being sulphate of soda, carbonate of soda, and common salt. Of the ten springs the Sprudel, Hygiea, Bernhardt, Neubrunnen, and Schlossbrunnen are the principal, having temperatures ranging from 165° to 122° Fahr. They are said to have been discovered in 1370, during a hunting excursion, by the Emperor Charles IV., to whom a statue has been erected in the market-place. The resident inhabitants make many curious articles in iron, steel, tin, and wood, for which they find a ready market during the season. The mountains in the neighborhood have been made accessible, and here and there nice plots of ground have been laid out for visitors. The town has a post-office, railway, and telegraph stations. It lies in 50° 13′ N. lat. and 12° 53′ E. long.

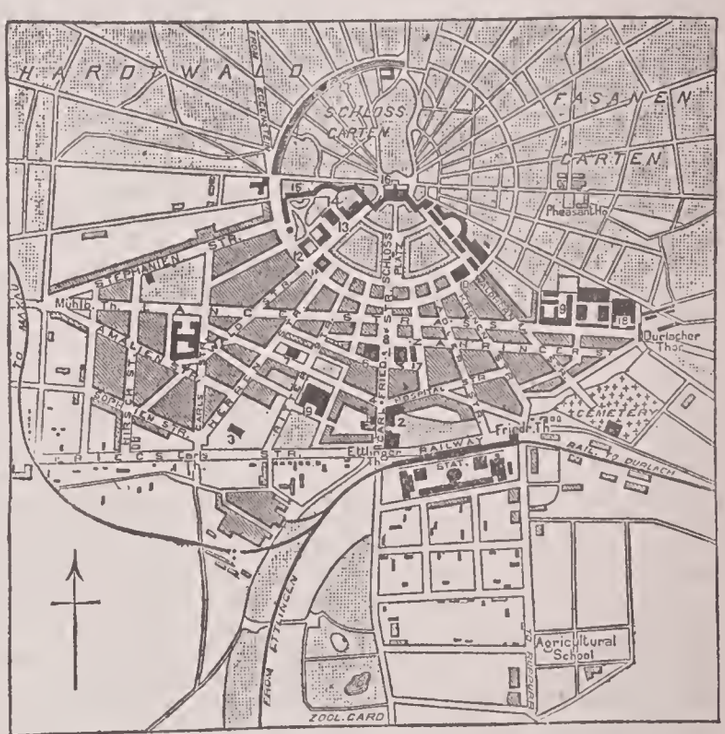
CARLSBURG, a fortified town of Transylvania, capital of the county of Unter-Weissenburg, situated on the north bank of the Maros, 54 miles south of Clausenburg. It consists of the upper town, or citadel, and the lower town. It has a fine Roman Catholic cathedral (containing among other tombs that of John Hunniades), Lutheran and Reformed churches, and a synagogue; also an ecclesiastical seminary, gymnasium, observatory, public library, mint, &c. Population in 1874, 7955. Lat. 46° 4′ 17″ N., long. 23° 34′ E.

CARLSHAMN, or KARLSHAVEN, a small seaport town of Sweden, in the laen of Carlskrona, on the Baltic, 27 miles west of Carlskrona. It has manufactures of sailcloth, leather, and tobacco. The harbor is small but secure, and by means of it a considerable trade is carried on in corn, ironware, timber, pitch, tar, and potash. Shipbuilding and fisheries are also prosecuted. Population in 1873, 5492.

CARLSKRONA, or BLEKINGE, a laen or province of Sweden, bounded on the N. by Kronoberg, N.E. by Calmar, E. and S. by the Baltic, and W. by Christianstadt. It has an area of 5398 square miles, and (1873) 127,877 inhabitants. Its principal towns are Carlskrona, Carlshamn, and Soelvesborg. The smallest and most fertile province of the kingdom, it has a mild climate and has been called the garden or park of Sweden. The inhabitants are lively and distinguished for beauty, and the principal industries are connected with agriculture and forestry, fishery, and shipping.

CARLSKRONA, the capital of the above province, a seaport on the Baltic, in 56° 10′ N. lat., 15° 33′ E. long., 55 miles east of Christianstadt. It is named from its founder Charles XI., and is built upon five small islands connected with each other and with the mainland by bridges. The town is well built, consisting partly of brick and stone, but principally of wooden houses, and has broad streets. The harbor, which is fortified, is capacious and secure, with a sufficient depth of water for the largest vessels. It has three entrances; the principal, and the only one practicable for large vessels, is on the south side of the town, and is defended by two strong forts. The dry docks are of great extent, and have been cut out of the solid granite rock. The arsenal and other buildings connected with the docks are extensive, and are separated from the town by a wall. The manufactures are naval equipments, linen cloths, tobacco, and refined sugar; the exports, metals, potash, tar, pitch, &c. The town is very deficient in good water. Carlskrona is the principal station of the Swedish navy. It is the seat of the Government and Admiralty offices, has a handsome town-hall, navy-arsenal and hospital, naval and other schools, churches, and navy-yards. Population in 1873, 16,653.

CARLSRUHE, or KARLSRUHE (CHARLES'S REST), a city of Western Germany, capital of the grand duchy of Baden. It stands on an elevated plain of the Hardwald (which nearly surrounds it), 380 feet above the level of the sea, 5 miles from the Rhine, and 39 miles W.N.W. of Stuttgart. The Frankfort and Basel Railway passes the city. Carlsruhe takes its name from Charles William, margrave of Baden, who, owing to disputes which he had with the citizens of Durlach, erected in 1715 a hunting-seat, around which the town has since been built. From the palace the principal streets, seventeen in number, radiate in the form of an expanded fan, in a S.E., S., and S.W. direction. The palace, erected in 1751 on the site of the previous erection of 1715, is a plain building in the old French



Plan of Carlsruhe.

1. Monument of Grand Duke Ludwig.
2. Palace of Markgrave Wilhelm.
3. Palace of Grand Duchess Sophie.
4. Obelisk.
5. Town Church.
6. Town-Hall.
7. Cathedral Church.
8. Pyramid.
9. Polytechnic School.
10. Finance Ministry.
11. Palace of Prince Wilhelm.
12. Art Gallery.
13. Theatre.
14. Botanic Garden.
15. Winter Garden.
16. Castle, Library, and Cabinet of Natural History.
17. General Post-Office.
18. Arsenal.
19. Vereinigte Sammlungen.

style, composed of a centre and two wings, presenting nothing remarkable except the octagon tower (*Bleithurm*), from the summit of which a splendid view of the city and surrounding country is obtained, and the marble saloon, in which the meridian of Cassini was fixed or drawn. In front of the palace is the Great Circle, a semi-circular line of buildings, containing the Government offices and the palace of the margraves of Baden. Carlsruhe has several fine public squares, the principal of which are the Castle-place—with Schwanthaler's statue of the late grand duke Charles Frederick in the centre—and the market-place. In the centre of the latter is a pyramid in honor of Charles William, the founder of the city, whose remains are interred there. Among the public buildings are the council-house, the palace of the margrave of Baden, hall of representatives, mint, post-office, barracks, arsenal, theatre, hall of fine arts, museum, the famed polytechnic school (with 800 students), cannon foundry, a synagogue, and several Protestant and Catholic churches. There are also several hospitals, a deaf-mute asylum, botanic gardens, and lyceum; military, medical, and veterinary schools, academies of architecture, painting, and music, and numerous literary and scientific associations. The town is adorned with several public fountains, and is supplied with water by an aqueduct from Durlach. Carlsruhe carries on a considerable trade, and has engineering, carriage, chemical, silk, cotton, carpet, woollen, jewelry, tobacco, and snuff manufactories. The town is surrounded by beautiful parks and gardens. Population (1875), 43,000. Lat. 49° 1′ N., long. 8° 25′ E.

CARLSTAD, a province or laen of Sweden, also called Wermland's Laen. It is bounded W. and N.W. by Norway, N.E. by Falun, E. by Obevo, and S. by Wenersborg and Lake Wener. The surface is mountainous and wooded, and is interspersed with numerous lakes and rivers. The province contains 300 iron mines, 80 foundries, and 300 forges. The neighborhood of Fyrksdalen is called the Swedish Switzerland. The principal towns are Carlstad, Cristenshamn, and Philipstad. Population in 1873, 263,037.

CARLSTAD, the capital of the above province, stands on the island of Tingvalla, at the mouth of the Clara-Elf, on the north shore of Lake Wener. One of two bridges connecting it with the mainland is the longest and most beautiful stone-bridge in Sweden. The town is the seat of a bishop, and has a handsome cathedral, a gymnasium, a theatre, a cabinet of natural history, and an agricultural society. The Gotha canal has considerably increased its commerce. Carlstad exports copper, iron, salt, timber, &c. It was founded by Charles IX., from whom it takes its name. Population in 1874, 7412.

CARLSTADT, a royal free city of Austrian Croatia, in the comitat of Agram, the capital of the district of the same name, stands on the Kulpa, which here receives the Korana and the Dobra, 32 miles south-west of Agram. It consists of the fortress (which is surrounded by ramparts, trenches, and palisades), the inner town, and a suburb. Carlstadt is the seat of a Greek bishop, and five Catholic churches, a Catholic gymnasium, and many handsome public buildings. It has a considerable transit trade, and manufactures the liqueur called *rosoglio*. It is situated in 45° 27′ N. lat. and 15° 36′ E. long. Population (1871), 5515.

CARLSTADT (KARLSTADT), a district of Bavaria, in Lower Franconia, containing 29,014 inhabitants. The capital, of the same name, which is situated on the right bank of the River Main, has a population of 2240.

CARLSTADT, KARLSTADT, or KAROLOSTADT (1480–1541), whose real name was ANDREAS RUDOLF BODENSTEIN, one of the boldest of the German Reformers, first the friend and afterwards the opponent of Martin Luther, was born at Carlstadt in Franconia, in 1480, thus being by three years Luther's senior. In early life he was distinguished by a thirst for knowledge, and a restless disposition which led him to visit various countries and to pass from school to school. He went to Rome and there plunged into the scholastic philosophy and theology; and having obtained the degree of bachelor of divinity, he arrived, in 1504, at Wittenberg. Here he was appointed professor at the university, first in the philosophical faculty, and ultimately (in 1513) in the theological. After obtaining his degree of doctor in theology in 1510, he held a canonry and was chosen archdeacon. In 1511 he was appointed dean or rector of the university; and in the following year it fell to his lot to confer the degree of doctor on Luther. At this time their friendship appears to have begun. Carlstadt had already attained a high reputation for learning, eloquence, and logical power. For the purpose of studying the canon law he went a second time to Rome in 1515, returning to Wittenberg in the following year. In the storm of persecution which raged against Reuchlin, Carlstadt took the part of the persecuted scholar. He also adopted about this time the views of Luther; and in April, 1517, he published a series of theses in which he asserted that the authority of Holy Scripture was above that of the fathers of the church, and that in the absence of Scripture decision an appeal must be made from the fathers to reason. It was at the end of October in the same year that Luther affixed his theses to the church door at Wittenberg, and Carlstadt strenuously supported him. In 1519 he undertook to hold a disputation with Dr. Eck, one of the greatest scholars of the age, on grace and free will. It took place at Leipsic in June, at the very time when the diet was sitting at Frankfort for the election of the emperor. Carlstadt as debater was not able to cope with Eck; and the discussions were tedious and almost fruitless. In the Papal bull against Luther, promulgated in 1520, Carlstadt was particularly named and condemned; and he was the first to appeal from the judgment of the Pope to a general council.

In 1521 he accepted an invitation from Christian II. of Denmark to teach the doctrines of the Reformation in that kingdom, but he made a very short stay there. Differences of opinion and petty jealousies were beginning to spring up between Luther and Carlstadt; and these ripened into bitter discussion and open hostility. Carlstadt's impetuous temper led him to become the advocate of violent measures for the attainment of those ends which Luther and the other Reformers hoped to compass by persuasion. In consequence of the riotous agitation stirred up in Wittenberg by his speeches, writings, and manner of procedure during Luther's confinement in the Wartburg, Luther declared openly against him. For the next two years he remained quiet. But in 1523, being compelled to leave Wittenberg, he retired to Orlamünde in Thuringia, and there got himself elected pastor by the people. His violent proceedings favored the suspicion that he was associated with the Anabaptists and was implicated in the schemes of Münzer, leader of the great peasant revolt. The elector of Saxony sent Luther to investigate the true state of things; and when Luther preached against Carlstadt at Jena they held a discussion on the "Real Presence," which Carlstadt was the first to deny, and an open quarrel broke out between them. He was now ordered to leave the territories of the elector. For some time he wandered about from place to place, and at Rotenburg excited fresh tumults and instigated the people to destroy the images and pictures in the churches. Pursued as a promoter of the peasant insurrection, he was driven to strange shifts, and exposed to great hardships, his life even being in danger. In his extremity he wrote to Luther, offering to prove his innocence, and entreating him to intercede for him with the elector, and get permission for him to return to Saxony. Luther listened to him, printed his defence, and succeeded in inducing the elector to comply with his request. For several years Carlstadt led a quiet, retired life, engaged in farming and commerce. But he grew weary of this enforced suppression of his eager life and longings, and, allying himself with some of the fanatical teachers, he once more attacked Luther. The controversy, in which Zwingli took part in support of the views of Carlstadt on the Supper, grew fiercer than ever; and Carlstadt, the permission for his return to Saxony being now revoked, made his escape into Friesland. Thence he passed into Switzerland, where, through Zwingli's influence, he was named first a deacon in the church of Zurich and then pastor at Altstetten. He afterwards returned to Zurich as archdeacon, and preached there with much success. In 1534 he settled as pastor and professor of theology at Basel, and this post he occupied till his death. To his exemplary Christian character and life at Basel testimony is borne by Grynæus in a letter to Pitiscus, chaplain of the Elector Palatine. As Carlstadt was the first to assert several of the leading principles of Protestantism, so was he also the first to write against celibacy, and the first Protestant divine to take a wife. His writings, which were almost exclusively polemical, have fallen into oblivion. He died at Basel, December 24, 1541.

CARLUKE, a burgh of barony, in the county of Lanark, Scotland, situated near the right bank of the Clyde, 5 miles north-west of Lanark. Its inhabitants (3423) are principally engaged in cotton-spinning, and in the extensive coal, iron, and lime works in the vicinity.

CARLYLE, Joseph Dacre (1759–1804), a celebrated Orientalist, was born in 1759 at Carlisle, where his father was a physician. Having completed his education at the grammar-school, he went in 1775 to Cambridge, was elected a fellow of Queen's College in 1779, and in 1783 took a master's degree. During his stay at college, with the assistance of a native of Baghdad then resident at Cambridge, he had attained great proficiency in Arabic literature; and after succeeding Dr. Paley in the chancellorship of Carlisle, he was appointed, in 1794, professor of Arabic in the university of Cambridge. Two years before his appointment he published his translation of the *History of Egypt* written by Maured Allatafet Jemalledin, known in the East as the historiographer of Egypt; and two years after his election to the professorship, a volume of *Specimens of Arabic Poetry*, from the earliest times to the extinction of the khalifs, with some account of the authors. Having been appointed chaplain by Lord Elgin to the embassy at Constantinople, he prosecuted his researches in Eastern literature, and made a lengthened tour through Asia Minor, Palestine, Greece, and Italy, collecting in his travels several valuable Greek and Syraic MSS. for a projected critical edition of the New Testament, collated with the Syraic and other versions—a work, however, which he did not live to complete. On his return he was preseuted by the bishop of Carlisle to the living of Newcastle-upon-Tyne, where he died in 1804. After his death there appeared a volume of poems, descriptive of the scenes of his travels, with prefaces extracted from his journal. Among other valuable works which he left unfinished was a half-corrected edition of the Bible in Arabic.

CARMAGNOLA, a town of Italy, near the right bank of the Po, in the province of Turin, and 16 miles by rail to the south of that city. It was formerly fortified, and the older portion is still surrounded with walls, while a fragment of its ancient castle is preserved in the form of a tower to the church of San Filippo. It contains five parish churches, several convents, and a hospital. A considerable trade is carried on, especially at the fair in June, in silk, flax, hemp, and cattle. Population in 1869, 12,799. Carmagnola, during the Middle Ages, belonged to the marquises of Saluzzo, and formed one of their frontier towns. In the 16th century it was fortified by the French, but it fell into the hands of the Savoyards in 1588, and was assigned to them at the peace of 1601. On its capture in 1792 by the army of the Revolution, its name became famous as the title of a republican dancing-song which finished every verse with the refrain—*Dansons la Carmagnole, Vive le son du canon.* The word thus introduced to popularity was soon applied to a vest of common stuff and peculiar shape, which was recognized as the sign of a true Republican; and not long after it was jocularly used to designate the exaggerated reports that were published of the victories of the patriot army.

CARMAGNOLA, Francesco Bussone, Count of (1390–1432), one of the most celebrated Condottieri of the early part of the 15th century, was born at Carmagnola in 1390. He was first in the service of Filippo Maria Visconti, duke of Milan, who raised him to the rank of count and made him governor of Genoa. Having, however, lost Visconti's favor, Carmagnola became general of the Venetian army, wrested Brescia from the hands of his old master, and inflicted a severe defeat upon him at Maclodio (1427). But in 1431, having failed to prevent the defeat of the Venetian fleet, and having been unsuccessful in an attempt to surprise Cremona, he incurred the suspicion of the senate, who not daring to show their disapproval while he was surrounded by his soldiers, lured him to Venice, and there tortured and beheaded him (1432).

CARMARTHEN, County of, or Carmarthenshire (Welsh *Caerfyrddin*), a county in South Wales, bounded on the N. by Cardigan, on the E. by Brecon and Glamorgan, on the S. by Carmarthen Bay, an inlet of the Bristol Channel, and on the W. by Pembroke. Its greatest length is, from S.W. to N.E., about 40 miles; its greatest breadth, S.E. to N.W., about 24 miles. It possesses an area of 947 square miles, or 606,172 acres (of which about 95,600 are occupied by commons and waste land), and is thus the largest of all the Welsh counties. It contains 5 hundreds and 97 parishes, and is in the diocese of St. David's.

The whole of the northern, and by far the largest, portion of Carmarthenshire is chiefly occupied by the Silurian geological formation. To the south of this, and crossing the county in a direction from S.W. to N.E., there stretches a belt of the Old Red Sandstone, varying in width from 1½ to 4 or 5 miles. This is succeeded on its southern edge by narrow belts of the carboniferous limestone, and the millstone grit; south of which the whole remaining portion of the county is occupied by the coal measures, forming part of the great South Wales coalfield.

In the south-east adjoining the border of Breconshire, there is a range of bleak and somewhat lofty mountains, called the Mynydd Dû or Black Mountains, where the Carmarthenshire Van rears its lofty summit about 2600 feet high. The rest of the county is thickly studded with rounded green hills, few of which exceed 1000 feet in height, and is intersected by valleys and glens, many of them presenting scenes of great beauty and interest.

The principal river is the Towy, with its tributaries the Gwili and Cothi, which drains the central basin of the county, and enters the sea in Carmarthen Bay immediately to the east of the river Taf. The latter stream, with its numerous affluents, drains the western portion of the county; while in the north, the Teifi separates Cardigan from Carmarthenshire. The Llwchwr, springing from the Black Mountains, separates in its lower course Glamorgan from this county.

The climate is mild, except in the very elevated parts of the county; but the annual fall of rain is very great, amounting at Carmarthen in 1875 to no less than 60·87 inches. Agriculture is generally not in a very forward condition; but progress is being made in efficient drainage under the provisions of the Drainage Acts, and better modes of agricultural practice are coming into use. The soil varies very much; but in the southern parts of the county, and in the larger valleys, it is exceedingly fertile.

In the south-east there are extensive and valuable coal and iron mines. There are also some important lead mines, and limestone is abundant in the south.

Railways intersect the county; the through line from Bristol to Milford Haven, traversing the southern district, affords expeditious communication with London on the east and Ireland on the west.

The principal industry is that of agriculture, more particularly that of stock-raising. In 1873 the number of holdings in the county of less than one acre in extent amounted to 5168, and of an acre and upwards to 2898. There were only 11 above 5000 acres, and none exceeded 35,000. The average size of each holding at that date was 63¼ acres, that of all Wales amounting to 74½. The average rental of those containing one acre and upwards amounted to 14s. 9d. per acre.

The following tables will show the state of agriculture in the two years 1872 and 1875, and from them it will be observed, that while the acreage under crop has slightly decreased, an increase has taken place in the numbers of live stock:—

Year.	Oats.	Barley.	Wheat.	Green crops.	Grass under rotation.
1872	41,920	21,771	12,432	11,204	41,001
1875	38,846	19,742	12,105	10,959	46,120

Year.	Horses.	Cattle.	Sheep.	Pigs.
1872	16,837	98,022	212,236	30,201
1875	17,760	104,604	226,425	26,628

The other industries of any importance are coal-working, iron-founding, and the smelting of tin and copper, principally of imported ores.

The population, which numbered 110,632 persons in 1851, increased in 1871 by 4½ per cent., amounting to 115,710, of whom 54,921 were males, and 60,789 females. There are only two towns of any considerable size,—Carmarthen, population 10,488, and Llanelly, 13,958. Two members are returned to Parliament by the county and one by the group of Carmarthen boroughs. A court of quarter-sessions is held in the county.

Welsh is the language commonly spoken by the lower orders, and in the northern parts of the county the manners and customs of the people are as purely Welsh as in any part of the principality. Of the history of Carmarthenshire it will be sufficient to say that it was occupied at the time of the Roman invasion by the Demetæ, a tribe which,

after the expulsion of the conquerors, soon relapsed into semi-barbarism. Owing to its natural advantages, it preserved its independence long after the northern and eastern portions of Wales had become absorbed into the English states, and the fealty paid by Howel Ddâ, its most eminent prince, to the English sovereign was more nominal than real. But the tide of Norman conquest swept over it, and was scarcely interrupted until in the 12th and 13th centuries the two Llewelyns made a gallant resistance to it. It was, however, at Carmarthen that Edward I., checked for a moment in his course, raised a new army, before which Llewelyn fled, and the independence of the county ultimately fell. It was in this county that the remarkable "Rebecca" insurrection originated in 1843–4. The multiplicity of toll-gates seemed to be the original cause of this singular conspiracy. Parties of five or six hundred men, mostly mounted, armed with pickaxes, sledges, hatchets, and guns, used nightly to traverse the counties of Carmarthen, Pembroke, Cardigan, and Brecon, headed by a tall man dressed in woman's clothes, throwing down the toll-gates, and committing other excesses; and so well did the rioters keep counsel, and so secretly did they manage their forays, that despite the exertions of the magistrates, assisted by large bodies of military sent into the districts, no effectual check could be put upon their proceedings for many months.

Carmarthenshire is rich in antiquities, and possesses the traces of three important Roman roads, besides encampments and several early British remains. The two most interesting mediæval ruins are those of Carreg Cennin and Dynevor castles.

CARMARTHEN, the capital of Carmarthenshire, is a parliamentary and municipal borough, and forms a county of itself with an area of 4996 acres. It is beautifully situated on the right bank of the Towy, about 5 miles from the sea. The river is navigable for small vessels; but, owing to the better access to the neighboring borough of Llanelly, and to the increased facilities of railway communication, the Towy is not used so much for the transit of goods as formerly. The streets of the town are for the most part narrow and steep, although many of the houses are well built and of a respectable class. Part of the town stands on elevated ground, and viewed from a distance it has an imposing appearance.

The principal church is that of St. Peter's, a large plain building with a lofty square tower, containing some interesting monuments, among which is that of the celebrated Sir Rhys ap Thomas and his lady. Sir Richard Steele is buried here, but no monument marks his resting-place. There is another church belonging to the Establishment, and several dissenting chapels. There is a large and well-conducted training college here for Welsh teachers; and there are two grammar-schools on public foundations. There are also two infirmaries, and a literary and scientific institution, the lectures at which are well attended. The town also possesses a guild-hall, a respectable stone edifice adorned with Tuscan columns, and having a covered market underneath. The county jail is built on the site of the ancient castle. There is a granite obelisk erected to the memory of Sir Thomas Picton, and a bronze statue to General Nott, who were both natives of the town; and also a monument to the officers and men of the 23d Regiment (Welsh Fusiliers) who fell in the Crimean War.

A considerable trade is carried on by river and rail in slates, lead-ore, and tin plates, besides domestic produce. The salmon and sewin (bull-trout) fishing is also productive of some trade. The corporation consists of a mayor, 6 aldermen, and 18 councillors. It returned a member to Parliament from 1536 to the period of the Reform Act. Since that time it has been associated with Llanelly in returning one member. There are markets on Wednesdays and Saturdays, and several fairs in the course of the year. The quarter sessions and assizes are held here. Population in 1851, 10,524, and in 1871, 10,488 (males 4820, females 5668), inhabited houses, 1984.

Carmarthen, as its name denotes, was a fortified place at an early period. It is generally believed to be the *Maridunum* of the Romans near which two branches of the great road, the *Via Julia*, diverged. Upon the erection of Wales into a principality, the chancery and exchequer of the southern division were fixed here. The last time when the castle was put to use was in the Parliamentary wars, when it was garrisoned and held for Charles I. After being reduced by the Parliamentary forces it was dismantled, and both it and the old walls were allowed to go to decay. The town gives the title of marquis to the duke of Leeds.

CARMEL, a mountain promontory of Palestine which runs out into the Mediterranean to the south of the bay of Acre in 32° 50′ N. lat. and 35° E. long. Gradually retiring from the coast it stretches south-east for a distance of sixteen or eighteen miles, and then sinks abruptly to form a connection with the mountains of Samaria. Composed almost entirely of oolitic formations, it is furrowed externally with numerous ravines and other irregularities, while within it is eaten out into countless caves. Its greatest height is about 1750 feet. By the Biblical authors it is celebrated for its fertility; and its very name, which signifies the "vineyard of the Lord," bears witness to its repute. At present there are only a few unimportant patches subjected to cultivation; and most of the mountain is covered with a thick brushwood of evergreens which rises at some parts into forest. The tree which more than any other gives its character to the scenery is the *Quercus Ilex*, or prickly oak; but the lentisk and myrtle are also abundant, and the profusion of lesser shrubs and aromatic herbs and flowers is altogether remarkable. The vine is almost extinct except in the neighborhood of the village of Esfia; but wine-presses hewn out of the rock show that its cultivation must at one time have been common. In the poetical books of the Scriptures allusions to Carmel are frequent; and it is especially celebrated in Biblical story as the scene of the sacrifice by Elijah which decided the claims of Jehovah and Baal. The exact site of the prophet's altar is fixed by tradition at El Muhrakah at the eastern extremity of the ridge, where a rough structure of hewn stones is still visited as a place of sacrifice by the Druses. Various other places in the neighborhood are connected with his name in one way or other, and the mountain itself, as well as the convent dedicated to the Virgin Mary, is familiarly known in the East as Mar Elyas. The origin of certain fruit-like fossils which occur in some of the rocks is explained by the legend that the keeper of a garden, having scornfully refused to let Elijah share in its produce, was punished by his melons and plums being instantly cursed into stone. At a slightly later period the mountain afforded an asylum to the prophet Elisha; and, according to Jamblichus, Pythagoras sought the inspiration of its solitudes. In the time of Vespasian it was the seat of an oracle; and Pliny speaks of its inhabitants as *gens sola et toto in orbe præter cæteras mira.* The sanctity and seclusion of the place attracted a number of Christian hermits as early as the 4th century; and here in the 12th century originated the order of the Carmelites. In 1209 the convent of St. Brocardus was founded at the fountain of Elijah; but the monks were massacred in 1238 and the building fell into decay. Another convent was erected in 1631; but it was destroyed in 1821 by Abd-ullah of St. Jean d'Acre, who employed the ruins to build the walls of his city. A few years later the building was restored by command of the Porte, the expense being defrayed partly by Abd-ullah and partly by the contributions procured by the monk John Baptist who wandered through a part of Europe, Asia, and Africa in pursuit of his mission. The building is large and commodious, and hospitable entertainment is freely rendered by the fraternity to travellers of any nation or religion whatever. The mountain was at one time dotted with hamlets; but these have been almost all depopulated by the warlike Druses. An attempt to establish American colonists in some of the villages resulted in failure; but in quite recent years considerable success has attended the efforts of a body of German Protestant dissenters, who call themselves Templars. Their principal settlement, founded in 1869, is at Haifa or Caipha, a town of from 2000 to 3000 inhabitants, at the northern end of the promontory, which is usually identified with the Roman *Sycamina.* (See the works of Irby and Mangles, Van de Velde, Thomson, Robinson, Tristram, and Stanley; and for legendary details, Mislin, *Les Saints Lieux*, 1851–57.)

CARMELITES, one of the four orders of Mendicant Friars. It is perhaps difficult to say whether upon the whole the Franciscans or the Carmelites have invented and propagated the more monstrous fictions respecting their own commencements and subsequent story. But as regards the very tender point of their first foundation, the latter must be admitted to have distanced their competitors

For the history of the Franciscans at least commences with a basis of solid and indubitable historical fact, whereas in the case of the Carmelites we plunge at once into the region of fable, and fable of the most monstrous kind. Mount Carmel is celebrated in Scripture as the abode of Elijah and Elisha, the former of whom the Carmelites claim as their founder. Elijah, or Elias, say the writers of the order, became a monk under the ministry of angels; and his first disciples were Jonah, Micah, and Obadiah. They declare further that the wife of the latter, having bound herself by a vow of chastity, received the veil from the hands of Elias himself, and became the first abbess of the Carmelite female order. They tell us also that Pythagoras was a member of this order, and that he had on Mount Carmel several conversations with the Prophet Daniel on the subject of the Trinity. They further assert that the Virgin Mary and Christ himself assumed the habit and profession of Carmelites.[1] We first, however, reach the solid ground of something like history in the account left by Phocas, a Greek monk of the Isle of Patmos, who visited the Holy Land in 1185, and who concludes the narrative of his journeying by relating that the cave of Elias was then visible on Mount Carmel, and that there had existed there a large monastery, as might still be seen from the remains of the buildings; that some years previously a monk in priest's orders, with white hair, had arrived there, coming from Calabria, and had established himself there in obedience to orders given him by Elias in a vision. He made, continues Phocas, a small enclosure among the ruins of the monastery, and built a bell tower and a little church. He then collected about ten companions, with whom, concludes Phocas, he still continues to live there. To these recluses, Albert, bishop of Vercelli, who had become patriarch of Constantinople, gave a "rule" about the year 1209. And this must be considered to constitute the foundation of the Carmelite order.

This rule consists of only sixteen articles; and it appears from it that the monks on Mount Carmel were at that time eremitical, dwelling in separate little houses. The lodging of the prior was placed at the entrance into the enclosure, and the church was in the middle of the enclosed space. The rule contains the ordinary injunctions and prohibitions as regards masses and other services to be heard or said, and kinds of food to be avoided, with some unimportant specialties of dates and seasons. Albert further enjoined on them to labor constantly with their hands, and to practise much silence. This rule was approved by Pope Honorius III. in 1226.

It is related that two English crusaders, John de Vesci and Richard de Grey, carried some of the recluses on Mount Carmel with them to England, and founded the first Carmelite monastery in England at Alnwick. Much about the same time—nearly the middle of the 13th century—Louis IX. of France, on his return from the Crusades, took with him to Paris some of the Mount Carmel monks, and established them under the name of Carmelites in a monastery there. Others passed from Mount Carmel into Italy and Spain under the special protection of the popes. The number of their establishments was very rapidly and very largely increased; and they held their first European general chapter at Aylesford in England in 1245.

The Carmelites, however, can refer to papal briefs, bulls, and rescripts of a much earlier time, in which their existence is recognized. John V. (ob. 686), Stephen V. (ob. 817), Leo IV. (ob. 855), Adrian II. (ob. 872), Sergius III. (ob. 911), Gregory VII. (ob. 1085), and Alexander III. (ob. 1181) may be cited among the early popes who conferred privileges or special indulgences on the order. They further quote John XXII. (ob. 1334), Sixtus IV. (ob. 1484), Julius III. (ob. 1555), Pius V. (ob. 1572), Gregory XIII. (ob. 1585), Sixtus V. (ob. 1590), and Clement VIII. (ob. 1605) as having all, in various documents, recognized the fact of their foundation by Elias. And, lastly, Benedict XIII., in 1725, permitted the order to erect in St. Peter's, among the statues of the founders of the religious orders, that of Elias as their founder, with the inscription,— *Universus Ordo Carmelitarum fundatori suo Sancto Eliæ prophetæ erexit!*

[1] For a full account of all these absurdities, see a very curious work, printed at Paris in 1751, but with the date of Berlin, entitled *Ordres Monastiques, Histoire extraite de tous les Auteurs qui ont conservé à la posterité ce qu'il y a de plus curieux dans chaque Ordre.*

The term *Universus* in the above legend is intended to indicate that all the different branches of the order participated in the erection of the statue, although they have become entirely separate societies. The monks of that portion of the order which had adhered to the ancient rule, modified and mitigated, however, in some respects by Innocent IV. (ob. 1254), and more largely by Eugenius IV. (ob. 1447), are termed Carmelites of the Ancient Observance. Shortly after the changes made in the rule by Pope Eugenius IV., several local reformations were effected in the order in different countries,—one in France by the general Jean Soreth of Normandy in 1451, and another in the congregation at Mantua, which rapidly spread itself, and, much to the disgust of the general of that portion of the order which adhered to the old rule, obtained from the Pontiff the right to elect a vicar-general of their own, not subject to the jurisdiction or the approbation of the general. Various other partial reformations were effected, and the members of those congregations which adopted them are styled "Reformed Carmelites." But a more important, or at least a more marked and decided division into two branches was brought about by one of the most noteworthy personages in all the Catholic hagiology, Saint Teresa. This extraordinary woman, a native of Avila, in Old Castile, became a Carmelite nun in a nunnery of the order in that city in 1535. She at once determined on carrying out the rule in all its primitive strictness; but finding this insufficient to satisfy her abounding zeal and ambition, she obtained in 1562 a brief from Pope Pius IV. authorizing her to establish a separate branch of the order, the more austere observances of which should be modelled according to her own views. Very shortly several nunneries of "Barefoot Carmelite Nuns" were established, mainly in Spain. Her success thus far soon led her to the more ambitious project of introducing a similar reform among the Carmelite body of the other sex. And this also she accomplished by the assistance of two or three of the leading members of the Carmelite community. The members of the communities which received this reformed rule, or which were founded for the observance of it, were called Barefoot Carmelites (*Carmes Déchaussés*, or *Carmelitani Scalzi*), in distinction to those of the older bodies. For some time, however, the monasteries and nunneries of the Barefoot Carmelites remained subject to the general of the parent body, till in 1580 Pope Gregory XIII., at the instance of Philip II. of Spain, permitted them to elect their own provincial generals, who were, however, still subject to the general of the entire order. But Sixtus V., having regard to the greatly increased and increasing number of their establishments, granted them, in 1587, the privilege of electing a vicar-general of their own. Finally, Clement VIII., in 1593, separated them entirely from the other Carmelites, empowered them to elect a general of their body, and constituted them a separate Order of Friars Mendicant,—dispositions which were subsequently confirmed by Gregory XV.

The Carmelites originally wore white woollen dresses. But inasmuch as the Orientals among whom they dwelt deemed this color a mark of nobility, they adopted striped dresses, specimens of which may still be seen in ancient paintings, the colors of such stripes being sometimes white, grey, and black, and sometimes white and dark brown. After their establishment in Europe, however, these striped dresses were abandoned, and by the authority of Honorius IV., they began in 1287 to wear a white cape and scapulary, which was, however, shortly afterwards changed for dark brown. Over this dress they now wear a white cloak and hood when they quit their convent.

The device, both of the original body and of the Barefoot Carmelites, consists of a mountain, topped by three stars, and above this a crown, from the middle of which comes forth an arm grasping a sword. The mountain represents Mount Carmel; the stars symbolize the Virgin—*Stella maris*—to whom the order is more especially dedicated; the crown figures forth her supremacy; the arm is the arm of Elias; and the sword it grasps is the token of his zeal. A line drawn across the top of the mountain differentiates the device as used by the Barefoot Carmelites. The order has been, and is indeed still, a very wide-spread one, in all quarters of the globe.

CARMICHAEL, Gershom (1672–1729), a metaphysician of whom Sir William Hamilton has said that he "may be regarded, on good grounds, as the real founder of the Scottish school of philosophy." He was born about the year 1672, probably in London, where his father, a Presbyterian minister who had been banished by the Scotch Privy Council for his religious opinions, was then living. Gershom was educated at Edinburgh University. He graduated there in 1691, and soon after became a Regent at St. Andrews. In 1694 he was elected a Master in the University of Glasgow,—an office that was converted into the professorship of Moral Philosophy in 1727, when the system of Masters was abolished at Glasgow. He was an eminently successful teacher, attracting students from England as well as Scotland, but his warm temper led him into various disputes with the principal and other college

authorities, in consequence of which he was more than once suspended from his functions. His works are *Breviuscula Introductio ad Logicam*, a treatise on logic and the psychology of the intellectual powers, in which among other things he affirms that all knowledge may be resolved into immediate judgments known in their own light; *Synopsis Theologiæ Naturalis;* and an edition of Puffendorff *De Officio Hominis et Civis*, with notes and supplements of high value. Carmichael died in 1729.

CARMINE, a pigment of a bright red color obtained from cochineal. It may be prepared by exhausting cochineal with boiling water, and then treating the clear solution with alum, cream of tartar, or acid oxalate of potassium; the coloring and animal matters present in the liquid are thus precipitated. Or an aqueous decoction of black cochineal is made, and treated with stannic chloride; a slow deposition of carmine then takes place; the liquid is poured off, and the carmine dried. Another process is to add to 15 quarts of boiling river water 1 lb of cochineal, and a clear solution of 6 drachms of carbonate of soda in 1 lb of water, and boil for thirty minutes. The liquid is then cooled, and 6 drachms of powdered alum are stirred in. After twenty minutes the resulting scarlet liquid is decanted, mixed well with the white of two eggs beaten up in ½ lb of water, and again boiled for a short time; it is then left quiet for about half an hour, after which it is decanted, and the carmine which has been deposited is drained on a cloth, spread out on plates with an ivory or silver spatula, covered with white paper, and dried. By this process about 1½ oz. of carmine is obtained from 1 lb of cochineal. Another method is to add 3 oz. of nitre and 4 oz. of acid oxalate of potassium to an infusion of 1 lb of cochineal, and to boil for ten minutes. After four hours' standing, the liquid is poured into flat dishes, where it is left for three weeks. At the end of this time it is freed of the coating of mould formed upon it, and is drawn off, leaving a firm layer of carmine of fine color. There are several other modes of preparing carmine, in some of which gelatine is used to assist its precipitation. The quality of carmine is affected by the temperature and the degree of illumination during its preparation,—sunlight being requisite for the production of a brilliant hue. It differs also according to the amount of alumina present in it. It is sometimes adulterated with cinnabar, starch, and other materials; from these the carmine can be separated by dissolving it in ammonia. Good carmine should crumble readily between the fingers when dry. Chemically, carmine is said to be a compound of coloring matter and a special animal principle with an acid from one of the agents employed to precipitate them. Its discovery is attributed to a Franciscan monk of Pisa. Carmine is used in the manufacture of artificial flowers, water-colors, rouge, cosmetics, and crimson ink, and in the painting of miniatures. Carmine Lake is a pigment obtained by adding freshly precipitated alumina to decoction of cochineal.

CARMONA, a town of Spain in the province of Seville, situated about 15 miles east of the city of that name, on a gentle elevation that overlooks an extensive plain. Its castle, now in ruins, was formerly the principal fortress of Peter the Cruel, and contained a spacious palace within its defences. The principal entrance to the town is an old Moorish gateway; and the gate on the road to Cordova is partly of Roman construction. Part of the ancient college of San Teodomir is of Moorish architecture, and the tower of the church of San Pedro is an imitation of the Giralda at Seville. The principal trade is in oil, corn, and cattle. Carmona, the Roman Carmo, was the strongest city in Further Spain in the time of Julius Cæsar; and its strength was greatly increased by the Moors, who surrounded it with a wall and ornamented it with fountains and palaces. In 1247 Ferdinand III. of Castile took the city, and bestowed on it the motto—*Sicut Lucifer lucet in Aurora, sic in Wandalia Carmona.* The Carmona fair, which is held in April, affords an almost unequalled opportunity of observing the genuine costumes and customs of southern Spain. Population, 20,704.

CARNAC, a village of France, in the department of Morbihan and arrondissement of L'Orient, about 9 miles south-west of Auray, which is the nearest railway station. It owes its celebrity to the rude stone monuments in its vicinity, which are among the most extensive and interesting of their kind. The most remarkable consists of long avenues of maenhirs or standing stones; but there is also a great profusion of other erections, such as dolmens and barrows, throughout the whole district. About half a mile to the north of the village is the Menec system, which consists of eleven lines, numbers 942 maenhirs, and extends a distance of 3376 feet. The terminal circle, whose longest diameter is 300 feet, is somewhat difficult to make out, as it is broken by the houses and gardens of a little hamlet. Further to the north-east there is another system at Kermario (Place of the Dead), which consists of 994 stones, many of them of great size—some, for example, 18 feet in height—arranged in ten lines and extending about 4000 feet in length. Still further in the same direction is a third system of Kerlescant (Place of Burning), composed of 266 stones, which are distributed into thirteen lines, terminated by an irregular circle, and altogether extend over a distance of 1000 feet or more. A fourth system at Menec Vihan, due east of the village of Carnac, has 125 stones. The alignment of Kermario points to the dolmen of Kercado (Place of St. Cado), where there is also a barrow, explored in 1863; and to the east of Menec stands the great tumulus of Mont St. Michel, which measures 317 feet in length and 192 feet in width at the base, and has at present a height of 33 feet. The tumulus, which is crowned with a chapel, was excavated by René Galles in 1862; and the contents of the sepulchral chamber, which include several jade and fibrolite axes, are preserved in the museum at Vannes. About a mile east of the village is a small piece of moorland called the Boceno, from the *bocenieu* or mounds with which it is covered; and here, in 1874, the explorations of Cleuziou and Miln brought to light what they suppose to be the remains of a Gallo-Roman town. The tradition of Carnac is that there was once a convent of the Templars or Red Knights on the spot; but this it seems is not supported by history. Similar traces were also discovered at Mané Bras, a height about three miles to the east. The rock of which these various monuments are composed is the ordinary granite of the district, and most of them present a strange appearance from their coating of white lichens. For further details the reader may consult the *Prehistoric Times* of Sir John Lubbock, who visited Carnac in 1867 along with Dr. Hooker; the *Guide to the Principal Chambered Barrows and other Prehistoric Monuments in the Islands of the Morbihan, &c.* (1875), by W. C. Lukis, who spent considerable portions of seven years in the district; the various publications of René Galles, such as his *Fouilles du Mont Saint Michel en Carnac*, 1864, and *Tumulus et dolmens de Kercado*, 1864; Fouquet's *Des monuments celtiques et des ruines romaines dans le Morbihan*, 1873; *Journal of Anthrop. Soc. of London*, 1869, p. cxxiii.; Jephson's *Walking Tour in Brittany*, 1866; and the *Proceedings of the Soc. of Scot. Antiq.*, 1875.

CARNARVON, County of (Welsh *Caer-yn-arfon*), a maritime county of North Wales, is bounded on the N. by Beaumaris Bay, on the E. by Denbigh, on the S.E. by Merioneth; on the S. W. by Cardigan Bay, and on the W. by the Irish Sea and the Menai Strait. There is a small detached portion of the county on the N. coast of Denbighshire. The greatest length of this county is from north-east to south-west, and measures about 55 miles; while its greatest breadth from south-east to north-west is about 23 miles. Nearly one-half of its whole length forms a spur-like peninsula, varying from five to nine miles in width, projecting in a south-west direction into the Irish Sea, and forming Cardigan Bay on the south, and Carnarvon Bay on the north. The county possesses an area of 579 square miles, or 370,273 acres, and contains 10 hundreds and 76 parishes.

The Lower Silurian and Cambrian beds may be termed the basis of the geological features of this county; but they are so completely penetrated in every direction by intrusive igneous rocks that there is hardly a square mile of surface in the whole county free from their presence. These consist chiefly of compact felspar, felspathic traps, greenstone, quartz porphyries, and syenite. On the west, along the shore of the Menai Strait, there is a narrow belt of carboniferous limestone; of this the Great Orme's Head is also composed; and on the western side of the peninsula part of the county is a broad band of chlorite and mica schist with serpentine interspersed. Carnarvon is rich in mineral treasures; for, besides lead and copper lodes and an appreciable amount of gold, its numerous slate quarries are amongst the most valuable mineral properties in the

United Kingdom, and yield princely incomes to the fortunate possessors, besides furnishing employment to many thousands of workmen.

Carnarvon is the most mountainous of all the Welsh counties, and its mountains are the grandest of any in the British islands south of the Forth. The Snowdon range fills up the whole of the centre of the county; and, with its lofty summits rising to the height of between 3000 and 4000 feet, throws an air of grandeur and sublimity over scenery which is of the most romantic and beautiful description. The summit of Snowdon itself is 3570 feet above the level of the sea, and it is surrounded by a phalanx of giants, many of them but little lower than itself. Among the more important of these, within the county, are the Carnedd Llewelyn, 3482 feet; the Carnedd Dafydd, 3430 feet; the Glyder Fawr, 3275 feet; the Elidyrfawr, 3033 feet; the Moel Siabod, 2863 feet; Moel Hebog, 2578 feet; and Drum, 2527 feet in height. The rocks of which the Snowdonian range is composed are for the most part of a very bold and rugged description, which adds to the impressiveness of their immense masses.

Some of the valleys are characterized by the extreme of wild and rugged grandeur, being walled in by the naked rocks, and traversed by foaming torrents; while others are marked by soft and smiling beauty. Among the former may be mentioned the gorge at Pont Aberglaslyn, while Nant Gwynant, with its placid lake and verdant meadows, will serve as an illustration of the latter. The vales of Beddgelert and Llanberis, the former at the southern, and the latter at the northern base of Snowdon, have a world-wide reputation for beauty; and the vale of the Conway, from Llanrwst to Conway, is a noble piece of scenery, backed as it is on its southern border by the Snowdon range.

The only river of importance is the Conway, which rises in Llyn Conway, in the S.E. corner of the county, and after separating Carnarvon from Denbigh in a nearly due north course of about 30 miles, falls into the sea at Conway. It is a tidal river, and is navigable for about 10 miles from Conway. The Seoint, a small stream, rises in Snowdon, and falls into the sea at Carnarvon.

The lakes are very numerous, and some of them of considerable size. The more important are the lakes of Llanberis (Llyn Peris and Llyn Padarn), to the north of Snowdon; Llyn Ogwen, to the north of the Glyder Fawr; Llyn Cwlyd and Llyn Eigiau, both to the north of Capel Curcg; Llyn Llydau on Snowdon; Llyn Cwellyn to the west, and Llyn Gwynant to the east of that mountain; Llyniau Nanty-Llef or Nantlle Pools, near Llanllyfni; and Llyn Conway, already referred to.

The climate is cold and severe during the winter, except in the peninsular part of the county and on the sea-coast, where it is very mild. The arable land occupies not more than a third part of the whole surface; and this is mostly in the vale of Conway, or in the neighborhood of the sea. A small quantity of wheat is raised; but the principal cultivated crops are oats, barley, and potatoes. The alluvial deposit in some of the valleys forms a rich and fertile soil, which is chiefly employed as meadow land. Dairy and sheep-farming form the chief employment of the agricultural population; and on the hills numbers of diminutive ponies are reared, which at two years old find a steady sale in the English market. Agriculture is not in a forward state, and has not been advanced by the success attending the mining industries of the county. In 1873 Carnarvon was divided among 6240 separate proprietors, 4610 of these owning holdings of less than an acre; eleven holdings consisted of more than 5000 acres, and none exceeded 42,000 acres. On an average each holding contained 48 acres, the average of all Wales being 74½; and the average rental of properties amounting to an acre and upwards was as high as 19s. 9d. per acre, owing to the presence of so many valuable mines.

The following tables will show the state of agriculture in the county in the years 1872 and 1875, and from these it will be observed that there is a general diminution of the acreage of crops but an increase in the numbers of live stock:

Year.	Oats.	Barley.	Wheat.	Green crops.	Grass under rotation.
1872. .. .	13,786	9101	2033	9134	35,418
1875.....	12,849	8459	1626	9101	37,006

Year.	Horses.	Cattle.	Sheep.	Pigs.
1872.....	7064	46,981	218,881	21,002
1875.....	7363	51,252	223,804	19,273

The county is as well served with railways as the mountainous character of the district will allow. The Chester and Holyhead line runs along the northern coast, and crosses to Anglesey by means of the Britannia Bridge over the Menai Strait. From this line branches diverge up the valley of the Conway, and across the peninsula by Carnarvon to Pwllheli, &c. The Cumbrian line enters from the south at Portmadoc.

These means of communication and the numerous ports on its coasts, afford very great facilities for the transport of the important mineral products of the county.

Copper, lead, and slate are worked very largely, particularly the last, which is of the most valuable quality. For roofing, paving, and ornamental purposes it is exported in large quantities. In 1871, 4370 men were employed in the slate quarries. The chief owners are Lord Penrhyn, Mr. Duff Smith, and the Welsh Slate Company.

The inhabitants, who all speak Welsh more or less, numbered in 1851, 87,870; in 1871 they had increased 20½ per cent., amounting to 106,121, of whom 51,874 were males and 54,247 females. Nearly the whole of Carnarvonshire is in the diocese of Bangor. It has a court of quarter sessions. It is represented in Parliament by one member for the county and one for the Bangor group of boroughs.

The principal towns are Bangor, population (1871) 9859; Carnarvon, 9449; Pwllheli, 3009; and Llandudno, 2762.

Carnarvonshire was occupied by the important tribe of the Segontiaci, who were with difficulty subdued by Ostorius Scapula and Suetonius Paulinus. During the Roman period it formed part of Britannia Secunda, and Conovium and Segontium have been identified as Caer Rhyn and Carnarvon (Caer Seoint). Later it was part of the kingdom of Gwynnedd until Edward I. in 1277 restricted that division to the land of Snowdon proper. The early fortresses at Diganwy, Dinorwig, &c., as well as the later castles at Conway, Carnarvon, and other places, attest the warlike character of its inhabitants.

CARNARVON, the capital of the above county, a parliamentary and municipal borough, occupies an area of 1897 acres, and is pleasantly situated on the eastern shore of Carnarvon Bay, in the Irish Sea, at the mouth of the Seoint, 210 miles north-west of London. It stands very nearly upon the site of Caer Seoint, the ancient capital of the Segontiaci, and owes its origin to Hugh Lupus, earl of Chester, who in 1098 fortified the place. The noble castle was commenced in 1284, and the common tradition that Edward II. was born in that year within its walls is now known to be unfounded, as they were at the date of his birth scarcely in existence. It occupies a large area on the west side of the town, and is in the form of an irregular oblong, surrounded by walls and defended by thirteen polygonal towers. The Eagle Tower (Edward's reputed birthplace) is at the extreme west, and is of conspicuous beauty and dominant height. A considerable portion of the town-wall near the castle is still entire. The parish church is nearly half a mile from the town. In the town itself there is a chapel of ease, and several large and commodious dissenting chapels. There are also a town and county hall, a training college for teachers, and handsome schools. The town also possesses assembly rooms and a theatre, and is resorted to as a sea-bathing place in summer. The port is used for the export of slates and copper ore from the quarries of Llanberis and Llanllyfni, but there is little manufacturing in the town itself. The borough has formed part of a district which has returned a member to Parliament since 1536. The Reform Bill added Bangor to the district, which now includes Carnarvon, Conway, Criccieth, Pwllheli, Bangor, and Nevin. The population of Carnarvon in 1851 was 8674, and in 1871, 9449 (males 4357, females 5092); the inhabited houses numbered 1975. There is a weekly market on Saturdays, and four fairs are held in the course of the year. The quarter sessions and assizes are held in the town.

CARNATIC, a large district of Southern India, now included in the presidency of Madras. Though no longer recognized as a political or administrative division, it is of great historic importance. It extended along the eastern coast about 600 miles in length, and from 50 to 100 miles in breadth. It was bounded on the N. by the Guntoor circar, the limit being the small River Gundezama, which

falls into the sea at Muntapilly, and thence it stretched southward to Cape Comorin. It was divided into the Southern, Central, and Northern Carnatic. The region south of the River Coleroon which passes the town of Trichinopoly, was called the Southern Carnatic. The principal towns of this division were Tanjore, Trichinopoly, Madura, Tranquebar, Negapatam, and Tinevelly. The Central Carnatic extended from the Coleroon River to the River Pennar; its chief towns were Madras, Pondicherry, Arcot, Vellore, Cuddalore, Pullicat, Nellore, &c. The Northern Carnatic extended from the River Pennar to the northern limit of the country; and the chief towns were Ongole, Carwaree, and Samgaum. The Carnatic, as above defined, comprehended within its limits the maritime provinces of Nellore, Chingleput, South Arcot, Tanjore, Madura, and Tinevelly, besides the inland districts of North Arcot and Trichinopoly. The population of this region consists chiefly of Brahmanical Hindus, the Mahometans being but thinly scattered over the country. The Brahmans rent a great proportion of the land, and also fill different offices in the collection of the revenue and the administration of justice. Throughout the country they appropriate to themselves a particular quarter in every town, generally the strongest part of it. The country in former times was the scene of unremitting violence and strife between the numerous chieftains and petty potentates, among whom it was divided; and forts and fortresses accordingly crown almost all the elevated points. They are built of a square form; from the long period of internal tranquillity which the country has enjoyed, they are now rapidly falling into decay. Large temples and other public monuments of civilization abound. The temples are commonly built in the middle of a square area, and enclosed by a wall 15 or 20 feet high, which conceals them completely from the public view, as they are never raised above it.

In the early centuries of the Christian era, the Carnatic or Carnata seems to have formed part of the Panja or Pandion kingdom; but about the middle of the 11th century it passed under the power of the Belalas, a family of Rajput race, which at that time was making itself supreme in Southern India. Of the greatness of this dynasty the ruins of Bisnagar, their capital, still give striking witness; but it succumbed before the mightier Mahometan potentates.

The Carnatic was first invaded by this new power in 1310 A.D., when they defeated the Hindu sovereign and conquered the country, which, after being divided between the kingdoms of Bijapore and Golconda, became ultimately tributary to the sovereigns of the Deccan. In the 17th century it was overrun by the armies of Aurungzebe; but it was again dismembered from the Mongul empire in 1717, when Nizam ul-Mulk obtained possession of the Deccan and the south of India. In 1743 he appointed Anwar ud-Deen nabob of the Carnatic, with his capital at Arcot; in 1754 a competition for the government arose; and after a long and tedious war, in which the English and the French took different sides, Mahomet Ali was left in possession of that portion of the Carnatic which was the fruit of the successes achieved by the British. Central Carnatic was laid completely waste by Hyder Ali, but was again reconquered by the British in 1783. In 1801 all the possessions of the nabob of the Carnatic were transferred to the British by a treaty, the conditions of which were, that a revenue of several lacs of pagodas should be reserved to the nabob annually, and that the British should undertake to support a sufficient civil and military force for the protection of the country and the collection of the revenue. On the death of the nabob in 1853 it was determined to put an end to the nominal sovereignty, a liberal establishment being provided for the family.

The Southern Carnatic, when it came into the possession of the British, was occupied by military chieftains called polygars, who ruled over the country and held lands by doubtful tenures. They were unquestionably a disorderly race; and the country, by their incessant feuds and plunderings, was one continued scene of strife and violence. Under British rule they have been reduced to order, and their forts and military establishments have been destoyed.

CARNEADES, a Greek philosopher, founder of the Third or New Academy, was born at Cyrene about 213 B.C. Little is known of his life. He learned dialectics under Diogenes the Stoic, and under Hegesinus, the third leader of the Academy in descent from Arcesilaus. The chief objects of his study, however, were the works of Chrysippus, opposition to whose views is the mainspring of his philosophy. "If Chrysippus had not been, I had not been either," he is reported to have said on one occasion. The most notable incident in his life was the embassy to Rome in 156. His eloquence and powerful reasoning excited among the Roman youth an enthusiasm for philosophical speculations, and roused the ire of Cato, who insisted on Carneades, with his companions, being sent from the city. According to Diogenes Laertius, Carneades died in his eighty-fifth year, *i.e.*, in 129 B.C.; according to Cicero he survived to the age of ninety.

Carneades is the most powerful of the ancient skeptics. Fundamentally he is at one with Arcesilaus (see ARCESILAUS); but he carried out his principles with such fulness and skill, both on the negative and on the positive side, that he is called with justice the founder of the New Academy. Negatively, the philosophy of Carneades is a polemic against the Stoic theory of knowledge in all its aspects. Experience, he thinks, clearly shows that there is no true impression. There is no notion that may not deceive us; it is impossible to distinguish between false and true impressions; *φανταία καταληπική* must be given up. There is no criterion of truth. Not content with attacking this fundamental position of the Stoic philosophy, Carneades also assailed their theology and physics. In answer to the Stoic doctrine of final cause, of design in nature, he points to those things which cause destruction and danger to man, to the evil committed by men endowed with reason, to the miserable condition of humanity, and to the misfortunes that assail the good man. There is, he concludes, no evidence for the doctrine of a divine superintending providence. Even if there were orderly connection of parts in the universe, this may have resulted quite naturally. No proof can be advanced to show that this world is anything but the product of natural forces. Carneades further attacked the very idea of God. He points out the contradiction between the attributes of infinity and individuality. Like Aristotle, he insists that virtue, being relative, cannot be ascribed to God. Not even intelligence can be an attribute of the divine Being. Many of the arguments employed in this connection by Carneades have little value, but the general line of criticism is highly suggestive and anticipates much in modern thought.

The positive side of Carneades's teaching resembled in all essentials that of Arcesilaus. Knowledge being impossible, a wise man should practise *ἐποχή*, withholding of judgment. He will not even be sure that he can be sure of nothing. Ideas or notions are never true, but only probable; nevertheless, there are degrees of probability, and hence degrees of belief, leading to action. This theory of probability was worked out with some care, but little is known of its application to practice. The views of Carneades on the *summum bonum* were not clearly known even to his disciple and successor Clitomachus. He seems to have held that virtue consisted in the direction of activity towards the satisfaction of the natural impulses. Carneades left no written works; his opinions seem to have been systematized by his follower Clitomachus. (See Diog. Laer. bk. iv., Cicero, and Sextus Empiricus. An admirable survey of Carneades is given by Zeller, *Phil. d. Griechen*, iii. pt. 1.)

CARNIOLA (in German, *Krain*), a duchy and crown land of the Austrian empire, bounded on the N. by Carinthia, on the N.E. by Styria, S.E. and S. by Croatia, and W. by Trieste, Görtz, and Istria. It has an area of 3857 English square miles, and the civil population in 1869 amounted to 463,273, of whom 220,000 were males and 243,264 females. It is occupied in the N. by the southern slopes and offshoots of the Carinthian Alps, in the W. by the Julian Alps and the Karst or Carso Mountains, and on the S.E. frontier by the Uskoken Mountains. The highest point is the Terglou, which rises to nearly 10,000 feet, and bears on its northern declivity the only glacier in the duchy. No part of Europe presents a greater number of caves, subterranean streams, funnels, and similar phenomena; and the grottoes of Adelsberg, especially, are among the most extensive and interesting in the world. The principal river of the duchy is the Save, which rises in the N.W. corner, and flows south-east; its main source is in the Wochein Lake, and its more important tributaries are the Gurk, the Kanker,

and the Leibnitz. The climate is rather severe, and the soil comparatively unproductive. In 1870, by official statistics, there were about 336,731 acres of arable land, 25,844 in vineyards, 406,325 in meadows and gardens, 504,879 in pasture, and 448,017 in woods. Millet is the grain principally grown, and furnishes the favorite national fare; maize is not uncommon, but wheat and rye are rarely met with. The country is rich in mineral wealth; in 1870 it yielded 23,632 tons of quicksilver ore —most of it obtained from the mines of Idria, 9401 of iron ore, 7630 of copper ore, 195 of zinc, and a small quantity of lead. The weaving of linen and lace is very common through the country, and distillation is carried on by a considerable number of the farmers on a small scale. Carniola is divided into the eleven districts of Adelsberg, Gottschee, Gurkfeld, Krainburg, Laibach, Litaj, Loitsch, Radmansdorf, Rudolfsworth, Stein, and Tchernembl; and the capital Laibach ranks as a separate division. There are fourteen towns, twenty-three market villages, and 3231 hamlets,—the most populous places being Laibach, with 22,593 inhabitants, Upper Idria, 3813, Krainburg, 2668, and Rudolfsworth, 2068. By far the greater part of the population is of Slavonic race,—the German element amounting to little more than a fifteenth of the whole. Nearly all are Roman Catholics, 956 being Protestants, and 315 adherents of the Greek Church. By the law of 1861 the Carniola diet consists of thirty-seven members, including, besides the bishop, ten appointed by the landed proprietors, eight by the towns and centres of industry, sixteen by the rural communes, and two by the commercial chambers at Laibach; six members are sent to the imperial diet. During the Roman empire Carniola formed part of Noricum and Pannonia. Conquered by Charlemagne, the most of the district was bestowed on the duke of Friuli; but in the 10th century the title of margrave of Carniola began to be borne by a family resident in the castle of Kieselberg near Krainburg. Various parts of the present territory were, however, held by other lords, such as the duke of Carinthia and the bishop of Friesing. Towards the close of the 14th century all the separate portions had come by inheritance or bequest into the hands of Rudolph IV. of Austria, who took the title of duke of Carniola; and since then the duchy has remained a part of the Austrian possessions, except during the short period from 1809 to 1813, when it was incorporated with the French Illyrian Provinces. In 1849 it became a crown land.

CARNIVAL. This word is probably most commonly written in English as it is here given; but it is extremely difficult to say what is the most correct orthography. Of course for the solution of any doubt upon the subject we turn immediately to the Italian vocabularies and practice. But on doing so we find ourselves at the beginning, not at the end of our difficulty. Fanfani, whose dictionary is constructed on the basis of the Della Crusca vocabulary, gives only "Carnevale."[1] Moroni also in his ecclesiastical dictionary gives both "Carnevale" and "Carnovale." Boiste, following the "Académie," gives "Carnaval," as the French form. Facciolati in his appendix of low Latin terms gives only *Carnisprivium*. Our mode of writing "Carnival" would seem, therefore, to be the only possible way of spelling the word which is unsupported by the authority of other languages; yet, if that which seems to be the most obvious, and is the most generally accepted meaning and derivation of the word, be the correct one, "Carnival" is surely the most natural form of a word intended to express "farewell to flesh-meat,"—*Carni-vale*. But there are sufficiently strong reasons for doubting whether such be really the etymology of the word. And the generally received notion seems to have naturally suggested itself to those who, understanding the term in its modern, popular, and specially non-Italian meaning, to signify the few last days of license and feasting immediately preceding Lent, have supposed that this feasting was meant as a sort of valedictory consolation for the privations about to follow. But such is not the proper meaning of the term, and it is hardly yet popularly so understood in Italy. It is still very commonly taken there to signify the whole of the time from the first day of the year to Shrove Tuesday inclusive. But neither is this accurately correct. Carnival time properly begins with the day following the festival of the Epiphany, that is the 7th of January, and lasts till midnight on Shrove Tuesday. Now, although it may be natural enough for those who consider "Carnival" to mean the three or four days of revelry which immediately precede Lent to imagine that such revelry celebrates their coming forty days of abstinence, it is hardly likely that a season of the year beginning between two and three months before such "farewell to flesh" should be named from that circumstance. The Della Cruscans, with Du Cange and Muratori, suppose the word to be derived from *Carn-avallare* (*avallare*, Ital. to swallow), from the greater quantity of flesh-meat used at that time of the year. But the Spaniards, following the older low Latin phrase "Carnisprivium," speak of Carnival as *Carnes tollendas*. And the phrase met with in the older ecclesiastical writers, *Carnisprivium sacerdotum* (applied to the period beginning with Sexagesima Sunday, from the fact of the regular clergy of most rules having practised a partial abstinence from that day till the beginning of Lent), would not seem to favor the supposition. It is to be observed also that there is another name for the period of carnival, once quite as common in Italy as that of which we are speaking, though now nearly obsolete, *Carnasciale;* and Muratori says that he has nothing to oppose to those who think that *Carnevale* is merely another form of *Carnasciale*, the meaning of which is to abound in (or use unrestrictedly) flesh,—*carne scialare*. Ferrario, on the other hand, maintains that the word was originally merely the same with "Carnalia," indicating an origin much earlier than any ecclesiastical observance, and used in the same way as "Saturnalia," "Liberalia," &c.

And, in fact, whatever may have been the origin of the *word*, there can be little doubt that the origin of the *thing* dates from ante-Christian times. The Bacchanalian festivals of antiquity were celebrated by the Romans, who adopted them from older nations, twice in the year, indicating the early connection of those rites with the phenomena of the solar system, in the winter and in the summer. And the primitive church, finding it, doubtless, impossible to suppress, as it would fain have done, those popular revels, adopted its usual policy of at least fitting them in to its system, and assigning to them a meaning connected with its own practices and observances. The Lupercalian festival in honor of Pan and Ceres, observed in February (which Pope Gelasius I., who died in 496, strove to supersede by substituting for them the festival of the Purification of the Blessed Virgin, with special illumination of candles on the altar *Candlemass*), also coincided with the period of carnival, as did also (at a little earlier period of the year) the mediæval celebration of the Festival of Fools, equally a survival of the same old Pagan midwinter revelling. Specially the use of masks and torches can be traced as the continuation of ancient practices.

The spirit of compromise, which has so generally characterized the dealings of the church with "the world," is very notable in its attitude towards the popular observances of carnival; and more especially so, as needs must have been the case, in those cities in which the Pope was temporal ruler as well as spiritual pastor. For many generations past these carnival gala doings, especially at Rome, were recognized as an important element in the material prosperity of the city. They were good for trade. They induced large numbers of people, foreigners and provincials, to throng to Rome. The Government of the popes, accordingly, not only looked leniently on carnival excesses, but took active steps to promote and assist the revelry. But the Pope was at the same time the universal bishop of souls! And, as the writer of Moroni's dissertation on the subject says, "If the church tolerates the inveterate custom of carnivalesque diversions, especially the masquerades, groaning all the while, it promotes exercises of piety at the same time, since the consequences of these travesties are dangerous, as affording opportunities for immoral conduct. And the Bacchanalian revelries of carnival, which are nothing else than an imitation of the abominable debauches of Pagans, when they abandon themselves to their passions, have been constantly denounced by the voice of reason, by that of the gospel, by the sacred canons, by the councils, and by all the pontiffs and zealous pastors of the churches, from the earliest ages down to our own days. The church from Septuagesima Sunday covers her altars, and her ministers assume vestments of penitence. She suspends the song of Hallelujah, and mingles tears

[1] But the Della Crusca *vocabolaria* itself, as well as Du Cange, Muratori, and other authorities, give either form, Carnevale or Carnovale.

and sighs of sadness with the joyous accents of the people. She assumes purple-colored vestments and altar-cloths in sign of mourning, suppresses her hymns, and proposes for our contemplation the fatal fall of our first parents, and the lamentable effects of that great sin." But at the same time the Cardinal Vicar, in whose hands was the police of Rome, was giving special permission for the wearing of masks in the streets, naming the days when people might pelt each other with sham comfits, regulating the exact size and nature of these, and planning the whole arrangement of the revels. Clement IX. (ob. 1669) meanwhile used to shut himself every year during carnival in the convent of St. Sabina on the Aventine, that he might at least not see what he could not avoid tolerating. Clement XI., in 1719 and 1721, issued two apostolical briefs with the view of repressing the license of carnival. Benedict XIII. (ob. 1730) always passed the carnival in the strictest retirement in the Dominican convent of St. Sixtus. Benedict XIV. (ob. 1758) strove, by an encyclical letter of the 1st of January, 1748, to moderate some of the worst excesses of licentiousness to which the carnival every year gave rise. But his efforts mainly restricted themselves to the merely formal points of insisting that the revelry should not be prolonged beyond the midnight of Shrove Tuesday, and forbidding the appearance of masks in the streets on Sundays and Fridays; adding a promise of plenary indulgence to all who would contribute to counterbalance the sins of carnival by the practice of certain extra devotional exercises during those days. Nevertheless, in the last years which preceded the destruction of the Pope's temporal power, when the inhabitants of Rome were bent on manifesting by every possible means their discontent at the ruling order of things, and their desire to associate themselves with the rest of liberated and united Italy, and for this reason were disposed to abstain from all carnival rejoicings, the priestly Government did everything in its power to promote the usual holiday doings, and excite the people to the accustomed revelry.

The Roman Carnival is recorded by several contemporary writers of records and diaries to have been especially splendid during the papacy of the great Farnese Pope Paul III., 1534–1549,—days when Rome was still overflowing with wealth sent thither by all tributary Christendom. And the year 1545 is mentioned by several chroniclers as having been marked by special magnificence. The carnival sports seem at that time to have consisted mainly of three divisions, the races in the Corso (which, formerly called the Via Lata, took its present name from them), and the spectacular pageants of the "Agona," now the Piazza Navona, and of the Testaccio. The races seem to have taken place on each of the eight days which were then held to constitute the period devoted to holiday-making. These races seem to have prevailed in one form or another from time immemorial; and before they were run in the Corso, as at present, took place in the open space in the neighborhood of the Porta St. Sebastiano, not far from the present Protestant cemetery. It was in the time of Paul II. (ob. 1471) that they were moved to the Corso. The Piazza del Popolo, which now forms the starting-place, was not then in existence. The races started from the Arch of Domitian, in the immediate vicinity of the Palazzo Fiano, and terminated in the Piazza di Venezia, so named from the huge palace, now the property of Austria, which the Venetian Pope Paul II. (Barbò) had just built. "In these races," says the writer in Moroni's *Dizionario*, "ran, during the eight days of carnival, old and young, boys, Jews, horses, asses, and buffaloes, the prizes consisting in a certain flag or banner called *palio*." The institution of these races as they existed subsequently, and still exist to the present day, belongs to a subsequent period. The principal feature of the carnival, however, in the days we are speaking of, consisted in the so-called sports, "giuochi," of the Agona and the Monte Testaccio. The former seem to have consisted of little more than one of those colossal processions of which that age was so fond. A full account of those processions may be found in a MS. preserved in the Albani library, entitled *The True Progression of the Festival of Agone and Testaccio, celebrated by the Gentlemen of Rome, on the Thursday and the Monday of Carnival in the year* 1545, *according to the practice of the Ancient Romans, together with a True Description of the Triumphal Cars.*

The following account of the games at Monte Testaccio is abridged from Crescimbeni, who has preserved the description left by a contemporary writer. The Testaccio is an artificial mound of considerable size, composed of pot sherds, the accumulation of many generations, long since well covered with turf.

"This place," says Crescimbeni, "is the finest and most convenient for spectacles that can be imagined. To the west there is the Monte Testaccio; to the east a little eminence on which the monastery of St. Saba once stood; on the north that part of the Aventine which Paul III. has fortified, and a few vine-dressers' cottages; to the south are the walls of Rome, with a tower at every hundred feet. All these positions were crowded with people, and all could see conveniently. Besides these commanding positions there were a great number of stands and scaffoldings. In the midst is the large open meadow, on the northern side of which was the dais raised for Madama (the beautiful Julia, sister of Paul III., whose recumbent statue may be seen on that Pontiff's tomb in St. Peter's), which was entirely surrounded by infantry and cavalry." Then came a procession like that described in the work referred to above, and then "commenced the great hunting match, in which thirteen bulls were slain, and six cars were sent down from Monte Testaccio, on each of which was a red standard and a live pig, in scrambling for which no less efforts were made than in slaying the bulls. Among the many liveried companies seen that day was one of thirty-six mountebanks clad in red, with iron-shod poles in their hands; and these were the first to assail the bulls. But the most splendid thing seen was a company of six cavaliers, consisting of the Cardinal Farnese, the Cardinal Santa Fiorà, the duke of Camerino, the duke of Melfi, the count of Santa Fiorà, and the prince of Macedonia. These were dressed as knights of old, and their garments were of gold, and silver, and silk with embroidery and lace, and needlework upon needlework,—such an elegance that I (says the worthy canon) have neither the patience nor the courage to describe it! Their horses, too, were adorned with the same splendor, and they performed such feats of horsemanship (these cardinals!) that the people thought it a miracle! Then three races were run, the first for riderless horses, with a banner of gold brocade for the prize; the second for ridden horses, with a banner of crimson velvet for the prize; and the third, for mares, the prize being a banner of purple velvet. On the last day of carnival there was a race of asses and buffaloes, and as usual there was revelling and tumult in abundance. At night there was a comedy in the Caffarelli palace. On the first day of Lent there was a procession to Santa Sabina, which was so grand that many disputed whether the Carnival or Lent was the finest at Rome!" Many other descriptions, some of them extending to great length, may be found in print among the vast quantity of volumes concerning the Eternal City; there is one especially relating to the doings of 1372. But there is evidence that these games were practised from a much greater antiquity. They were somewhat modified from generation to generation; but ostentation, magnificence in dress, and blood-thirsty cruelty to animals were the unchanging characteristics of them.

Church writers may represent the excesses of carnival as abhorrent to the church, and may point to the various ordinances of mortification and repentance which she has appointed as a means for atoning for the guilt then contracted by the city. But nothing is more certain than that many of the popes were great patrons and promoters of carnival keeping. Paul II., the Venetian Barbò, was one of the most notable in this respect. In his time the Jews of Rome were compelled to pay yearly a sum of 1130 golden florins (the thirty being added as a special memorial of Judas and the thirty pieces of silver), which was expended on the carnival. And we have a decree of Paul II. minutely providing for, and arranging the diversions which were to take place in it. Among other things his Holiness orders that four rings of silver gilt should be provided, two in the Piazza Navona, and two at the Monte Testaccio,—one at each place for the burghers and the other for the retainers of the nobles to practise riding at the ring. The Pope also orders a great variety of races, the expenses of which are to be paid from the Papal exchequer,—one to be run by the Jews, another for Christian children, another for Christian young men, another for sexagenarians, a fifth for asses, and a sixth for buffaloes. Under Julius III. we have long accounts of bull-hunts—bull-baits we should rather say—in the Forum, with gorgeous descriptions of the magnificence of the dresses, and enormous suppers in the palace of the Conservatori in the Capitol, where seven cardinals, together with the Duke Orazio Farnese, supped at one table, and all the ladies by themselves at another. After the supper the whole party went into the court-yard of the palace, which was turned into the semblance of a theatre, "to see a most charming comedy which was admirably played, and lasted so long that it was not over till ten o'clock!" Even the austere and rigid Caraffa, Paul IV. (ob. 1559), used to keep carni-

val by inviting all the Sacred College to dine with him. The vigorous and terrible Sixtus V., who was elected in 1585, set himself to the keeping of carnival after a different fashion. Finding that the license then customary and permitted gave rise to much abuse and no few crimes, he prepared for carnival, to the no small dismay and terror of the Romans, by setting up sundry gibbets in several conspicuous places of the town, as well as whipping posts, —the former as a hint to robbers and cut-throats, the latter in store for minor offenders. We find, further, from the provisions made at the time, that Sixtus reformed the evil custom of throwing dirt and dust and flour at passengers, permitting only flowers or sweetmeats to be thrown. The *barbèri* (riderless horses) had by this time begun to run regularly every carnival in the Corso; and Sixtus caused a lane to be enclosed with palisades in the centre of the street, along which the horses might run without the danger of causing the accidents which, it seems then, as now, were frequently the result of this sport. He also compelled the people to desist from the old practice of using every kind of violence and trick to impede the *barbèri* in their course, for the purpose of favoring this or the other among the competitors.

It was formerly the custom, especially in the 16th and 17th centuries, to suspend all carnival observances during the *Anno Santo* or jubilee year. Gregory XIII., when he celebrated the eleventh jubilee in 1575, forbade any of the usual carnival celebrations, and ordered that all the money usually expended for the purpose by the Apostolic Chamber should be used for the assistance of poor pilgrims. Clement X., just a hundred years later, on the occasion of the jubilee of 1675, prohibited all carnival celebration, and granted to the Archconfraternity of Pilgrims of the Holy Trinity the 6000 crowns which the Apostolic Chamber was at that period in the habit of spending on the carnival rejoicings, at the same time compelling the Jews to pay over to the same purpose the sums they annually furnished for the barbèri and the prizes of the races. The carnival celebrations have also been frequently suspended on account of the appointed day or days for them having fallen on the date of some church festival. When in the pontificate of Innocent XII. the Wednesday in the last week of carnival chanced to fall on the festival of the Purification of the Virgin, the race of the barbèri which ought to have taken place on the vigil of that festival, was changed to the previous Sunday. On many subsequent occasions the days of the sports have from similar causes been sometimes postponed, sometimes anticipated, and sometimes suppressed. In 1808 Pius VII. forbade all carnival manifestations on account of the French invasion, nor would he permit any to take place in 1809, notwithstanding that the French in the occupation of the city had proclaimed the celebration of the carnival. Of course the Pope had no power to enforce his wish that no sort of carnival rejoicing should take place. But it is remarkable, as indicating the feeling of the population at the time, that the Corso remained entirely deserted and all the shops shut.

The later Popes for the most part restricted the public festivities of the carnival to the last six or seven days immediately preceding Ash Wednesday. The municipal authorities of the city, on whom the regulation of such matters now depends, allow ten days. The public are not, however, permitted to do all the things which are understood to constitute the celebration of carnival on all these days indifferently. Some days are appointed for a "gala corso," *i.e.*, a processional driving up and down the Corso, of all those who choose to take part in it, with the handsomest carriages and the finest liveries and horses, &c., they can compass; and on these days consecrated to finery and ostentation nothing save flowers is permitted to be thrown, either from the balconies and windows to the carriages, or *vice versa*. Other days are set apart for the throwing of "coriandoli," as they are termed, little round pellets about the size of a pea made of plaster, and manufactured and sold in enormous quantities. These *coriandoli* are supposed to represent comfits, which tradition declares to have been the only things thrown in the olden time before the spirit of carnival was, as is supposed, spoiled and vulgarized by the influx of strangers from the north. But the reader has already seen that the flinging of dust, flour, and disagreeable things of all sorts had to be repressed at a very early time. At the present day the principal fun seems to consist in flinging down bushels on bushels of these plaster *coriandoli* on the passers in the streets, mainly in the Corso, from the balconies, and in the return fire of these from the cars which pass up and down the Corso. These cars are huge machines, of which a large wagon forms the basis, built up sometimes in the form of a ship, or a castle, or other such device, and made gay-looking with garlands and abundant bright colored calico. Some dozen or so of young men, generally in uniform fancy dresses, stand on these machines, and work hard at returning, with such best vigor and activity as they may, the pelting they endure from the balconies. The ladies are mainly the occupants of these. All are masked; those who are prudent wear masks of wire gauze, for a handful of these *coriandoli* vigorously and dextrously thrown point blank into the face is not an attack to be despised. Meanwhile everybody shrieks at the top of his voice, the masks affect a counterfeit and high falsetto note, with which they invariably address the unmasked and each other. Then at a given signal begins the running of the *barbèri*, or riderless horses. Some ten of them are led to the starting place in the Piazza del Popolo, with loosely hanging little spiked machines, contrived to act as spurs, hanging to their sides, and crackers attached to them, which are fired at the moment of starting. A gun gives the signal for the compact crowd in the Corso to make a lane for the horses to run through.

By the aid of the police and soldiers this is more or less satisfactorily accomplished, and the horses dash through it, the crowd closing behind them as they run. Rarely, or perhaps it would be more accurate to say never, does a Carnival pass without two or three accidents, frequently fatal ones, in consequence of incautious persons getting knocked down by the rushing horses. The race is run in about two minutes. The winning "post" is a sheet hung across the street at the spot hence called *Ripresa dei Barberi*, in the Piazza di Venezia. The prizes consist, as in olden time, of certain standards of velvet, gold lace, and the like, called "*palio*," which are after the race paraded through the Corso. In these days sums of money, 300 or 400 francs, are usually added by the municipality. The price of these prizes was formerly furnished by the Jews, as has been seen. And popular tradition says that the Jews were permitted to furnish the horses and prizes as a concession to humanity, in lieu of running themselves in *propria persona*. It is undoubtedly true that they were so compelled to run. But it would seem that they did not do so *exclusively*, other categories of persons, as the boys, the youths, the old men, having done the same. These races of the barbèri were abolished in the year 1874, but were re-established in 1876, in accordance with the wishes of a large portion of the Romans. It remains to mention the peculiar diversion of the *Moccoletti* (tapers), which takes place immediately after sunset on Shrove Tuesday. Everybody in the streets, in the balconies and windows, and in the carriages, carries a taper, and everybody endeavors to extinguish the tapers of his neighbors, principally by means of flapping with handkerchiefs, and keep his own alight. All the other features of a modern carnival are common to all the principal Italian cities, but the *Moccoletti* and the *Barbèri* are peculiar to Rome. The fun ends by burning at midnight on Shrove Tuesday a colossal figure supposed to represent the carnival. These are the public and out-door aspects of carnival. But besides this all the theatres have masked balls, called *Veglioni* (from *Vigilare*, watch or keep awake, *Veglia*, a vigil, or keeping awake; the addition of the intensitive termination *one* gives the word the signification of "a great keeping awake," *i.e.*, a festival to last nearly all night). In all classes of society also carnival is deemed the especial season for balls, and for festivities of all kinds.

Of the other Italian cities, besides Rome, Venice used in old times to be the principal home of carnival. But small remains of it are to be seen there now. A stage, gay with colored draperies and gas, set up by the municipality in the great square of St. Mark, on which a few masked and dominoed figures go and dance to music provided by the town, constitutes pretty well the whole of the once celebrated carnival of Venice. Turin, Milan, Florence, Naples, all put forth competing "programmes" for the carnival, all induced by the same motive,—the good of trade. The institution has become everywhere a matter of pure money-getting speculation. Milan and Naples are now the most active competitors with Rome in this respect. In old times Florence was conspicuous for the licentiousness of its carnival; and the *Canti Carnascialeschi*, or Carnival Songs, of Lorenzo de' Medici remain still, though a somewhat rare book, to show to what extent that license was carried. (T. A. T.)

CARNIVORA, or Flesh-eating Animals, is the name employed to designate the important order of Mammals which contains the dogs, cats, hyænas, weasels, bears, badgers, and others. By some zoologists the Carnivora are divided into the *Pinnipedia*, or aquatic carnivora, as the seals and walrus, and the *Fissipedia*, which are mostly terrestrial, as the dogs, cats, &c. By others again the *Pinnipedia* are regarded as possessing characters sufficiently distinctive to justify their being placed in a separate order of Mammals. See MAMMALIA.

CARNOT, LAZARE NICOLAS MARGUERITE (1753–1823), was born at Nolay in Burgundy, May 13, 1753. After receiving a good mathematical education in his native province, he was admitted as an officer of the en

gineer corps under the patronage of the prince of Condé; and he was beginning to gain some reputation as an author by means of a prize eulogy on Vauban, two mathematical essays, and a number of verses of no great value when the Revolution drew him into political life. In 1791 he was returned to the National Assembly for the Pas de Calais, and it was not long before he became a member of the Committee of Public Safety under Robespierre. He took a leading part in the most revolutionary measures; before his election he had addressed a paper to the Assembly proposing the seizure of the property of the church, and he now proposed to arm 30,000 *sans-culottes* with pikes, and to destroy all the citadels in France, and voted for the overthrow of the nobility and the execution of the king. His genius, however, was more military than political; he effected an important improvement in the discipline of the army, and his activity and spirit contributed materially to the successes of the Republic. One of his chief exploits was the victory of Wattignies, where he led in person, and headed a charge on foot. In 1794, after the fall of Robespierre, Carnot had to defend his colleagues, Collot d'Herbois and Barère, from the charge of complicity with the crimes of their leader, and himself only escaped arrest through the glory of his military services. He based his defence on the argument that no member of the Committee was to be held responsible for the deeds of any of the others, since pressure of business made it necessary to sign orders without staying to learn their contents; and, though the excuse is far from sufficient, it was probably true that Carnot, amid the unceasing toils of a minister of war, was not aware of many of the atrocities which were committed. In 1795 he became one of the five directors of the Republic, and it was now that he projected his famous *Plan for the Invasion of England*, by landing two armies simultaneously on the coasts of Sussex and Yorkshire. But not long after he was proscribed, and compelled to take refuge in Germany. Here, though under the protection of a monarch, he published his *Mémoire Justificatif*, in which he declares himself the "irreconcilable enemy of kings." On the downfall of the Directory he returned to France, and became minister of war,[1] but he soon resigned this office, consistently refusing to consent to the election of Napoleon as consul for life; and on the abolition of the tribunate in 1806 he retired into private life, became an active member of the Institute, and devoted himself to the pursuit of science. After the Russian campaign, believing that the independence of France depended upon the success of its emperor, he offered his services to Napoleon, and was made governor of Antwerp, which he defended till the abdication in 1814. He was still faithful to the Republic, and his revolutionary *Mémoire au Roi* did powerful service to the anti-royalist cause. On Napoleon's return from Elba, Carnot was made minister of war, but the time was past for carrying out the vigorous measures which he proposed. On the overthrow of the empire he retired first to Warsaw, and then to Magdeburg, where he died in 1823.

Besides the above-mentioned writings, Carnot was the author of several works on mathematical subjects, of which the best is his *Réflexions sur la Métaphysique du Calcul Infinitesimal*, and several on political subjects, including *Réponse de Carnot, l'un des fondateurs de la république, au rapport du Bailleul sur la conspiration du* 18 *fructidor* (1798); *Exploits des français depuis le* 22 *fructidor au* 1er *jusqu'au* 15 *pluviose an. III. de la république; Exposé de la situation de l'Empire* (1815); *Exposé de la conduite du général Carnot depuis le* 1er *juillet* 1814.

CARNUNTUM, an ancient town in Upper Pannonia, on the right bank of the Danube. It was of Celtic foundation, but became at a somewhat early period a Roman post, and was raised to the rank of a colony and a municipium. For three years during his wars with the Marcomanni and Quadi it was the residence of Marcus Aurelius, and here a part of his *Meditations* was composed. The town was taken and destroyed by the German invaders in the 4th century; but it was afterwards rebuilt, and continued to be a place of some importance till its final destruction in the wars against the Magyars in the Middle Ages. Extensive ruins, supposed to be those of Carnuntum, still exist at Hainburg or Haimburg, a small town of Lower Austria, about 24 miles east of Vienna.

CARO, Annibale (1507–1566), poet, was born at Civita Nuova, in 1507. He became tutor in the family of Ludovico Gaddi, a rich Florentine, and then secretary to his brother Giovanni, by whom he was presented to a valuable ecclesiastical preferment at Rome. At Gaddi's death, he entered the service of the Farnese family, and became confidential secretary in succession to Pietro Ludovico, duke of Parma, and to his sons, duke Ottavio and cardinals Ranuccio and Alexander. Caro's most important work was his translation of the *Æneid* (Venice, 1581, Paris, 1760). He is also the author of *Rime, Canzoni*, and sonnets, a comedy named *Gli Straccioni*, and two clever *jeux d'esprits*, one in praise of figs, *La Ficheide*, and another in eulogy of the big nose of Leoni Ancona, president of the Academia della Vertù. Caro's poetry is distinguished by very considerable ability, and particularly by the freedom and grace of its versification; indeed he may be said to have brought the *verso sciolto* to the highest development it has reached in Italy. His prose works consist of translations from Aristotle, Cyprian, and Gregory Nazianzen, and of letters, written in his own name and in those of the cardinals Farnese, which are remarkable both for the baseness they display and for their euphemistic polish and elegance. His fame has been greatly damaged by the virulence with which he attacked Ludovico Castelvetro in one of his canzoni, and by his meanness in denouncing him to the holy office as translator of some of the writings of Melanchthon. He died at Rome about 1566.

CAROLAN, Turlogh, the most famous of the modern Irish bards, was the son of John Carolan or O'Carolan, a respectable descendant of an ancient tribe of East Breifny, a district now forming part of the counties of Meath and Westmeath. He was born at a place called Newtown, near Nobber, in the county of Meath, about the year 1670. His father, being reduced to a state of poverty, quitted his native county and eventually settled at Alderford, co. Roscommon, on the invitation of the family of M'Dermott Roe. It was here that the future bard received his education, which appears to have been very limited, as he never acquired more than a smattering of the English language. In his eighteenth year he was seized with small-pox and totally deprived of sight. This misfortune led to his becoming a professional bard or itinerant minstrel. His benefactress having provided him with a harp, a horse, and attendant, he began his avocation in his twenty-second year by visiting the houses of the surrounding gentry, his wanderings being chiefly confined to Connaught. It is said, however, that he never played for hire, and that at the houses where he visited he was welcomed more as a friend than as an itinerant minstrel. To the family of M'Dermott Roe he was attached by the tendcrest ties of gratitude and affection, and for them were composed some of his sweetest strains. The number of Carolan's musical pieces, to nearly all of which he composed verses, is said to exceed 200. He died on the 25th March, 1738, and was buried at Kilronan. His poetical *Remains* in the original Irish, with English metrical translations by Thomas Furlong, are printed in Hardiman's *Irish Minstrelsy* (1831). Many of his songs are preserved among the Irish MSS. in the British Museum.

CAROLINA, North and South. See North Carolina and South Carolina.

CAROLINE, Amelia Augusta (1768–1821), wife of George IV. of Great Britain, second daughter of Charles William Ferdinand, duke of Brunswick-Wolfenbüttel, was born on the 17th May, 1768. She was brought up with great strictness, and her education did not fit her well for her after station in life. In 1795 she was married to George, the Prince of Wales, who disliked her, and separated from her after the birth of a daughter in January, 1796. The princess resided at Blackheath; and as she was thought to have been badly treated by her profligate husband, the sympathies of the people were strongly in her favor. About 1806 reports reflecting on her conduct were circulated so openly, that it was deemed necessary for a commission to inquire into the circumstances. The princess was acquitted of any serious fault, but various improprieties in her conduct were pointed out and censured. In 1814 she left England and travelled on the Continent, residing principally in Italy. On the accession of George in 1820, orders were given that the English ambassadors should prevent the recognition of the princess as queen in any foreign court. Her name also was formally omitted from the liturgy. These acts stirred up a strong feeling in favor of the princess among the English people generally; and she at once made arrangements for returning to England and claiming her rights. She rejected a proposal

[1] [He was minister of the interior and Davoust of war during the Hundred Days.—Am. Ed.]

that she should receive an annuity of £50,000 a year, on condition of renouncing her title and remaining abroad. Further efforts at compromise proved unavailing; the princess arrived in England on the 6th June, and one month later a Bill to dissolve her marriage with the king on the ground of adultery was brought into the House of Lords. The trial began on the 17th August, 1820, and on the 10th November the Bill, after passing the third reading, was abandoned. The public excitement had been intense; the boldness of the queen's counsel, Brougham and Denman, unparalleled; and the ministers felt that the smallness of their majority was virtual defeat. The queen was allowed to assume her title, but she was refused admittance to Westminster Hall on the coronation day, July 19, 1821. Mortification at this event seems to have hastened her death, which took place on the 7th August of the same year.

CAROLINE ISLANDS, a widely-scattered archipelago in the Pacific Ocean to the east of the Philippines and the north of New Guinea, between 3° and 11° N. lat., and 135° and 177° E. long. By the Spaniards, who lay claim to the whole, they are divided into the Western, the Central, and the Eastern Carolines.

The Western, better known as the Pelew, Pellew, or Palau Islands, have a total area of 346 square miles, and are nearly encircled by a coral reef. The principal members of the group are Babelthaup, with an area of 275 miles, Coröre, Urucdzapel, Jaracong or Errakong, Kiangle, Eimelius, Pellelew, and Angour or Ngaur; and the general title of Errekeltiu Islands is applied to all the archipelago to the south of Babelthaup. The surface is frequently well wooded and the soil fertile; and bread-fruit, cocoa-nuts, sugar-cane, arums, oranges, and bananas are grown in abundance. Cattle, sheep, and pigs have been introduced; there is a great variety of birds, and the lagoons abound with turtle and fish. The inhabitants are a dark copper-colored race, and bear evident traces of Malay and Papuan blood. Not only the separate islands, but even the villages form independent but co-operative republics. The most peculiar institution is the Clöbbergoll, a kind of corporation for purposes of mutual aid and defence. The women have clöbbergolls of their own, and possess a considerable share of political influence. The Pelewese still used stone instruments and weapons at the close of last century, but produced a variety of artistic articles with their limited means. They have five kinds of recognized currency in the islands, consisting of pieces or beads of ancient glass and enamel, to which they ascribe a divine origin. The population seems to be rapidly decreasing; Dr. Semper calculates that at present the whole group contains 10,000 inhabitants. The Pelews were brought prominently into notice by Captain Henry Wilson, whose ship—the "Antelope"—was wrecked in August, 1783, on one of the islands. A narrative of his residence on the islands was published by George Keate, in 1788. Dr. Semper gives a graphic account of his intercourse with the natives in his *Die Palau-Inseln im Stillen Ocean*, 1873; and in the *Journal des Museum Godeffroy*, Hamburg, 1873, Alfred Tetens describes his visit during 1865–1868.

The Central Carolines, or those which are more usually known as the Carolines proper, consist of about 48 groups with 400 or 500 islands. Omitting Ualan, Puynipet, and Rug the area is hardly 20 square miles, but including them it amounts to 360. The Ngoli, Gulu, or Matelotas group lies to the north-east of the Pelews, and consists of three islands inhabited by a few people from Yap. Yap or Guap[1] lies further to the north-east, is about 10 miles in length, and has an excellent harbor on the south-east. The natives are at a higher level of civilization than most of their neighbors; they cultivate the betel-nut with great care, build first-rate boats, lay out their villages regularly, pave their streets, and construct stone piers and wharves. A Spanish mission was established in the island in 1856. A map and description will be found in the *Godeffroy Journal* for 1873, which also gives an account of the Ulithi, Elivi, or Mackenzie group, previously described by Captain Wilkes of the United States exploration. The Ulea, Swede, and Lütke Islands are of little importance; but the Hugoleu or Rug group, discovered in 1824 by Duperrey, is composed of five large and about forty smaller islands, and contains nearly 35,000 inhabitants, who are divided into two distinct races—a black and a red—which are often at war with each other. The Mortlock or Young William's group, which received its former name from its discoverer in 1793, consists of three atolls called respectively Satoan, Etal, and Lukunor. The natives, who number about 3400, are of Samoan origin, and are the only worshippers of regular idols in the archipelago. To the north-east lies Ngatik, Nutik, or Raven Island, discovered in 1773, and inhabited by immigrants from Puynipet, greatly mingled with foreign blood. An account of a visit by the "Star" to the last three or four islands is given in the *Geographical Magazine* for 1874. Puynipet (Bornabi, Bonabe, Bonibet, Funopet, or Panapee), also called Ascension by the French, along with the two low atolls of Andema and Paphenemo (known to English sailors as Ant's Islands and Pakeen respectively), constitute the group called by Admiral Lütke the Seniavine. The population at the time of the "Novara's" visit in 1858 was 2000, reduced by small-pox from 5000 in 1846. There is a small colony of whites, and the island has been the seat of an American mission since 1851. The island is the chief rendezvous for the whalers in that part of the Pacific. There is a remarkable mass of ruins in the centre of the island, which seems to have belonged to a fortification. (See Kubary, "Die Ruinen von Naumatie auf der Insel Ponape," in the *Godeffroy Journal.*) Ualan Kusai, or Strong's Island, which occupies almost the centre of the Carolines proper, is a volcanic island with an area of about 30 square miles and a population from 700 to 1000. It was discovered in 1804 by the American Crozer, and is the seat of an American mission.

The Eastern Carolines are otherwise known as the Mulgrave Archipelago, and comprise the Radak, Ralik, or Marshall group and the Gilbert group. The total population is estimated at 100,000. They were discovered by the two voyagers whose names they bear in 1788.

The Carolines were probably first visited by Alvaro de Saavedra in 1528; in 1579 Drake discovered the Pelews; and in 1686 another group was added to the list by Admiral Francesco Lazeano. To the last-mentioned navigator they owe the name they now bear, which was given in honor of Charles II. of Spain.

See beside the works mentioned above, the voyages of Freycinet, Duperrey, D'Urville, Lütke and Chamisso; Cheyne's *Islands in the Western Pacific Ocean*, 1852; J. Van der Hoeven, *Beschrijving van Schedels van Inboorlingen der Carolina-Eilanden*, 1865; and articles by J. B. Davis and W. T. Pritchard in *Anthropological Journal*, 1866.

CARORA, a well-built town of Venezuela, in the province of Barquisimeto, 94 miles S.S.W. of the town of Coro, on the River Moreva or Tocuyo. It carries on a considerable trade in aromatic balsams, gums, cochineal, agricultural productions, cattle, and mules. Before the wars of independence it contained about 9000 or 10,000 inhabitants, and at present it numbers about 6000. Its foundation dates from 1752.

CAROUGE, a town of Switzerland, in the canton of Geneva, and about two miles south of that city, with which it is connected by a horse-railway. It is situated in the midst of fine orchards and meadows; and the neighborhood is thickly studded with villas. Cotton-spinning and the manufacturing of leather and pottery are the principal industries. About 1780 King Victor Amadeus of Savoy endeavored to attract the workmen of Geneva to Carouge, and thus to render it the rival of the greater city; but the occupation of his country by the Revolutionary forces in 1792 prevented the success of the undertaking. The population in 1870 was 5871.

CARPATHIAN MOUNTAINS, or KRAPACKS, the eastern wing of the great central mountain system of Europe. They lie between 44° 30′ and 49° 40′ N. lat., and 17° and 26° E. long., enclosing Transylvania and Hungary, and form a curve 800 miles long, the concavity of which is towards the south-west. The south-eastern extremity of the curve is at Orsova on the Turkish frontier, where the Danube separates it from the northern spurs of the Balkan or Hæmus range. The western extremity is at Presburg in Hungary on the same river. The breadth of the Carpathian Mountains is between 100 and 200 miles. They form the main water-shed between the northern seas and the Black Sea. The Valley of the March divides them from the Silesian and Moravian chains; the valley of the Lower Danube, from the system of the Alps. They are almost entirely in Austrian territory. The chief divisions are the

[1] [Seized by Germany in 1885, but by papal arbitration awarded to Spain. See Vol. XVI. p. 268, note.—AM. ED.]

Little Carpathians on the west, between the Waag and the March; to the east of these, the Jablunka Mountains; then the Western Carpathians, or Carpathians proper; and lastly, the East Carpathians to the south-east of Transylvania. The Western Carpathians include the groups of the Tatra, Lomnitz, and Bisztra. Of these the highest is the Tatra, some of the peaks of which are free from snow only one month in the year. The Gerlsdorfer Spitze, the loftiest point, has an altitude of 8685 feet. On the northern side are some small glaciers, which, however, hardly deserve the name. It is here that the mountain lakes, or "eyes of the sea" are found, in deep hollows between the steep and jagged granitic peaks. The main ridge of the Carpathians running east from the Tatra is called the Waldgebirge, the highest points of which are 2800 feet above sea-level. The Tatra and adjoining groups have a very important influence on the climate of the regions lying south of them, serving as a protection from the north wind. The East Carpathians, the southernmost member of the chain, occupy a quadrangular tract of about 25,500 square miles. The highest point is Mount Butschetje, in South Transylvania; it is 9528 feet in altitude. The chief passes of the Carpathians are those of Tergova, leading from Orsova to Temesvar; Vulcan, in the valley of the Schyl, and Rothe Thurm, in the Aluta valley, at the foot of Mount Surul, both on the south border of Transylvania; Türsburg, between Bucharest and Kronstädt; Ojitos and Gymos between Moldavia and Transylvania; Borgo, leading from Bistritz to Bukowina; Jablonka on the route from Presburg to Cracow. The Carpathians are rich in metallic ores; lead and quicksilver, and also rock-salt, are obtained from them; there are large copper-workings in Zips, gold and silver mines at Kremnitz and Schemnitz in Hungary, and rich gold ores at Nagyag in Transylvania. Besides these substances, the Carpathians furnish a variety of minerals. Granite is an important constituent of the range. In the Liptau Mountains it is overlain by limestone; and in the Zipfer Mountains it is associated with limestone and gneiss. In the Waldgebirge the large deposits of sandstone afford a poor soil for cultivation. Basalt and other igneous rocks, with the remains of ancient craters, are met with in some districts of the Transylvanian Alps. On the slopes of the Carpathians large quantities of wheat and maize are raised; cattle and sheep are pastured in great numbers; and vineyards and orchards flourish. The vegetation presents four zones; that of the beech extends to 4000 feet above the sea, that of the Scotch fir to 1000 feet higher; above this grows a species of pine, which becomes dwarfed and disappears at an altitude of about 6000 feet, beyond which height is a zone of lichen and moss covered or almost bare rock.

CARPATHUS, the ancient name of the island of Scarpanto, about 30 miles south-west of Rhodes, in that part of the Mediterranean which was called, after it, the *Carpathium Mare*, or Carpathian Sea.

CARPENTARIA, Gulf of, an extensive arm of the sea deeply indenting the north coast of Australia, between 10° 40′ and 17° 30′ S. lat., and 136° and 142° E. long. It averages 350 miles in length and breadth, and is bounded on the E. by York Peninsula, and on the W. by Arnhem Land. At its south-east corner is situated a group of islands of which the largest is Wellesley; and towards the western side are the Sir Edward Pellew Islands and the Groote Eylandt. A large number of rivers find their way to the gulf, and some of them are of considerable size. On the eastern side there is the Mitchell River; at the south-east corner the Gilbert, the Flinders, the Leichhardt or Disaster, and the Gregory or Albert; and on the west the Roper River. Jan Carstensz, who undertook a voyage of discovery in this part of the globe in 1623, gave the name of Carpentier to a small river near Cape Duifken in honor of Pieter Carpentier, at that time governor-general of the Dutch Indies; and after the second voyage of Abel Tasman in 1644, the gulf, which he had successfully explored, began to appear on the charts under its present designation.

CARPENTRAS, the chief town of an arrondissement in the department of Vaucluse in France, is situated on the left bank of the Auzon, 15 miles north-east of Avignon, with which it is connected by means of a branch railway leaving the main line at Sorgues. It is well built, but the streets are narrow. Part of its old walls and towers are still standing, and the Porte d'Orange is a fine specimen of an ancient gateway. Among its buildings the most interesting are the Cathedral of St. Siffrein, rebuilt in 1405, a triumphal arch, which forms the only important relic of the Roman period, the old Episcopal palace, and a hospital of the 18th century; and there are also a theatre, a public library of 12,000 volumes, and a museum of antiquities, as well as various municipal buildings. Water is brought to the town by an aqueduct of 48 arches, completed in 1734; and a canal of quite recent construction communicates with the Durance. Soap-works, distilleries, dye-works, and cotton factories are the chief industrial establishments; and there is trade in silks, saffron, oil, honey, and fruits. Carpentras is identified with *Carpentoracte*, a town of Gallia Narbonensis mentioned by Pliny, which appears to have been of some importance during the Roman period. In the Middle Ages its history is full of vicissitudes; it was captured and plundered by Vandal, Lombard, and Saracen. About 1313 it was for a time the residence of Pope Clement V.; and it continued, along with Avignon and the district of the Venaissin, of which it was regarded as the capital, to be administered by the Papal legate till the Revolution. The name of the "Carpentras Inscription" is specially appropriated by Semitic scholars to a few lines of Aramaic preserved on a stone in the Episcopal library, which are remarkable as probably the oldest specimen of rhythmic verse in the Semitic languages (see *Journal Asiatique*, 1868). Population in 1871, 7967.

CARPENTRY. See Building, vol. iv. pp. 426–433.

CARPET is the name applied in modern times to a woven or felted fabric, made generally of wool, which is used for covering the floors of chambers or for spreading on the ground. The term is probably connected with the Latin *tapetes*, whence also comes the word tapestry, which, though now distinctively applied to hangings, was in early times not clearly distinguished from carpeting. Carpets and rugs were originally employed by Oriental nations for sitting, reclining, or devotionally kneeling upon; and when first introduced among Western communities they were also used as covers for tables and couches, or for laying before altars or chairs of state as *pedalia* or foot cloths. The processes for making tapestry hangings and carpets being the same, and the distinction of their application being vague, it was chiefly by the nature of the design that any line was, in mediæval times, drawn between the two classes.

The mention of carpets dates from a very remote period of antiquity. In Egypt they were first applied to religious purposes by the priests of Heliopolis, and were used to garnish the palaces of the Pharaohs. It was also a custom of antiquity to place them under the couches of guests at banquets. Regarding a carpet rug, which he considers to be of ancient Egyptian manufacture, Sir J. Gardner Wilkinson says,—"This rug is made like many cloths of the present day, with woollen threads, on linen strings. In the centre is a figure of a boy in white, with a goose above, the hieroglyphic of 'a child,' upon a green ground, around which is a border composed of red and blue lines," &c. (*Manners and Customs of the Ancient Egyptians*, vol. iii. pp. 141–2). The carpets of the Homeric age were generally white or plain cloths; but they were also sometimes produced with various colors and embroidered designs. At the supper of Iphicrates, purple carpets were spread on the floor; and at the magnificent banquet of Ptolemy Philadelphus (an account of which is given by Callixenus of Rhodes) we learn that underneath 200 golden couches "were strewed purple carpets of the finest wool, with the carpet pattern on both sides; and there were handsomely embroidered rugs, very beautifully elaborated with figures. Besides this," he adds, "thin Persian cloths covered all the centre space where the guests walked, having most accurate representations of animals embroidered on them" (Athenæus, v. 26). The Babylonians, who were very skilful in weaving cloths of divers colors (Pliny, viii. 48), delineated upon their carpets entire groups of human figures, together with such fabulous animals as the dragon, the sphynx, and the griffin. These were numbered among the luxuries of Elagabalus. On the tomb of Cyrus was spread a purple Babylonian carpet, and another covered the bed whereon his body was placed (Arrian, vi. 29). These carpets were exported in considerable quantities to Greece and Rome, where they were highly esteemed. The pre-eminence of the ancient Babylonian carpet weavers does not appear ever to have been lost by their successors, and at the present time the carpets

of Persia are as much prized and as eagerly sought by European nations as they were when ancient Babylon was in its glory.

Oriental carpets were first introduced into Spain by the Moors; and at a later date the Venetians imported them into Italy, and supplied Western Europe with this luxurious manufacture. We have frequent mention of them during the Middle Ages, and their costliness and magnificence are celebrated in the illuminated pages of fabliaux and romances. They were spread in the presence-chambers of royalty, before the high altars of chapels and cathedrals, in the bowers of "ladyes faire," and on the summer grass. Many articles of furniture were also covered with them—beds, couches, tables, and regal faldistories; but here it becomes difficult to distinguish between carpet and tapestry, both being used promiscuously. Tapestry of Baldekine or Baldachine (from Baldak, an ancient name of Baghdad) was a carpet inwrought with gold and silver threads. Such carpets were carried on poles, and uplifted as a canopy over the host, and over great personages in procession. The troubadors had carpets of gold embroidery which they laid upon the grass beneath them. Hearth-rugs and throne carpets, gorgeously emblazoned with heraldic centre-pieces, were the handiwork of high-born dames during the romance period. To some of them were attached fringes, but these were more usually composed of the fag-ends of the warp, like those of Persia, India, and Turkey. A black velvet carpet, "fringed with silver and gold, and lined with taffeta," is enumerated in the inventory of Archbishop Parker's household furniture in 1577. Rushes were strewn on the floor of Queen Mary's presence-chamber, and that of Elizabeth had the additional covering of a Turkey carpet. Long prior to this, however, Eastern carpets had been introduced. In the reign of Edward VI. we read that before communion-tables were placed—

> "Carpets full gay,
> That wrought were in the Orient."

Chequered matting appears to have been very generally used about the 15th century. In Lydgate's metrical life of St. Edmund (MS. Harl., No. 2278), is a representation of the room wherein that saint was born, the floor is covered with chequered matting, and a fringed hearth-rug of Gothic design is before the fire-place. Carpets composed entirely of leather strips interlaced together may be seen in our antiquarian museums.

In the reign of Henry IV. the carpet manufacture appears to have been introduced from Persia into France. Colbert, the minister of Louis XIV., established the manufactory at Beauvais in 1664, which is now in the hands of the French Government, and produces very artistic specimens. A variety of these, "in Turkish, Peruvian, and Chinese styles," was exhibited at London in 1851. The national manufactory of Gobelins, which likewise sent its beautiful carpets and tapestry to the Great Exhibition, was established shortly after that of Beauvais. It was purchased in 1677 by Colbert from the Gobelin family, whose progenitors, two centuries earlier (Gilles and Jehan Gobelin), brought their art, as was supposed, from Flanders. An attempt was made, in the time of Henry VIII., by William Sheldon, to start this manufacture in England; and under the patronage of James I. it was more successfully established, with the superintendence of Sir Francis Crane, at Mortlake in Surrey, where both carpets and tapestry were produced. Toward this object the sum of £2676 sterling was contributed by its royal patron, and French weavers were brought over to assist. But it does not appear that anything considerable was effected, until after the revocation of the Edict of Nantes in 1685, when artisans of every trade fled to England, and among them tapestry and carpet weavers, who settled in various parts. About the year 1750, Mr. Moore was awarded a premium by the Society of Arts for the best imitation Turkey carpets; and Parisot conducted an establishment for their manufacture at Paddington, under the patronage of the duke of Cumberland. Subsequently carpets were wrought on the same principle at Axminster, in Devonshire, whence the name; and afterwards at Wilton, where the manufacture is still continued. The Board of Trustees for the Encouragement of Arts and Manufactures in Scotland offered prizes for the best Persian and Turkey carpets, which were carried off by Gregory, Thomsons, & Co. of Kilmarnock, and Whytock & Co. of Edinburgh. About ninety years previously they had been made in the vicinity of Holyrood Palace.

Carpets, as manufactured at the present day, range themselves under two classes. The first and ancient class being such as are made by knotting into the warp, tuft after tuft, the materials of the pattern; and the second consisting of those in which the pattern is woven up in the loom. To the first class belong Oriental carpets generally, as well as such as are woven at many places throughout Europe under the name of Turkish carpets. Persia is now, as it has been from the most remote times, the recognized source of what is most truly artistic, durable, and valuable in this manufacture; and after the products of that country, those of various parts of India and Turkey are most esteemed.

Persian Carpets.—The carpet weaving of Persia is similar in its process to the tapestry manufacture of Gobelins, Beauvais, or Aubusson. The tapestry, as is well known, consists of tufts of wool (French *moquettes*) or other fibre sewed on the strings of the warp, by means of small shuttle needles. The Persian carpet is formed by knotting into the warp tuft after tuft of woollen yarn, over each row of which a woof shot is passed, the fingers being here employed instead of the shuttle-needles, as the fabric is of a coarser description. In both methods the principle is the same. Both are formed in looms of very simple construction, the warp threads are arranged in parallel order, whether upright or horizontal, and the fabric and pattern are produced by colored threads, hand-wrought upon the warp.

In Persia there are entire tribes and families whose only occupation is that of carpet-weaving. These dispose of their productions at the bazaars to native merchants, who remove them to Smyrna or Constantinople, where they meet with European purchasers. The finest carpets both as to design and texture come from Kerman, Feraghan, and Kurdistan. The Kerman products resemble in appearance the finest velvet pile carpets, but with the nap cut much shorter. The carpets of Feraghan are in external appearance somewhat like Brussels carpets, while those of Kurdistan have their pattern on both sides and are woven quite smooth. The trade in real Persian carpets was formerly limited, owing to their small size, as they were seldom larger than hearth-rugs, long and narrow in shape; but with the extension of the European demand larger carpets are now made, and they are woven in pieces with separate borders, so that they can be sewed together. The introduction of aniline dyes into Persian designs is likely, it is feared, to be detrimental to the mellow effect of native colors. Very many of the imported carpets are considerably tarnished by exposure in bazaars, if they have not indeed been already used. To render these more salable they are cleaned by cropping the surface, which in some cases is shaved quite close to the knot, hence a proportion of those brought to England have not their original richness and depth of pile. Carpets of silk were at one period extensively made in the country, but this manufacture has been entirely abandoned for more than a century. Felted carpets or *nurmuds* are also very largely made in Persia, but do not constitute an export commodity. Very beautiful patterns are produced in this felt carpeting by means of colored tufts of worsted inlaid or inserted during the process of manufacture, producing a regular pattern when finished.

Turkey Carpets.—The greater part of the real Turkey carpets imported into England are manufactured at Ushak or Ouchak, in the province of Aïdin, about six days' journey from Smyrna, and rugs are principally made at Kulah, an adjacent village. In the provinces of Khodavendikiar, Adana, and Nish numerous households are employed in their production, as also in the districts of Bozrah, the city of Aleppo, and the villages of Trebizond. Here and there, throughout Caramania, such carpets are also made. The Turcomans of Tripoli, the women of Candia, and the peasantry of Tunis and Algiers are likewise engaged in the fabrication of a similar kind of carpet. In none of these places, however, does any large manufactory exist; the carpets are the work of families and households. These carpets are woven in one piece, and there is this notable peculiarity in their manufacture, that the same pattern is never again exactly reproduced; no two carpets are quite alike. The patterns are very remarkable, being rude and simple in design, and coming down from a very remote

period. The colors are rich and harmonious, red or green being the usual ground colors with blues, yellows, and black, but very rarely is any white permitted to appear. The design is usually made up of a large central more or less diamonded pattern with smaller diamonds filling up the corners and sides, the whole surrounded with a border of lines of the different colors. No representation of any living form, nearer than what might be taken as the rude outline of leaves, is introduced into the designs. The peculiarities of the patterns have been accounted for on the theory that the Turkey carpet represents inlaid jewelled work, which accords with the Oriental delight in jewels and works in precious stones.

Indian Carpets.—The manufacture of carpets, which have a very wide range of texture, quality, and material, is widely distributed throughout the East Indies. The weaving is carried on entirely by natives, who combine this as a domestic industry with agricultural labor according to the season. It has also been very widely adopted as a proper and profitable species of prison labor. The chief centres of the manufacture of woollen carpets, both for native use and export, are Mirzapore and Benares in the north-west provinces, and Masulipatam in the Madras Presidency, from which latter place the carpets most highly prized in Great Britain are imported.

At Benares and Moorshedabad are produced velvet carpets with gold embroidery. A very elaborate carpet, sent from Kashmir to the Exhibition of 1851 by Maharajah Goolab Singh, was composed entirely of silk, with a pile nearly an inch thick, in every square foot of which, we are informed, there were at least 10,000 ties or knots. Ornamental hookah carpets and rugs with a silken pile are made in Mooltan, Amritsar, Peshawar, and Kashmir, those of Mooltan being the most famous. Woollen rugs are made very cheaply throughout Bengal and are in great demand; but for texture, workmanship, and coloring the rugs of Ellore, Tanjore, and Mysore are unsurpassed. Cotton carpets or *Suttringees* are a cheap substitute for woollen fabrics in almost universal use throughout India. They are woven in stripes of either blue and white or red and white,—the principal centres of the manufacture being Agra, Bareilly, Patna, Birbhum, and Bardwan. The price of these articles is generally determined by their weight, but those of Agra are accounted the best. There is considerable variety in the designs of Indian carpets, but it is allowed they exhibit perfection of harmonious coloring. The prevailing color is a full deep red, broken with leaves, &c., of an orange hue, and interspersed with soft-toned blues or greens. A creamy white is also introduced with excellent effect; but of late years the introduction of bleached whites has robbed the patterns of that mellow subdued effect which constituted one of their leading charms.

Carpets made in this hand or needle-work style to which we have hitherto been alluding have long been made at various places throughout Europe, and the manufacture is still continued. The most celebrated and artistic textures of this class are the Aubusson, Savonnerie, and Beauvais carpets of France, and the similar products of Manufacture Royale de Tapis of Tournai in Belgium. The manufacture of what are called Turkey carpets is also wide spread, and the common Axminster rugs of England are made on the same principle. But the characteristic carpet weaving of Europe is entirely the product of machine or loom work, and of such there are several distinct varieties. Of these the first is the

Kidderminster, or Scotch Carpet.—This is called also the ingrain carpet, and is made in many parts of Scotland and the north of England, and in the United States of America. It consists of worsted warp traversed by woollen weft, and is woven in pieces about a yard wide. It is composed of two distinct webs interlaced together at one operation, and is therefore a double or two-ply carpet, similar on its two sides. In this article only two colors can with propriety be introduced, as otherwise it has a striped or mixed appearance. A pure or plain color can only be obtained where the weft traverses the warp of the same color. Suppose a crimson figure on a maroon ground; the one web is maroon, the other is crimson, and the pattern is produced by these intersecting each other at fixed points; what is crimson on one side being maroon on the other and *vice versa*. One beam contains the warp of both plies, arranged in two tiers, which is passed through the *mails* or metallic eyes of the harness—two threads through each eye—and thence through the reed. The harness draws up certain warp threads to admit of the passage of the shuttle with the weft, the pattern depending upon the warp threads which are so drawn up. This was formerly effected by means of a revolving barrel, whose surface was studded with pins, which by rotation acted upon the warp threads. These studs being arranged so as to produce one pattern, a separate barrel or a new arrangement of the studs was requisite for every other pattern. But this machine is now superseded by the more efficient Jacquard apparatus, which produces the pattern by means of an endless chain of perforated cards working against parallel rows of needles. The successful introduction of the power-loom for the use of the carpet weaver, which was accomplished by the ingenious perseverance of Mr. William Wood, about a quarter of a century ago, has had a marked influence in cheapening carpets and extending the limits of the industry. An improvement upon the Kidderminster carpet is the triple or three-ply fabric, the invention of Mr. Thomas Morton of Kilmarnock. This is composed of three distinct webs, which, by interchanging their threads, produce the pattern on both sides, permitting at the same time much greater variety of color, with a corresponding increase of thickness and durability in the texture.

Figured Venetian carpeting is of similar description; but in it the woof is completely covered by a heavy body of warp. Dutch carpeting is much inferior in quality, and was originally made of cow-hair, but now of the coarsest wool. Neither fabric has great capabilities of design; simple diced patterns are wrought in the Venetian, stripes and chequers in the Dutch.

The *Brussels Carpet* is a very superior texture composed of worsted and linen, and has a rich corded appearance. The figures are raised entirely from the warp, by inserting a series of wires between the linen foundation and the superficial yarn. These wires are afterwards withdrawn, leaving a looped surface. In this manufacture there is a great waste of material, and the colors are usually limited to five, although in carpets of the best quality six colors are introduced. Each color has its continuous layer of thread, running from end to end of the web, which rises to the surface at intervals indicated by the design, and then sinks into the body of the fabric. Thus, in a five-color Brussels there are five layers or covers, only one of which is visible at any given point; and owing to the irregularity of their ascent to the surface, the colors cannot be placed upon one beam, but each thread is wound on a separate bobbin, with a weight attached to give a proper tension. These bobbins are arranged in five frames jutting out behind the loom—260 bobbins in each frame for the ordinary width. Additional frames are requisite for additional colors introduced; but where more than five are engaged the pattern is rather indistinct. The threads of all the bobbins are then drawn through the harness, heddles, and reed, to unite with the linen yarn in the compound fabric, the Jacquard machine being employed to produce the pattern. The manufacture of Brussels carpets was first introduced into Wilton upwards of a century ago, from Tournai in Belgium. Kidderminster is now the chief seat of this manufacture; but it is also extensively prosecuted in many other localities.

Moquette or *Wilton Carpets* are woven in the same manner as Brussels carpets, differing only in this, that the loops are cut open into an elastic velvet pile. To effect this the wires are not circular as in the Brussels fabric but flat, and furnished with a knife edge at the upper extremity, the sharp point of which, drawn across the yarn, cuts the pile. These carpets, which have a rich soft appearance, besides being manufactured in many parts of England and Scotland, are also made in France.

Tapestry Carpets are manufactured by a very ingenious process which was invented and patented by Mr. Richard Whytock of Edinburgh in 1832. In Mr. Whytock's invention, by a combination of printing and weaving, a pile similar to Brussels carpeting is produced, in which any desired range of colors is available to the designer, while only a single thread is used in the texture instead of the five or six which run through the Brussels texture. In tapestry carpet weaving the ordinary process of printing is reversed; for instead of the fabric being first woven and afterwards printed, the threads are printed before even the *warp* is formed. One thread, or two treated as one, in

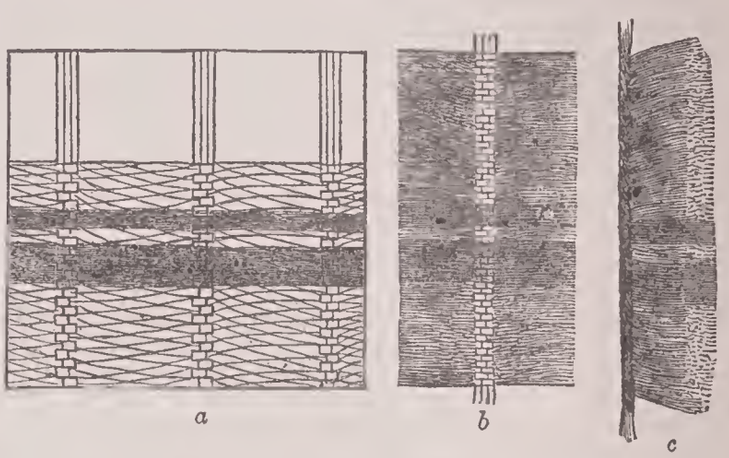
some cases miles in length, are colored, by steps of half an inch, faster than a swift runner would make the distance. When these threads have been all parti-colored in this manner, they form the elements, as it were, of the intended design or fabric. Singly, they exhibit no regular figure or pattern; but when arranged in their proper order, ready for the weaver's beam, the figure comes into view, much elongated of course, inasmuch as 18 feet of the warp will sometimes be gathered into 4 feet of cloth, in order to secure the due proportions of the intended object. The two combined arts of printing and weaving are simplified by this contrivance. With regard to the weaving—1*st*, The loom occupies only one-third of the space in length that the Brussels loom requires; 2*d*, The latter must have 1300 little beams or bobbins, from which the worsted pile has to be gathered, whereas this loom requires only one beam for the whole of the worsted threads; 3*d*, While the Brussels or Wilton, on a web of 27 inches, requires for the best fabric 2860 threads, only 780 are here requisite—one layer instead of five—to produce as good or a better surface; and 4*th*, While the number of colors in succession lengthwise, on the Brussels principle, must not exceed six or seven, any desired number can be introduced in a tapestry carpet. Again, as regards the printing, whereas formerly a change of blocks was required for every change of pattern, in this new process the same blocks serve for all patterns—as the pen serves for every form of type. If an object, say a rosebud, recurs a thousand times in the length of a web, at intervals of 4 feet, the block printer must apply his block a thousand times to print the opening bud; but here the buds are congregated, so that one stroke may dye them all. If it be desired to have a thousand buds in the length of the web, let a thread be wound round a hollow cylinder a thousand times, and a traversing wheel charged with color be passed across the coil. The thread, when uncoiled, will be found to be marked in a thousand places, exactly where it is wanted to tip the opening bud with red from end to end of the web. Design-paper, whereon the pattern is indicated in small squares, serves as a guide to the printer,—each square being one stroke of the color-pulley. After the threads are thus streaked across with color, they are removed from the cylinder or drum, and the dyes are fixed by the action of steam. The threads are then arranged in setting frames, according to the squares of the design-paper, to constitute the warp of the projected web. The Jacquard is thus superseded, and the loom restored to nearly the same simplicity as of old, when

"Between two trees the web was hung."

Not only can the pile of Brussels carpets be readily imitated by the process of Mr. Whytock, but a velvet pile can also be produced by simply cutting the loops as practised for Wilton or Moquette carpets.

Like every other improvement, this invention on its first introduction met with considerable opposition, particularly on the part of manufacturers and dealers. During the first fourteen years, the number of looms employed gradually increased from one to fifty-six, the greatest number in operation at Lasswade in 1847. The great success which has attended the manufacture of tapestry carpets was chiefly owing to the energetic manner in which Mr. Whytock's brilliant idea was taken up and developed by the eminent firm of Messrs. John Crossley & Sons of Halifax. The manufacture was entered on by many other carpet-weavers, and now, as tapestry and velvet pile carpeting, it is one of the most extensive and best established departments of the industry; and the invention has been the means of bringing articles fit for the use of the most refined and fastidious within the reach of all classes of the community. Rugs, table covers, velvets, and tapestry-hangings are printed and woven on the same principle.

Patent Axminster Carpets owe their origin to Mr. James Templeton of Glasgow, who obtained a patent for his invention in 1839. With a loom as simple as that required for Mr. Whytock's patent tapestry, Mr. Templeton succeeded in weaving patterns which embrace an unlimited variety of colors, and that with wool not printed, but dyed in the yarn. Further, these carpets are pile fabrics, and can be woven of a depth equal to any Oriental production; while for density, smoothness, and firmness of texture they cannot be surpassed. The manufacture involves two distinct weaving operations,—1*st*, the preparation of the chenille the strips of which form the weft, and 2*d*, the carpet-weaving proper. A design for the carpet to be woven is first prepared and accurately laid down in its proper colors on paper ruled into small squares. This design is then cut into small longitudinal strips and given to the chenille weaver to guide him as to the colors he is to use, and attaching these to the side of his web, he proceeds in regular order with length after length till the whole pattern is woven up (*a*, in wood-cut). The depth or thickness of the pile to be made is regulated by the spaces missed in passing warp threads through the reed. In the breadth of this web there may be ten, a dozen, or more separate chenilles, and consequently there is that number of separate repeats of the pattern available for the weaving which follows. This first web is cut into shreds or strips (*b*) along its whole length according to the number of separate chenilles it contains, and the loose edges fold together by a peculiarity in the weaving (*c*), so that a double pile projects upwards from a firmly woven centre or back.



Preparation of Chenille for Templeton's Carpets.

The chenille strips now form the weft thread for the second weaving, and being woven into a strong linen or hempen backing in the same order that the strips were cut off from the original pattern, the colors combine as in the pattern, and the elements of the complete design come out as the weaving proceeds. Each length of the chenille strips thus makes up a complete section of the design, and if twelve strips were woven in the breadth of the chenille web, they give the material necessary for twelve repeats. The difficulties which opposed the successful issue of his invention Mr. Templeton set himself to combat and overcome with unusual perseverance and determination, and his exertions have been rewarded by his products attaining the highest place in public estimation, and by the establishment of a most extensive trade in his carpets. At a much earlier period than most other manufacturers he perceived the high importance of obtaining the co-operation of the best artists and designers to supply him with appropriate and artistic patterns. In 1851 Mr. Templeton obtained designs from Mr. E. T. Parris, and later he was fortunate enough to secure the aid of such eminent decorative artists as Mr. Digby Wyatt and Mr. Owen Jones.

Carpeting of felted-wool upon which colored patterns are printed are in large demand for crumb-cloths, and as a cheap covering for the floors of bed-rooms, &c. A very large trade, chiefly export, is now carried on in carpets made from jute fibre. The chief centre of this trade is Dundee, and there the goods are chiefly woven in plain strips or chequered patterns, imitations of Kidderminster or Scotch carpeting being rarely attempted in this inferior fibre. The printing of jute carpets has been accomplished in a manner very pleasing to the eye, but it is feared that such goods would not satisfactorily meet the rougher test of human feet. Matting of coir (from the husk of the cocoa-nut), Manila hemp (*Musa textilis*), and Indian mat-grass (*Cyperus textilis*), are also in extensive use. Floor-cloths of various kinds come under a separate designation.

From the privately printed lectures of Mr. Owen Jones on *The True and the False in the Decorative Arts* we extract the following on carpet-design :—

"Carpets should be darker in tone and more broken in hue than any portion of a room, both because they present the

largest mass of color, and because they serve as a background to the furniture placed upon them.

"As a general rule, lighter carpets may be used in rooms thinly furnished than the contrary, as we should otherwise have too overpowering a mass of shade. Turkey carpets are by universal consent adopted for dining-rooms, but not all Turkey carpets (and indeed very few) are fitted for such a purpose. The generality of Turkey carpets consist of a border with the whole middle of the carpet forming one large pattern converging to the entre. All-over patterns are much more rare. In the East, Turkey carpets are placed on a raised platform or dais at one end of a saloon, and all round the edge of it are cushions on which the Easterns recline, so that the whole middle of the carpet is perfectly free, and the complete pattern is seen at a glance. This is not the case when they are transferred to our dining-rooms, where the dining table alone cuts off the best half of it. . . The principle of design in a Turkey carpet is perfect, and our manufacturers would do well, instead of copying them in Axminster, as is their wont, to apply the principles to be learnt from them in producing carpets more in harmony with their requirements.

"I will say no more on the floral style, but to express a regret that the more perfect the manufacturing process in carpets becomes the more do they (the carpets) appear to lend themselves to evil. The modest Kidderminster carpet rarely goes wrong, because it cannot; it has to deal with but two colors, and consequently much mischief is beyond its reach. The Brussels carpet, which deals with five colors, is more mischievous. The tapestry carpets, where the colors are still more numerous, are vicious in the extreme; whilst the recent invention of printed carpets, with no bounds to its ambition, has become positively criminal."

(A. WH.—J. PA.)

CARPI, a town of Italy in the province of Modena, 10 miles north of that city, on a canal supplied by the Secchia. It is the seat of a bishop, and has a cathedral, a theological seminary, a modern palace, an old castle, and considerable remains of its ancient fortifications. Silk-growing and silk-weaving, the manufacture of straw hats, and the cultivation of grain, hemp, and flax are the principal occupations of the inhabitants, who number about 17,500. In the 14th and 15th and part of the 16th century, it belonged to the Pico family; but it was taken possession of by Charles V. and bestowed on Alfonso d'Este.

CARPI, GIROLAMO DA (1501–1556), an historical and portrait painter, born at Ferrara, was one of Benvenuto Garofalo's best pupils. Becoming infatuated with the work of Antonio Leti, called Correggio, he quitted Ferrara, and spent several years in copying that master's paintings at Parma, Modena, and elsewhere, succeeding in aping his mannerisms so well as to be able to dispose of his own works as originals by Correggio. It is probable that not a few pictures yet attributed to the great painter are in reality the work of his parasite. Da Carpi's best paintings are a Descent of the Holy Spirit, in the church of St. Francis at Rovigi; a Madonna, an Adoration of the Magi, and a St. Catharine, at Bologna; and the St. George and the St. Jerome, at Ferrara.

CARPI, UGA DA (died 1536), a painter, was long held the inventor of the art of painting in Chiaroscuro, afterwards brought to such perfection by Parmegiano and by Baltasar Peruzzi of Siena. The researches of Huber and Breitkopf have proved, however, that this art was known and practised in Germany by Jan Ulrich Pilguin and Mair, at least as early as 1499, while the date of the oldest of Da Carpi's prints is 1518. Printing in chiaroscuro is performed by using several blocks. Da Carpi usually employed three,—one for the outline and darker shadows, another for the lighter shadows, and a third for the half-tint. By means of them he printed engravings after several pictures and after some of the cartoons of Raphael. Of these a Sybil, a Descent from the Cross, and a History of Simon the Sorcerer are the most remarkable.

CARPINI, JOANNES DE PLANO, author of a remarkable mediæval work on Northern Asia. He appears to have been a native of Umbria, where a place formerly called Pian del Carpine, but now Piano del Magione, stands near Perugia, on the road to Cortona. He was one of the companions and disciples of his countryman St. Francis of Assisi, and from sundry indications can hardly have been younger than the latter, born in 1182. John bore a high repute in the order, and took a foremost part in the propagation of its teaching in Northern Europe, holding successively the offices of warden (*custos*) in Saxony, and of provincial (*minister*) of Germany, and afterwards of Spain, perhaps of Barbary, and of Cologne. He was in the last post at the time of the great Mongol invasion of Eastern Europe and of the disastrous battle of Liegnitz (April 12, 1241), which threatened to cast European Christendom beneath the feet of barbarous hordes. The dread of the Tartars was, however, still on men's mind four years later, when Pope Innocent IV. determined (1245) on sending a mission to the Tartar and other Asiatic princes, the real object of which apparently was to gain trustworthy information regarding the hordes and their purposes.

At the head of this mission the Pope placed Friar John, at this time certainly not far from 65 years of age, and to his discretion nearly everything in the accomplishment of the mission seems to have been left. The legate started from Lyons, where the Pope then resided, on Easter Day (16th April, 1245), accompanied by another friar, who speedily broke down and was left behind. After seeking the counsel of an old friend, Wenceslaus, king of Bohemia, he was joined at Breslau by another minorite, F. Bennet the Pole, appointed to act as interpreter. The onward journey lay by Kiev; the Tartar posts were entered at Kaniev, and thence the route ran across the Dnieper (*Neper*) and the Don to the *Ethil* or Volga, on which stood the *Ordu* or camp of Batu, at this time the senior of the Chinghizid family. Here the envoys with their presents had to pass between two fires before being presented to the prince. Batu ordered them to proceed onward to the court of the supreme Kaan in Mongolia, and on Easter Day once more (April 8, 1246) they started on the second and most formidable part of their journey—"so ill," writes the legate, "that we could scarcely sit a horse; and throughout all that Lent our food had been nought but millet with salt and water, and with only snow melted in a kettle for drink." Their bodies were tightly bandaged to enable them to endure the excessive fatigue of this enormous ride, which led them across the *Jaic* (now called River Ural), and then north of the Caspian and the Aral to the Jaxartes (*quidam fluvius magnus cujus nomen ignoramus*), and the Mahometan cities which then stood on its banks; then along the shores of the Dzungarian lakes and so forward, till, on the Feast of St. Mary Magdalene (22d July), at last they reached the imperial camp called *Sira Ordu* (Yellow Pavilion), near the Orkhon River,—this stout-hearted old man having thus ridden something like 3000 miles in 106 days.

Since the death of Okkodai the imperial authority had been in *interregnum*. Kuyuk, his eldest son, had now been designated to the throne; his formal election in a great *Kurultai*, or diet of the tribes, took place while the friars were at Sira Ordu, numbered among 3000 to 4000 envoys and deputies from all parts of Asia and Eastern Europe, bearing homage, tribute, and presents. They afterwards, on the 24th of August, witnessed the formal enthronement at another camp in the vicinity called the Golden Ordu, after which they were presented to the emperor.

It was not till November that they got their dismissal, bearing a letter to the Pope in Mongol, Arabic, and Latin, which was little else than a brief imperious assertion of the Kaan's office as the scourge of God. Then commenced their long winter journey homeward; often they had to lie on the bare snow, or on the ground scraped bare of snow with the traveller's foot. They reached Kiev on the 9th of June, 1247. There, and on their further journey, the Slavonic Christians welcomed them as risen from the dead, with festive hospitality. Crossing the Rhine at Cologne, they found the Pope still at Lyons, and there delivered their report and the Kaan's letter.

Not long afterwards Friar John was rewarded with the archbishopric of Antivari in Dalmatia, and was sent as legate to St. Louis. We do not know the year of his death, but it would seem that his *successor* in the see died before April, 1253; hence it is probable that John did not long survive the hardships of his journey.

He recorded the information that he had collected in a work called in one MS. *Liber Tartarorum*, in another *Historia Mongalorum quos nos Tartaros apellamus*. The work is divided into eight ample chapters on the country, climate, manners, religion, character, history, policy, and tactics of the Tartars, and on the best way of opposing them, followed by a single chapter on the regions passed through. The book thus answers to its title. Like some other famous mediæval itineraries it shows an entire absence of a traveller's or author's egotism, and contains, even in the last chapter, scarcely any personal narrative. John of Pian del Carpine was not only an old man when he went cheerfully upon his mission, but was, as we know from accidental

evidence in the annals of his order, a fat and heavy man (*vir gravis et corpulentus*), insomuch that during his preachings in Germany he was fain, contrary to Franciscan precedent, to ride a donkey. Yet not a word approaching more nearly to complaint than those which we have quoted above appears in his narrative. His book, both in its defect of personal detail and in literary quality, is inferior to that written a few years later by a younger brother of the order, and envoy to the Mongol, William de Rubruck. But it is an excellent work, and in our own day an educated Mongol, Galsang Gomboyev, has borne detailed and interesting testimony to the great accuracy of its statements (see *Mélanges Asiat. tirés du Bullet. Hist. Philol. de l'Acad. Imp. de St. Petersbourg*, ii. p. 650, 1856).

The book must have been prepared immediately after the return of the traveller, for the Friar Salimbene, who met him in France in the very year of his return (1247), gives us these interesting particulars:—"He was a clever and conversable man, well lettered, a great discourser, and full of a diversity of experience. . . . He wrote a big book about the Tattars (*sic*), and about other marvels that he had seen, and whenever he felt weary of telling about the Tattars, he would cause that book of his to be read, as I have often heard and seen" (*Chron. Fr. Salimbeni Parmensis* in *Monum. Histor. ad Prov. et Placent. pertinentia*, Parma, 1857).

For a long time the work was but partially known, and that chiefly through an abridgment in the vast compilation of Vincent of Beauvais (*Speculum Historiale*) made in the generation following the traveller's own, and printed first in 1473. Hakluyt (1598) and Bergeron (1634) published portions of the original work; but the complete and genuine text was not printed till 1839, when it was put forth by the late M. D'Avezac in the 4th volume of the *Récueil de Voyages et de Mémoires* of the Geog. Society of Paris,—a work of that great geographer which forms such a model of editorial taste, learning, and sagacity, as will hardly be surpassed or equalled.

John's companion, Benedictus Polonus, also left a brief narrative taken down from his oral relation. This was first published by M. D'Avezac in the work just named. (H. Y.)

CARPOCRATES, a Gnostic of the 2d century, about whose life and opinions comparatively little is known. He is said to have been a native of Alexandria and by birth a Jew. His family, however, seem to have been converted to Christianity. His Gnostic theory was for the most part founded upon Platonism, and he made especial use of the doctrines of reminiscence and pre-existence of souls. He regarded the world as formed by inferior spirits who are out of harmony with the supreme unity, knowledge of which is the true *Gnosis*. The souls which remember their pre-existing state can attain to this contemplation of unity, and thereby rise superior to all the ordinary doctrines of religion or life. Jesus is but a man in whom this reminiscence is unusually strong, and who has consequently attained to unusual spiritual excellence and power. To the Gnostic the things of the world are worthless; they are to him matters of indifference. From this position it easily followed that actions, being merely external, were morally indifferent, and that the true Gnostic should abandon himself to every lust with perfect indifference. The express declaration of these Antinomian principles is said to have been given by Epiphanes, son of Carpocrates. The notorious licentiousness of the sect was the carrying out of their theory into practice.

CARPZOV (in Latin *Carpzovius*), the name of a family, many of whose members attained distinction in Saxony in the 17th and 18th centuries as jurists, theologians, and statesmen. They traced their origin to Simon Carpzov, who was burgomaster of Brandenburg in the middle of the 16th century, and who left two sons, Joachim and Benedict.

Benedict Carpzov (1565–1624), first of this name, second son of Simon, was an eminent jurist. He was born in Brandenburg in 1565, and was educated at the universities of Frankfort and Wittenberg and other German schools. He returned home in 1590, and was soon after nominated assessor in law. In 1595 he was appointed professor of law at Wittenberg, whence he removed in 1602 to the court of Sophia, electress of Saxony, at Colditz, who named him her chancellor. After some years he returned to Wittenberg, and died there, November 26, 1624, leaving five sons. He published a collection of writings entitled *Disputationes juridicæ*.

Benedict Carpzov (1595–1666), second of the name, was the second son of the preceding, and like him was a great lawyer. He was born at Wittenberg in 1595, was at first a professor at Leipsic, obtained an honorable post at Dresden in 1639, became Ordinary of the Faculty of Jurists at Leipsic in 1645, and was named privy councillor at Dresden in 1653. Among his works, which had a very extensive influence on the administration of justice, even beyond the limits of Saxony, are,—*Definitiones forenses* (1638), *Practica nova rerum criminalium* (1635), *Opus decisionem illustrium Saxoniæ* (1646), *Processus juris Saxonici* (1657), &c. His last years were spent at Leipsic, and his time was entirely devoted to sacred studies. He read the Bible through fifty-three times, studying also the comments of Osiander and Cramer, and making voluminous notes. These have been allowed to remain in manuscript. He died at Leipsic, August 30, 1666.

August Carpzov (1612–1683), fourth son of the first Benedict, distinguished himself as a diplomatist. Born at Colditz in 1612, engaged first as advocate of the court at Wittenberg, he was appointed in 1657 chancellor and president of the Consistory at Coburg, and from 1675 till his death was privy councillor at Gotha. He took part in negotiating the treaties of Osnaburg and Nuremberg. Like his brother he was a man of earnest piety, and published several devotional works. He died at Coburg, November 19, 1683.

Johann Benedict Carpzov (1607–1657), fifth son of the first Benedict, was born at Rochlitz in 1607, became professor of theology at Leipsic, made himself known by a *Systema Theologicum*, in two volumes, and died at Leipsic, October 22, 1657, leaving five sons, all of whom attained some literary eminence.

Johann Gottlob Carpzov (1679–1767), grandson of the preceding, was born at Dresden in 1679. He was educated at Wittenberg, Leipsic, and Altdorf, became a learned theologian, and in 1719 was called to the chair of Oriental languages at Leipsic. In 1730 he was appointed superintendent and first pastor at Lübeck. His most important works were the *Introductio in libros canonicos bibliorum Veteris Testamenti*, and *Critica sacra V. T.* He died at Lübeck, April 7, 1767.

Johann Benedict Carpzov (1720–1803), grandson of the first Johann Benedict, was a distinguished classical scholar. He was born at Leipsic in 1720, became professor of philosophy there in 1747, and in the following year removed to Helmstädt as professor of poetry and Greek. In 1749 he was named also professor of theology. He was author of various philological works, wrote a dissertation on Mencius and published an edition of Musæus. He died April 28, 1803.

CARRANZA, Bartolemé de (1503–1576), a Spanish primate and theologian, was born of noble family at Miranda in Navarre, in 1503. He studied at the university of Alcala, and entered the Dominican order. The only Spaniard who could pretend to rival him in learning was Melchior Canus, and as professor of theology at Valladolid he gained so brilliant a reputation that students flocked thither from all parts of Spain to hear him. Charles V. selected him as envoy to the Council of Trent (1546). At this council he earnestly maintained that it was the duty of priests to reside in their benefices; and next year he (1547) followed up this appeal by publishing at Venice *De necessaria residentia episcoporum et aliorum pastorum*. He was also chosen by Charles to accompany to England the prince who afterwards became Philip II., on the visit which he made for the purpose of marrying Mary. Carranza became that queen's confessor, and labored very zealously for the re-establishment of Roman Catholicism. In 1557 Philip appointed him to the archbishopric of Toledo, a post he was very reluctant to accept, as he foresaw the jealousy which his promotion would arouse; and indeed the bishop of Lérida the very next year denounced him to the Inquisition as a heretic, taking as pretext his *Commentarios sobre el catechismo Christiano*, published that year at Antwerp, though that book was approved by a commission of the Council of Trent. It was placed in the *Index Expurgatorius*, and Carranza was imprisoned for eight years, after which, on appealing to Rome, he was taken thither and confined (1566–1576) in the castle of St. Angelo. In 1576 he received final sentence, being made to abjure opinions which he had never held, suspended from his archbishopric for five years, and banished to the Dominican convent of Minerva. Seven days after this judgment he died. The people of Spain honored him as a saint, and Gregory XIII. placed a highly laudatory inscription on his tomb. His most famous work, *Summa Conciliorum*, first published at Venice in 1546, is of considerable value, and has been frequently reprinted.

CARRARA, a town of Italy, in the province of Massa-Carrara, about 62 miles north-west of Florence, is situated not far from the coast of the Mediterranean, in a deep valley watered by the Avenza. The principal buildings are the collegiate church of St. Andrea, the Madonna delle Grazie, and the ex-ducal palace. The town owes its whole importance, as well as its very name, to the quarries in the neighboring mountains, which from a very early period have been one of the principal sources of statuary marble in the world. They are for the most part situated close to the village of Torano, about a mile distant from the town. Of the 450 quarries at present in full working order, the best are those known as Canal Grande, Poggio, Donzio, and Palvaccio. The excavation gives employment to about 6000 men; and nearly 4000 are engaged in the cutting and polishing shops, which number about 115. In 1873 the total value of the marble extracted was £360,000. Carrara is built not far from the site of the ancient *Luna*, an Etrurian city of considerable importance; and the marble was known to the Romans as *Marmor Lunense*. Napoleon I. founded in the town an academy of fine arts, which still exists and possesses a large collection of statues. The only native sculptors of note are Alberti Maffeoli in the 15th century and Danese Cattaneo in the 16th. The population of the town proper is about 8000, but the commune contains 23,827.

CARREL, Armand, or more fully Jean Baptiste Nicolas Armand (1800–1836), a distinguished French publicist, was born at Rouen, 8th May, 1800. His father was a merchant in good circumstances, and he received a liberal education at the college of his native town, afterwards attending the military school at St. Cyr. He had an intense admiration for the great generals of Napoleon, and his uncompromising spirit and bold uprightness soon marked him out as a man of independent views, and to be suspected. Entering the army as sub-lieutenant he took a secret but active part in the unsuccessful conspiracy of Belfort. On the outbreak of war with Spain in 1822, Carrel, whose sympathies were altogether with the Spanish cause, sent in his resignation, and succeeded in effecting his escape to Barcelona. He enrolled himself in the foreign legion and fought gallantly against his former comrades. Near Figuières the legion was compelled to surrender, and Carrel became the prisoner of his old general, Damas. There was considerable difficulty about the terms of capitulation, and one council of war condemned Carrel to death. Fortunately some informality prevented the sentence being executed, and he was soon afterwards acquitted and set at liberty.

His career as a soldier being then finally closed, Carrel resolved to devote himself to literature. He came to Paris and began as secretary to Augustin Thierry, the celebrated historian. His services were found to be of great value, and on his side he not only obtained admirable training in habits of composition, but was led to investigate for himself some of the most interesting portions of English history. His first work of importance (he had already written one or two historical abstracts) was the *History of the Counter-Revolution in England*, an exceedingly able political study of the events which culminated in the Revolution of 1688. He gradually became known as a skilful writer in various periodicals; but it was not till he formed his connection with the *National* that he became a power in France. The *National* was at first conducted by Thiers, Mignet, and Carrel in conjunction; but after the revolution of July, Thiers and Mignet assumed office, and the whole management fell into the hands of Carrel. Under his direction the journal became the first political organ in Paris. His judgment was unusually clear, his principles solid and well founded, his sincerity and honesty beyond question; and to these qualities he united an admirable style, lucid, precise, and well balanced. As the defender of democracy he had frequently to face serious dangers. He was once in Ste. Pelagie, and several times before the tribunal to answer for his journal. Nor was he in less danger from private enmities. Before his last fatal encounter he was twice engaged in duels with editors of rival papers. The dispute which led to the duel with M. Émile de Girardin was one of small moment, and might have been amicably arranged had it not been for some slight obstinacy on Carrel's part. The meeting took place on the morning of the 22d May, 1836. De Girardin was wounded in the shoulder, Carrel in the abdomen. The wound was at once seen to be dangerous, and Carrel was conveyed to the house of a friend, where he died after two days' suffering. His works, with biographical notice by Littré, have been published in five volumes (Paris, 1858). A fine estimate of his character will be found in Mill's *Dissertations*, vol. i.

CARRIAGE, a term which in its widest signification includes all structures employed for the purposes of transport of merchandise and movable goods and of human beings. Such vehicles are generally mounted on wheels, but the sledge and the litter are types of the exception to this rule. Carriages, according to the definition above given, include in these days a vast variety of forms, ranging from the humble wheel-barrow and rude farm-cart up to the luxuriously appointed sleeping-cars of railways, and the state carriages of royal personages. A narrower application, however, limits the term to such vehicles as are used for the conveyance of persons, and it is in this restricted sense that the term is here used. Cars or carriages for use on railways or tramways are also excluded, and will be dealt with in other connections.

Although, doubtless, the primitive means of transport was by riding on the back of the horse, camel, elephant, or other animal, there is evidence that the use of certain kinds of carriages dates from a very remote antiquity. When Pharaoh advanced Joseph to the second place in Egypt "he made him to ride in the second chariot which he had;" and later, Joseph, by command of the king, sent wagons out of the land of Egypt to convey Jacob and his whole family to the land of his adoption. Thus at this early period there were two distinct types of carriage in use among the civilized inhabitants of Egypt,—a country which from its level character presented facilities for the development of this species of conveyance. The use of chariots in Egypt and among early nations generally was reserved for rulers and warlike leaders.

It was among the Romans that the use of carriages as a private means of conveyance was first established, and with that people carriages attained great variety of form as well as richness of ornamentation. In all times the employment of carriages depended greatly on the condition of the roads over which they had to be driven, and the establishment of good roads, such as the Appian Way, constructed 331 B.C., and others, greatly facilitated the development of carriage travelling among the Romans. In Rome itself, and probably also in other large towns, it was necessary to restrict travelling in carriages to a few persons of high rank, owing to the narrowness and crowded state of the streets. For the same reason the transport of goods along the streets was forbidden during the ten hours between sunrise and sunset. For long journeys and to convey large parties the *reda* and *carruca* appear to have been mostly used, but what their construction and arrangements were is not known. During the empire the carriage which appears in representations of public ceremonials is the *carpentum*. It is very slight, with two wheels, sometimes covered, and generally drawn by two horses. If a carriage had four horses they were yoked abreast, among the Greeks and Romans, not in two pairs as now. From the *carruca* are traced the modern European names,—the English *carriage*, the French *carrosse*, and the Italian *carrozza*. The *sirpea* was a very ancient form of vehicle, the body of which was of osier basket-work. It originated with the Gauls, by whom it was named *benna*, and by them it was employed for the conveyance of persons and goods in time of peace, and baggage during war. With its name are connected the modern French *banne*, *banneton*, *vannerie*, and *panier*,—all indicating basket-work. The *essedum* was a two-wheeled carriage, the form of which the Romans copied from the war cars of the Belgæ.

These various vehicles were sometimes very splendidly ornamented with gold and precious stones; and covered carriages seem more and more to have become appendages of Roman pomp and magnificence. Sumptuary laws were enacted on account of the public extravagance, but they were little regarded, and were altogether abrogated by the Emperor Severus. Suetonius states that Nero took with him on his travels no less than a thousand carriages.

On the introduction of the feudal system the use of carriages was for some time prohibited, as tending to render the vassals less fit for military service. Men of all grades and professions rode on horses or mules, and sometimes the monks and women on she-asses. Horseback was the general mode of travelling; and hence the mem-

bers of the council, who at the diet and on other occasions were employed as ambassadors, were called *rittmeister*. In this manner also great lords made their public entry into cities.

Covered carriages were known in the beginning of the 16th century, but their use was confined to ladies of the first rank; and as it was accounted a reproach for men to ride in them, the electors and princes sometimes excused their non-attendance at meetings of the state by the plea that their health would not permit them to ride on horseback. Covered carriages were for a long time forbidden even to women; but about the end of the 15th century they began to be employed by the emperor, kings, and princes, in journeys, and afterwards on state occasions. In 1474 the Emperor Frederick III. visited Frankfort in a close carriage, and again in the following year in a very magnificent covered carriage. Shortly afterwards carriages began to be splendidly decorated; that, for instance, of the electress of Brandenburg at the tournament held at Ruppin in 1509 was gilded all over, and that of the duchess of Mecklenburg was hung with red satin. When Cardinal Dietrichstein made his entrance into Vienna in 1611, forty carriages went to meet him; and in the same year the consort of the Emperor Matthias made her public entrance on her marriage in a carriage covered with perfumed leather. The wedding carriage of the first wife of the Emperor Leopold, who was a Spanish princess, cost, together with the harness, 38,000 florins. Those of the emperor are thus described: "In the imperial coaches no great magnificence was to be seen; they were covered over with red cloth and black nails. The harness was black, and in the whole work there was no gold. The panels were of glass, and on this account they were called the imperial glass coaches. On festivals the harness was ornamented with red silk fringes. The imperial coaches were distinguished only by their having leather traces; but the ladies in the imperial suite were obliged to be contented with carriages the traces of which were made of ropes." At the magnificent court of Duke Ernest Augustus at Hanover, in 1681, there were fifty gilt coaches with six horses each. The first time that ambassadors appeared in coaches on a public solemnity was at the imperial commission held at Erfurt in 1613. Soon after this time coaches became common all over Germany, notwithstanding various orders and admonitions to deter vassals from using them. These vehicles appear to have been of very rude construction. Beckmann describes a view he had seen of Bremen, painted by John Landwehr in 1661, in which was represented a long quadrangular carriage, apparently not suspended by straps, and covered with a canopy supported by four pillars, but without curtains. In the side was a small door, and in front a low seat or box; the coachman sat upon the horses; and the dress of the persons within proved them to be burgomasters. At Paris in the 14th, 15th, and even 16th centuries, the French monarchs rode commonly on horses, the servants of the court on mules, and the princesses and principal ladies sometimes on asses. Persons even of the highest rank sometimes sat behind their equerry on the same horse. Carriages, however, were used at a very early period in France; for there is still extant an ordinance of Philip the Fair, issued in 1294, by which citizens' wives are prohibited from using them. It appears, however, that about 1550 there were only three carriages at Paris,—one belonging to the queen, another to Diana of Poitiers, and the third to René de Laval, a very corpulent nobleman who was unable to ride on horseback. The coaches used in the time of Henry IV. were not suspended by straps (an improvement referred to the time of Louis XIV.), though they were provided with a canopy supported by four ornamental pillars, and with curtains of stuff or leather.

Occasional allusion is made to the use of some kinds of vehicles in England during the Middle Ages. In *The Squyr of Low Degree*, a poem of a period anterior to Chaucer, a description of a sumptuous carriage occurs:

> "To-morrow ye shall on hunting fare
> And ride, my daughter, in a chare.
> It shall be cover'd with velvet red,
> And cloth of fine gold all about your head,
> With damask white and azure blue
> Well diaper'd with lilies new."

Chaucer himself describes a chare as

> With gold wrought and pierrie."

When Richard II. of England, towards the end of the 14th century, was obliged to fly before his rebellious subjects, he and all his followers were on horseback, while his mother alone used a carriage. The oldest carriages used in England were known as chares, cars, chariots, caroches, and whirlicotes; but these became less fashionable when Ann, the wife of Richard II., showed the English ladies how gracefully she could ride on the side-saddle, Stow, in his *Survey of London*, remarking, "so was riding in those whirlicotes and chariots forsaken except at coronations and such like spectacles." The same writer states that in the year 1564 Guilliam Boonen, a Dutchman, became the queen's coachman, and was the first that brought the use of coaches into England. Although Stow is incorrect in thus attributing the introduction of coaches to the time of Elizabeth, there is no doubt that at the period he indicates, the use of wheeled vehicles began to be so common that it then became a prominent public fact. "Little by little," he again states, "they became usual among the nobilitie and others of sort, and within twenty years became a great trade of coachmaking." By the beginning of the 17th century the use of coaches had become so prevalent that in 1601 the attention of Parliament was drawn to the subject, and a Bill "to restrain the excessive use of coaches" was introduced, which, however, was rejected on the second reading. Their use told severely on the occupation of the Thames watermen, and Taylor the poet and waterman complained bitterly both in prose and verse against the new-fangled practice:—

> "Carroaches, coaches, jades, and Flanders mares
> Doe rob us of our shares, our wares, our fares.
> Against the ground we stand and knock our heels,
> Whilest all our profit runs away on wheeles."

The sneers of wits and watermen notwithstanding, coaches became so common, that in the early part of the 17th century they were estimated to number more than 6000 in London and its surrounding country.

Vehicles plying for public convenience, we have seen, were in existence during the period of the Roman empire, and concurrently with the renewal of carriage locomotion in the 16th century, public carriages were again re-established. Hackney coaches were first introduced in France during the minority of Louis XIV. by one Nicolas Sauvage, who lived at the sign of Saint Fiacre in the Rue St. Martin, and hence hired carriages came to be called *fiacres*, though eventually the name was restricted to such as were stationed for hire in the streets. In 1650 Charles Villerme obtained the exclusive privilege of hiring out *fiacres* in Paris for a payment of 5000 livres. The prototype of the modern omnibus first commenced plying in the streets of Paris on the 18th March, 1662, going at fixed hours, at a stated fare of five sous. Soldiers, lackeys, pages, and livery servants were forbidden to enter such conveyances, which were announced to be *pour la plus grand commodité et liberté des personnes de merite*. In the time of Charles X. the omnibus system in reality was established; for no exclusion of any class or condition of person who tendered the proper fare was permitted in the vehicles then put on various routes, and the fact of the carriages being thus at the service of all gave rise to the present name.

Hackney coaches were first established in London in 1625. Writing in 1634 to Lord Stafford, Mr. Garrard says,—"Here is one Captain Bailey; he hath been a sea captain, but now lives on the land, about this city, where he tries experiments. He hath erected, according to his ability, some four hackney-coaches, put his men in livery, and appointed them to stand at the May-pole in the Strand, giving them instructions at what rate to carry men into several parts of the town, where all day they may be had. Other hackney-men seeing this way, they flocked to the same place, and perform their journeys at the same rate, so that sometimes there is twenty of them together."

In 1637 there were in London and Westminster no fewer than 50 such coaches; in 1652 they had increased to 200, and in 1654 to 300, employing 600 horses. In 1694 the number of hackney coaches was limited to 700, and in 1715 to 800. Thus, notwithstanding the competition of sedan chairs, the hackney-coach held its place and grew in importance till it was, about 1820, supplanted by the *cabriolet de place*, now shortened into "cab," which had previously held a most important place in Paris. In that city the cabriolet came into great public favor about

the middle of the 18th century, and in the year 1813 there were 1150 such vehicles plying in the Parisian steeets. The original cabriolet was a kind of hooded gig, inside which the driver sat, besides whom there was only room left for a single passenger. Mr. Hansom, the inventor whose name attaches to the London two-wheeled vehicle to the present day, patented his cab first in the year 1834. It consisted originally of a square body hung in the centre of a square frame, the two wheels being about 7 feet 6 inches in diameter, the same height as the vehicle. On this very numerous improvements were quickly made, and in 1836, after a fresh patent had been obtained in the name of Messrs. Gillett and Chapman, a company was formed for establishing hansom cabs essentially the same as now in use.

Of coaches possessing a history the two best known in the United Kingdom are Her Majesty's state coach, and that of the Lord Mayor of London. The latter is the oldest, having been built, or at least first used, for the procession of Sir Charles Asgil, Lord Mayor elect, in November, 1757. The body of this wonderful vehicle is not supported by springs, but hung on leather straps; and the whole structure is very richly loaded with ornamental carving, gilding, and paint-work. The different panels and the doors contain various allegorical groups of figures representing suitable subjects and heraldic devices painted in a spirited manner. The royal state coach, which is described as "the most superb carriage ever built," was designed by Sir William Chambers, the paintings on it were executed by Cipriani, and the work was completed in 1761. The following is an official description of it:—

"The whole of the carriage and body is richly ornamented with laurel and carved work, beautifully gilt. The length, 24 feet; width, 8 feet 3 inches; height, 12 feet; length of pole, 12 feet 4 inches; weight, 4 tons. The carriage and body of the coach is composed as follows:—Of four large Tritons, who support the body by four braces, covered with red morocco leather, and ornamented with gilt buckles; the two figures placed in front of the carriage bear the driver, and are represented in the action of drawing by cables extending round their shoulders, and the cranes and sounding shells to announce the approach of the monarch of the Ocean; and those at the back carry the imperial fasces, topped with tridents. The driver's foot-board is a large scallop shell, ornamented with bunches of reeds and other marine plants. The pole represents a bundle of lances; the splinter bar is composed of a rich moulding, issuing from beneath a voluted shell, and each end terminating in the head of a dolphin; and the wheels are imitated from those of the ancient triumphal chariot. The body of the coach is composed of eight palm-trees, which, branching out at the top, sustain the roof; and four angular trees are loaded with trophies allusive to the victories obtained by Great Britain, during the late glorious war, supported by four lions' heads. On the centre of the roof stand three boys, representing the genii of England, Scotland, and Ireland, supporting the imperial crown of Great Britain, and holding in their hands the sceptre, sword of state, and ensigns of knighthood; their bodies are adorned with festoons of laurel, which fall from thence towards the four corners. The panels and doors are painted with appropriate emblematical devices, and the linings are of scarlet velvet richly embossed with national emblems."

Modern Carriages.—The forms of carriages as now built are so numerous as almost to defy classification, and they altogether baffle detailed description. The climate, conditions of life, and various other circumstances of different countries have originated modified forms of carriage in each of them, some of which have come into general use, while others are seldom seen out of the land of their origin. Mr. G. N. Hooper, of the firm of Hooper & Co. of London, who has given valuable assistance in the preparation of the present article, supplies the following table of modern carriages with the countries of their origin:—

Coach.	Kotze, Berlin.	Hungary or Prussia.
Chariot.	Coupé.	France.
Barouche.	Calèche.	"
Britzska.	Britzska.	Austria.
Droski.	Droitzska.	Germany and Russia.
Cabriolet.	Cabriolet.	France.
Cab Phaeton.	Milord or Victoria.	England.
Mail Phaeton.	Mail phaeton.	"
Gig and Tilbury.	Tilbury.	"
Curricle.	Curricle.	Italy.
Landau.	Landau.	Germany.
Fourgon.	Fourgon.	France.
Dog-cart.	To-car.	England.
Omnibus.	Omnibus.	France (by Shillbeer, an Englishman).
Drag.	Malle-Anglaise.	England.
Park Phaeton.	Phaeton de parc.	"
Brougham.	Petit coupé.	(Lord Brougham).
Double Brougham. Clarence.	Clarence.	England.
Wagonette.	Wagonette.	"
Sociable.	Sociable.	"
T-cart.	T-cart.	"
Sociable-landau.	...	"
Basket carriage.	Panier-à-salade.	"
Britzska-chariot.	Eilwagen.	Germany.
Spider Phaeton.	...	America.
Rockaway.	...	"
Char-à-coté.	...	Switzerland.
Tarantas.	Voiture de voyage.	Russia.
Kibitka.	...	"
Telega.	...	"
Troika.	...	"
Outside car on two or four wheels.	...	Ireland.
Sledge.	...	Russia, Norway, Germany, Canada, &c.
Carriole.	...	Norway.

In addition to this list there are numberless forms of fancy carriage, and the misdirected ingenuity of coach-builders is frequently exercised in the attempt to combine the features and advantages of several vehicles in one structure, generally with the result of rendering it unfit to be used with comfort or safety in any form.

In comparing the carriages of the present day with those of earlier periods it should be borne in mind that many circumstances apart from the skill and invention of the coach-builder have combined to modify or to necessitate the modification of such structures. The condition of streets and roads was such, at no very remote date, as to permit of only the most cautious traffic within limited areas in vehicles of great strength, solidity, and weight. The paving of streets and macadamization of highways gave designers of carriages facilities for planning vehicles of a light, airy type on more elegant lines, of which opportunities they were not slow to take advantage. Again, previous to the introduction of railways, not only public coaches but private carriages had to be built with a view to afford accommodation for undertaking long journeys, which are now entirely performed by railway, and that circumstance also now enables the coach-builder to give primary attention to the comfort, gracefulness, and elegance of the vehicles he constructs. But after allowance is made for all such circumstances, there remains to coach-builders, and especially to those of Great Britain, a very large share of credit, for the inventive skill and ingenuity which has brought the modern carriage to that perfection of workmanship and artistic finish which it everywhere displays. To enumerate the improvements in coach-building, which have been effected chiefly in the present century, would demand a much greater space than can be devoted to this subject. It must suffice simply to point to the Collinge axle invented in 1792, now universally adopted, by means of which wheels require oiling only once in several months. The elliptic springs, upon which nearly all carriages are now mounted, were patented by Obadiah Elliott in 1804. A great many ingenious devices have also been adopted for facilitating the opening and closing of the head of landaus or such carriages as are made to be open or close at pleasure. And generally coach-building has enjoyed a full share of the advantages flowing from the improved mechanical devices and processes of modern times.

Coachmaking.—Coachmaking is a combination of crafts rarely united in one trade, embracing, as it does, work in such diverse materials as wood, iron, steel, brass, cloth, leather, ivory, hair, &c. A great division of labor and numerous highly skilled artisans are consequently employed in the various stages in the construction of a high-class carriage. The workmen include body-makers, who build up the part in which persons sit; carriage-makers, who make or fit together all the under parts of the vehicle on which the body rests; wheel-wrights, joiners, and fitters; trimmers, who fit up the inside of the carriage; and several classes of smiths for special work connected with the iron framing, axles, springs, &c. Painting is an important part of the business, those professing it being divided into body,

carriage, and heraldry or ornamental painters; and after the painter comes the polisher who gives the final brilliant polish to the outside of the whole structure.

A very great deal in the coach-making business depends on the selection of materials. Ash is the kind of wood commonly used in the framework both of body and carriage; and the quality best suited for body-wood is that of a mild and free nature, while for the carriage the wood cannot be too strong or robust. Full-grown wood, of course, is best suited for both purposes, and the planks must be allowed to lie until they are properly seasoned, as is indeed most essential with all the wood used in the building of a carriage. After the framework is made, the lower part of the body is panelled up with the softest bay mahogany, plain and free from grain. The kinds of wood generally applied to coach-wheel making are elm or fustic for the naves, oak for the spokes, and ash for the felloes; but beech felloes are often used, and it has been found by experience that beech, when the felloes are cut from the log shortly after it is felled, and kept until they become dry before being put upon wheels, answers admirably for this purpose. American hickory is also one of the best available woods for spokes as well as carriage-poles; and a large trade is now conducted between Great Britain and the United States in the importation of American machine-made hickory wheels. Canadian black walnut has also come into use as a substitute for mahogany in panelling, and many other woods are available for special portions of carriages.

Formerly, in the making of coach-springs, nothing was used but German steel, which from its hardness was more apt to snap than the English steel now employed for that purpose. The latter combines with superior elasticity a strength that enables the spring-maker to fabricate his springs at least one-third lighter, while they stand equal fatigue. The iron mounting of coach-work requires the skill of experienced smiths; for besides solidity, some degree of taste is requisite to form the shapes and sets of the different parts. No branch of coach-making contributes more to the elegance of the vehicle than that of the painter. His colors must be of the best quality in order to stand exposure in all weathers. The varnish used is copal, of which there are two kinds,—the finest for finishing the body, and the second for finishing the carriage. Between paints of different qualities and varnish, a well-finished carriage gets from twenty to twenty-four separate coats before it is finished. Between each coating of varnish, color and varnish the work is carefully rubbed smooth and flat with pumice or fine glass paper, and the final polish is attained by rubbing with the palm of the hand.

The growth and development of railway travelling, instead of checking the use of horse-drawn vehicles, or injuring the art of the coach-builder, has had very powerful influence in the opposite direction. Railway travelling has caused an enormous increase in the use of cabs and other public vehicles, while increasing wealth has multiplied luxurious private carriages. The revival of the driving of four-horse drags, in imitation of the old stage-coaches, between London and various suburban towns (one going to Brighton), which has taken place of late years, is deserving of note. These coaches were put on the road by members of several aristocratic clubs, not with a view to profit; their success, however, has been very great.

As a coach-making and coaching country, England has long held the foremost place. "The road," its coaches, and their drivers figure largely in the popular literature of the country, and the perfection of coach equipment has been an unfailing source of national pride. British coach-builders still continue to hold, almost without dispute, the highest position in their craft; and that expensive luxury —a first-class London-built carriage—cannot, for honest workmanship, handsome lines, and beautiful finish, be excelled by any product of industry. (J. PA).

CARRICKFERGUS, a maritime county of a town, and a co-extensive parliamentary borough of the same name, in the province of Ulster in Ireland. It is enclosed by the county of Antrim, except on the S. where it is skirted by the Bay of Carrickfergus (Belfast Lough). It comprises an area of 16,702 acres, of which 129 are occupied by the town. The surface is in general hilly; Lough Mourne, a lake of about 90 acres in extent, is 556 feet above the level of the sea, and the highest mountain, Slieve True, which commands a magnificent prospect, attains an elevation of 1100 feet. The land near the sea-shore is an alluvial plain. The farms are small, except in the hilly district, where grazing is carried on. The chief crops are oats and potatoes, for which sea-weed, with lime and vegetable matter, forms the manure; and the district has long been famous for the manufacture of cheese. The fisheries are valuable and extensive, and the oysters taken off the coast are highly prized for their size and flavor. At Duncrue, about a mile and a half from the town, on the property of the marquis of Downshire, rock-salt of remarkable purity and in large quantity is found in the Triassic sandstone.

According to ecclesiastical arrangement, this burgal county forms a single rectory in the diocese of Connor. The population numbered 8520 persons in 1851, and 9397 in 1871,—4280 males and 5117 females. The borough returns one member to Parliament.

The town of Carrickfergus, from which the county and adjoining bay take their name, is 9½ miles north-east of Belfast by rail. It stretches along the shore of Belfast Lough, is about one mile in length, and consists of the old or walled town in the centre, the Irish quarter on the west, and the Scotch quarter on the east,—the last being chiefly inhabited by fishermen, descendants from a colony driven by religious persecution from Galloway and Ayrshire about the year 1665. The town is irregularly built, and deficient in neatness. The principal building is the old castle, standing on a projecting rock, from which the town derives the name Carrick; it was formerly a place of much strength, and is still maintained as an arsenal, and mounted with heavy guns. The ancient donjon or keep, 90 feet in height, is still in good preservation. The parish church, an antiquated cruciform structure, was originally a chapel or oratory dependent on a Franciscan monastery. The entrance to a subterranean passage between the two establishments is still visible under the communion-table of the church. The jail, built on the site of the above-mentioned monastery, was formerly the county of Antrim prison. The court-house, which adjoins the jail, is a neat modern building. When Carrickfergus was the county town of Antrim (which it ceased to be in 1850), the assizes were held there. The town has some trade in domestic produce and in linen manufactures, there being several flax spinning-mills and a bleach-work in the immediate neighborhood. Distilling is carried on in the town. Vessels of 100 tons burden can discharge at the pier, and there is a patent slip on the shore. The population of the municipal town was 3543 in 1851, and 4212 in 1871, with an excess at the latter date of 528 females. In 1871 567 were Catholics and 3645 Protestants, and of the latter 2056 were Presbtyerians.

In the reign of Queen Elizabeth the town obtained a charter, and this was confirmed by James I., who added the privilege of sending two burgesses to the Irish parliament. The corporation, however, was superseded, under the provisions of the Municipal Reform Act of 1840, by a board of municipal commissioners. In 1182, John de Courcy, to whom Henry II. had granted all the parts of Ulster he could obtain possession of by the sword, fixed a colony in this district. De Courcy built the castle which afterwards came into the possession of the De Lacy family, who, being ejected, invited Edward Bruce to besiege it (1315). After a desperate resistance the garrison surrendered. In 1386, the town was burned by the Scots, and in 1400 was destroyed by the combined Scots and Irish. Subsequently, it suffered much by famine and the occasional assaults of the neighboring Irish chieftains, whose favor the townsmen were at length necessitated to secure by the payment of an annual tribute. In the reign of Charles I. many Scotch Covenanters settled in the neighborhood to avoid the persecution directed against them. In the civil wars, from 1641, Carrickfergus was one of the chief places of refuge for the Protestants of the county of Antrim; and on July 10, 1642, the first Presbytery held in Ireland met there. In that year the garrison was commanded by General Munroe, who having afterwards relinquished the cause of the English Parliament, was, in 1648, surprised and taken prisoner by Sir Robert Adair. At a later period Carrickfergus was held by the partisans of James II., but surrendered in 1689 to the forces under King William's general Schomberg; and in 1690 it was visited by King William, who landed here on his expedition to Ireland. In 1760 it was surprised by a French squadron under Commodore Thourot, who landed with about 1000 men, and, after holding the place for a few days, evacuated it on the approach of the English troops. Eighteen years later Paul Jones, in his ship the "Ranger," succeeded in capturing the "Drake," a British sloop-of-war, in the neighboring bay; but he left without molesting the town.

CARRICK-ON-SUIR, a town of Ireland in the south riding of the county of Tipperary, province of Munster, is situated on the Suir, 14 miles east of Clonmel, with a station on the Waterford and Limerick railway. It was formerly a walled town, and contains some very ancient buildings, such as the parish church and the castle, erected in 1309, which belongs to the Butler family. On the other side of the river, but connected by a bridge of the 14th century, stands the suburb of Carrickbeg, with an abbey founded in 1336. The woollen manufactures for which the town was formerly famous still give employment to about 400 people; and upwards of 1000 are at work in the linen and flax factories. A thriving export trade is carried on in agricultural produce, and slate is extensively quarried in the neighborhood. Carrick-on-Suir became a place of importance soon after the English conquest of Ireland, and it still gives the title of earl to a branch of the Butler family. Population in 1871, 7792.

CARRIER, in its general acceptation, is a person who conveys the goods of another for hire. In its mere colloquial use it was applied to the class of men, now rendered comparatively obsolete by the railway system, who conveyed goods in carts or wagons on the public roads. In jurisprudence, however, the term is collectively applied to all conveyers of property, whether by land or water; and in this sense the late changes and enlargements of the system of transit throughout the world have given additional importance to the subject. The law by which carriers, both by land and sea, are made responsible for the goods intrusted to them, is founded on the prætorian edict of the civil law, to which the ninth title of the fourth book of the Pandect is devoted. The edict itself is contained in these few words, "*nautæ, caupones, stabularii, quod cujusque salvum fore receperint, nisi restituent, in eos judicium dabo.*" The beautiful simplicity of the rule so announced has had a most beneficial influence on the commerce of the world. Throughout the great civilized region which took its law directly from the Roman fountain, and through the other less civilized countries which followed the same commercial code, it laid a foundation for the principle that the carrier's engagement to the public is a contract of indemnity. It bound him, in the general case, to deliver what he had been entrusted with, or its value,—thus sweeping away all secondary questions or discussions as to the conditions of more or less culpability on his part under which loss or damage may have occurred; and it left any limitations of this general responsibility to be separately adjusted by special contract.

The law of England recognizes a distinction between a common and a private carrier. The former is one who holds himself out to the public as ready to carry for hire from place to place the goods of such persons as choose to employ him. The owner of a stage coach, a railway company, the master of a general ship, a wharfinger carrying goods on his own lighters are common carriers; and it makes no difference that one of the *termini* of the journey is out of England. It has been held, however, that a person who carries only passengers is not a common carrier; nor of course is a person who merely engages to carry the goods of particular individuals. If a man undertakes to carry goods safely, although he is not a common carrier, and is to have nothing for the carriage, he is responsible for damage sustained by his negligence. A common carrier is subject at law to peculiar liabilities. He is bound to carry the goods of any person who offers to pay his hire, unless there is a good reason to the contrary, as, for example, when his carriage is full, or the article is not such as he is in the habit of conveying. He ought to carry the goods in the usual course without unnecessary deviation or delay. To make him liable there must be a due delivery of the goods to him in the known course of his business. His charge must be reasonable; and he must not give undue preference to any customer or class of customers. The latter principle, as enforced by statute, has come to be of great importance in the law of railway companies. In respect of goods entrusted to him, the carrier's liability, unless limited by a special contract, is, as already stated, that of an insurer. There is no question of negligence as in the case of injury to passengers, for the warranty is simply to carry safely and securely. The law, however, excepts losses or injuries occasioned immediately "by the act of God or the king's enemies"—words which have long had a strict technical signification. It would appear that concealment without fraud, on the part of the customer, will relieve the carrier from his liability for *negligence*, but not for actual *misfeasance*. Fraud or deceit by the customer (*e.g.*, in misrepresenting the real value of the goods) will relieve the carrier from his liability. The responsibility of the carrier ceases only with the delivery of the goods to the proper consignee. By the Carrier's Act (11 Geo. IV. and 1 Will. IV. c. 68) the liability of carriers for gold, silver, &c. (in general "articles of great value in small compass") is determined. Should the article or parcel exceed £10 in value, the carrier is not to be liable for loss unless such value is declared by the customer, and the carrier's increased charge paid. Where the value is thus declared, the carrier may, by public notice, demand an increased charge, for which he must, if required, sign a receipt. Failing such receipt or notice, the carrier must refund the increased charge and remain liable as at common law. Except as above no mere notice or declaration shall affect a carrier's liability; but he may make special contracts with his customers. The carriage of goods by railway, or canal, or by sea, is subject to special regulations. (See RAILWAYS and CHARTER PARTY.) A carrier of passengers is responsible for personal injuries only when they have been occasioned by his negligence or want of skill. Where there has been contributory negligence on the part of the plaintiff,—*i.e.*, where he might, by the exercise of ordinary care, have avoided the consequences of the defendant's negligence,—he is not entitled to recover. By 9 and 10 Vict. c. 93 (commonly called Lord Campbell's Act), when a person's death has been caused by such negligence as would have entitled him to an action had he survived, an action may now be maintained against the party responsible for the negligence on behalf of the wife, husband, parent, or child of the deceased. Previously such cases had been governed by the maxim *actio personalis moritur cum persona*.

CARRIER, JEAN BAPTISTE (1756–1794), French Revolutionist, one of the actors most infamous for cruelty in the "Reign of Terror," was born at Yolai, a village near Aurillac, in Upper Auvergne, in 1756. At the beginning of the Revolution (1789), he was merely an obscure attorney; and in 1792, with many others of the same class, he was chosen deputy to the National Convention. He was already known as one of the influential members of the Cordeliers Club, which, with the Jacobins, supported Robespierre. After the subjugation of Flanders he was one of the commissioners nominated in the close of 1792 by the Convention, and sent into that country to carry out a general spoliation of the inhabitants, which was called "organizing the progress of liberty." In the following year he took part in establishing the revolutionary tribunal, and said openly that for the prosperity of the republic at least half of its population must be "suppressed." He voted for the death of Louis XVI., was one of the first to call for the arrest of the duke of Orleans, and took a prominent part in the revolution of May 31 (overthrow of the Girondists). After a mission into Normandy, Carrier was sent, early in October, 1793, to Nantes, under orders from the Convention, to suppress the revolt which was raging there, by the most severe measures. Nothing loath, he established a revolutionary tribunal, and formed a body of desperate men, called the Legion of Marat, for the purpose of destroying in the swiftest way the masses of prisoners heaped together in the jails. The form of trial was soon discontinued, and the victims were sent to the guillotine or shot or cut down in the prisons *en masse*. He also had large numbers of prisoners put on board a vessel with a trap door in its bottom, and sunk in the Loire by night. This process, first of the *noyades* of Nantes, called by its inventor "republican baptism," was twenty-five times repeated, so that the river became polluted with corpses, and a decree was issued, prohibiting the drinking of its water; and even in this wholesale slaughter of men, women, and little children, there were special aggravations. Such was the terror inspired by these deeds that for some time no one dared to denounce the perpetrator, who, in his reports to the Committee of Public Safety, deliberately lied. At length the horrible truth became known, and Carrier was recalled. He was now the object of general execration; and although, in consequence of the fall of Robespierre (9th Thermidor), he had a short respite, he was in November, 1794, tried before the revolutionary tribunal. The proceedings lasted nearly a month, and on the 16th De-

cember, having vainly pleaded the orders of the Convention in his defence, he was condemned to death and executed.

CARRON, a small village of Scotland, in the county of Stirling and parish of Larbert, on the right bank of the Carron river, about two miles north-east of Falkirk. It is of importance for its iron-works, which were started in 1760 by a chartered company, with a capital of £150,000. There are five blast-furnaces and thirty-five bloomary forges, and they give employment to upwards of 2000 individuals. The carronade, a short kind of cannon with a large chamber for the powder, is so called because it was first made in perfection at these works. The river, which falls into the Forth three miles E.N.E. of Falkirk, is interesting as at one time the boundary of the Roman empire on the north-west. In the neighborhood are the ruins of the ancient Camelon, and not far from the iron-works is the site of a now demolished monument of great antiquity known as Arthur's Oven, or Oon. The population is about 2500.

CARSTARES, William (1649–1715), a Scottish clergyman, born at Cathcart, near Glasgow, on the 11th February, 1649, was the son of the Rev. John Carstares, a member of the extreme Covenanting party of Protestors. He was educated at the university of Edinburgh, and then passed over to Utrecht, where he commenced his life-long friendship with the prince of Orange, and began to take an active part in the politics of his country. At this time the state of Scotland was restless and unhappy in the extreme; and it was natural, therefore, that the Government should desire to silence Carstares, whom it had several reasons to dislike. He was the intimate of William; he had been the bearer of messages between the disaffected in Scotland and Holland; and he was believed to be concerned with the learned James Steuart in the authorship of a severe pamphlet—*An Account of Scotland's Grievances by reason of the D. of Lauderdale's Ministrie, humbly tendered to his Sacred Majesty.* Accordingly, on his return to England, at the close of 1674, he was committed to the Tower; the following year he was transferred to Edinburgh Castle, and it was not till August, 1679, that he was released. After this he visited Ireland, and then became pastor to a Nonconformist congregation at Cheshunt. During 1682 he was in Holland, but in the following year he was again in London, and was implicated in the Rye House Plot. On its discovery he was examined before the Scottish Council; but, though the torture of the thumb-screw was applied, he refused to utter a word till he was assured that his admissions would not be used in evidence, and in the disclosures he then made he displayed great discretion. On his return to Holland he was rewarded by William's still warmer friendship, and the post of court chaplain; and after the Revolution he continued to hold this office, under the title of royal chaplain for Scotland. He was the confidential adviser of the king, especially with regard to the affairs of his native country, and rendered important service to Presbyterianism, in promoting the Revolution Settlement.

At the accession of Anne, Carstares retained his post as royal chaplain, but resided in Edinburgh, having been elected principal of the University. He was also minister of Greyfriars, and afterwards of St. Giles, and was four times chosen moderator of the General Assembly. He took an important part, too, in promoting the Union, and was consulted by Harley and other leading Englishmen concerning it. During Anne's reign, the chief object of his policy was to frustrate the measures which were planned by Lord Oxford to strengthen the Episcopalian Jacobites,—especially a Bill for extending the privileges of the Episcopalians, and the Bill for replacing in the hands of the old patrons the right of patronage, which by the Revolution Settlement had been vested in the elders and the Protestant heritors.

On the accession of George I. Carstares was appointed, with five others, to welcome the new dynasty in the name of the Scottish Church. He was received graciously and with hearty thanks for his services, and the office of royal chaplain was again conferred upon him. A few months after he was struck with apoplexy, and died on the 28th of December, 1715.

See *State-papers and Letters addressed to William Carstares*, to which is prefixed a Life by M'Cormick, 1774; and Story's *Character and Career of William Carstares*, 1874.

CARTAGENA, or Carthagena, a fortified seaport of Spain on the Mediterranean Sea, in the province of Murcia, and 29 miles S. by E. of the town of that name, in 37° 36′ N. lat. and 1° W. long. The town stands on a hill separated by a little plain from the harbor; towards the N. and E. it communicates with a fertile valley; on the S. and W. it is hemmed in by high mountains. The harbor, the finest on the eastern coast of Spain, is fringed by four hills; and the island called La Escombrera, the ancient *Scombraria*, 2½ miles from the narrow entrance, shelters it from the violence of wind and waves. The harbor is heart-shaped and deep, except near its centre, where there is a ledge of rocks only 5 feet under water. On the eastern side is a breakwater 842 yards in length. A tramway leads from the port to the centre of the mining district, a distance of about two leagues. The streets of the town are spacious, but not imposing; and the friability of the stone gives the houses a dilapidated look. The barracks, arsenal, wet and dry docks, marine school, parade, rope-walks, and the fortifications, are all in a neglected condition. The mines near the town are very productive, and thousands of men and beasts are employed in transporting ores of lead, iron, copper, zinc, and sulphur to the coast. In 1871 there were 150 blast-furnaces and 76 smelting furnaces at work. The profits vary according to the prices of English coal and coke. Among other mineral products of Cartagena may be mentioned gypsum, saltpetre, amethysts, and rubies. Barley and wheat are grown in fair quantity, and there are some extensive vineyards and olive yards. Esparto grass (*Stipa tenacissima*), a species of rush, now much used in paper manufacture, is largely grown in the neighborhood. It is the *spartum*, or Spanish broom, of the ancient Romans,—whence their name for Cartegena, *Carthago Spartaria.* It is still used locally for making shoes, ship's cables, mats, and a kind of spun cloth. Barilla, earthenware, glass, and silk are also among the manufactures of Cartagena. The former prevalence of fever, the abandonment of the arsenal, and the prosperity of the neighboring port of Alicante have much affected the trade of the town during this century; the railroad communication which now exists with Murcia promises, however, to bring about a revival of its commerce. The imports are chiefly coal and coke from Wales and the north of England. The principal exports are esparto grass and metallic ores; 195,000 tons of the latter were shipped in 1872, almost wholly to Great Britain. The British vessels cleared in 1872 were 244, tonnage 113,015. Of foreign vessels 413 were cleared, tonnage 184,933. The sanitary condition of the town is now greatly improved, as the Almajar Marsh, which formerly caused much intermittent fever, has been drained. The drinking-water of Cartagena is not good; house-rent and food, with the exception of bread-stuffs, are dear; and there are many paupers and mendicants, to whom no public relief is afforded. The population in 1872 was estimated at 26,000, exclusive of the miners and the laborers in the works of the port.

Cartagena was founded about the year 243 B.C. by Hasdrubal, and was called *Carthago Nova* or New Carthage, to distinguish it from the African city of Carthage. It was conveniently situated opposite to the Carthaginian territory in Africa, and was early noted for its harbor, the best on the neighboring coast of Spain. Its silver and gold mines were the source of great wealth both to the Carthaginians and to the Romans. In 210 B.C. this important place, the head-quarters and treasure city of the Punic army, was stormed and taken with great slaughter by P. Scipio. The city continued to flourish under the Romans, who made it a colony, with the name *Colonia Victrix Julia Nova Carthago.* In 425 A.D. it was pillaged and nearly destroyed by the Goths. The modern Cartagena was a bishopric till the year 1219, when the see was removed to Murcia. It was rebuilt by Philip II. of Spain, for the sake of its harbor. In 1706, in the war of the Spanish Succession, it was occupied by Sir John Leake; and in the next year it was retaken by the duke of Berwick. On the 5th November, 1823, the town capitulated to the French. In consequence of the insurrection in Spain, Cartagena was in 1844 again the scene of warfare. On the 23d August, 1873, it was bombarded by the Spanish fleet under Admiral Lobos; on the 11th October a battle took place off the town, between the ships of the Government and the Intransigentes, and on the 12th January, 1874, Cartagena was occupied by the Government troops.

CARTAGENA, or Carthagena, a seaport town on the northern coast of South America, in the United States

of Colombia, in 10° 25′ 48″ N. lat. and 75° 34′ W. long. It is situated on a low sandy island, which, with the island south of it, Tierra Bomba, forms the harbor of Cartagena. To the east of the town, and connected with it and the mainland by bridges, is the suburb of Xiximani, on another island. The houses of Cartagena are of stone, with lattices and balconies of wood, and are regularly built, but mostly only one story high. The streets are well-paved, but dark and narrow; arrangements have lately been made for lighting them by petroleum gas. The principal buildings are the fortresses, some convents and churches, and the public hospitals. The town possesses a park and a theatre. The large cisterns in the walls contain a supply of excellent water. The mean temperature of Cartagena is about 83° Fahr. In the summer the heat is excessive, and yellow fever often commits great ravages; leprosy, also, is not unfrequent. The harbor, which is second to none on the north coast of South America, covers 40,000 acres; it affords complete security to ships in all weathers, and great facilities for loading and unloading. It is divided into three sections, Boca Grande and Pascaballos, and the Caldera, which have a depth of about 15 fathoms; and Boca Chica, which is deeper. The entrance to Boca Chica is defended by the two forts—Angelo and San Fernando. Its narrowness, the shallows at its mouth, and the irregularity of the tides render a pilot necessary for ships passing through it. The roadstead for large vessels is about three miles from the city. A chain of salt lakes, which open into the Bay of Cartagena to the S.W., and extend towards the Magdalena, in a valley through which that river may at one time have flowed, was taken advantage of by the Spaniards in former times for the construction of a canal. Very little cutting seems to have been necessary, except at Calamar, the point of junction with the river. During the War of Independence the old channel became choked up; it was reopened, however, in 1846, after which the flooding of the valley rendered the channel once more unnavigable, except for barges of light draught. On account of the closing of the Digue, the rival port of Baranguilla has been created, and a great amount of commerce has been transferred to Santa Martha. The rapidly-increasing requirements of trade in Colombia, and the great superiority of Cartagena as a shipping depôt, cannot fail, however, of securing before long the reopening of the route by the Digue. The imports of Cartagena from the United Kingdom are cotton goods, linen and woollen cloth, crockeryware, glass, cutlery and hardware. The exports are sugar, tobacco, coffee, cotton, dividivi and dye-woods, ivory-nuts, balsam of Tolu, caoutchouc, cocoa-nuts and fibre, and hides. Most of the cotton is obtained from wild plants, and the export is falling off year by year, as is also that of caoutchouc, from the wasteful cutting down of the india-rubber trees. The cultivation of sugar bids fair to succeed, for the climate and rich soil are adapted for the growth of the cane. The difficulty of obtaining labor has hitherto been a clog on agricultural enterprise in Cartagena. The value of bullion exported from Cartagena on British account in the year ending August 31, 1873, was £6237. The value of the imports was £153,160; the customs revenues, £41,400. There are no duties on exports. The number of vessels which entered the port in 1873 was 50, tonnage 30,637. The population of Cartagena, formerly estimated at 28,000, is now about 9000 only; four-fifths of these are black or colored people. The town of Cartagena is the chief naval arsenal of New Granada. It was founded in 1533 by Pedro de Heredia; in 1544 it was seized by the French; it was taken in 1585 by Sir Francis Drake, and in 1697 by the French, who obtained from it over a million of money. In 1741 Vernon unsuccessfully besieged the town. It was taken by Bolivar in 1815, and surrendered to the royalists in the same year. Finally, it was captured by the republicans, September 25, 1821.

CARTAGO, an inland town of Costa-Rica, Central America, on a river of the same name, 60 miles from the Gulf of Nicoya. The town suffered severely from an earthquake in 1841, and has since then decreased in commercial importance, while the population has been reduced from about 9000 to 3000 inhabitants. The volcano Cartago, near the town, is 11,480 feet high.

CARTAGO, an inland city of the state of Cauca, in the United States of Colombia, South America, 130 miles northwest of Bogota, and situated on the Viega, an affluent of the Cauca. The inhabitants, numbering about 8000, carry on a considerable trade in horned cattle, fruits, coffee, cocoa, and tobacco. The climate is dry and salubrious, and the surrounding country well cultivated.

CARTE, Thomas (1686–1754), an English historian, was born at Dusmoon, near Clifton, in 1686. He was educated at Oxford, and was first brought into public notice by his controversy with Dr. Chandler regarding the Irish massacre, in which he defended Charles I. His attachment to the Stuarts also caused him to remain a non-juror, and on the discovery of the plot of Atterbury, whose secretary he was, he was forced to flee to France. During his residence in that country he collected materials for an English edition of De Thou and Rigault. These papers were purchased by Dr. Mead, under whose direction the book was published in a very handsome form. Being recalled to England through the influence of Queen Caroline, he published, in 1738, *A General Account of the Necessary Materials for a History of England.* The task of collecting these materials he undertook, with the assistance of subscriptions from various sources. The first volume of his history, which is only of value for its vast and careful collection of facts, was published in 1744. By the insertion in it of the statement that the king's evil had been cured by the Pretender, Carte forfeited the favor of most of his patrons. He, however, continued to publish; and the 2d volume appeared in 1750, the 3d in 1752, the 4th in 1755. His papers became the property of the University of Oxford, and were deposited in the Bodleian Library.

CARTER, Elizabeth (1717–1806), a celebrated lady scholar, and translator of the works of Epictetus, was the daughter of the Rev. Dr. Carter of Deal in Kent, and was born in that town, December 16, 1717. Her mother, Margaret Swayne of Bere, in Dorset, lost her fortune by investing it in the South Sea Stocks, and died of a decline when Elizabeth was about ten years old. Dr. Carter educated his children, boys and girls alike; but Elizabeth's slowness of apprehension tired out his patience, and it was only by great perseverance that she conquered her natural incapacity for learning. She studied late at night and early in the morning, taking snuff and chewing green tea to keep herself awake; and she so injured her health by this that she suffered throughout her life from severe headaches. Miss Carter learned Greek and Latin from her father, and was specially proficient in Greek, so that Dr. Johnson said concerning a celebrated scholar, that he "understood Greek better than any one whom he had ever known except Elizabeth Carter." She learned also Hebrew French, German, Italian, Spanish, Portuguese, and lastly some Arabic. She studied astronomy, ancient geography, and ancient and modern history. In 1734 some of her verses appeared in the *Gentleman's Magazine* under the signature "Eliza," Carr the editor being a friend of her father. In 1738 she published a small collection of poems, and next year she translated from the French an attack on Pope's *Essay on Man* by M. Crousaz. In 1739 appeared her translation from the Italian of Algarotti's *Newtonianismo per le Dame*, calling it *Sir Isaac Newton's Philosophy explained for the use of the Ladies, in Six Dialogues on Light and Colors.* Her translation of Epictetus was undertaken in 1749 to please her friends Dr. Seeker (afterwards archbishop of Canterbury) and Miss Talbot, to whom the translation was sent, sheet by sheet, as it was done. This work was published by guinea subscription in 1758. In 1762 Miss Carter printed a second collection of poems. Dr. Carter, from 1762 to his death in 1774, lived with his daughter in a house at Deal, which she had purchased. Her literary earnings were augmented by an annuity settled on her in 1761 by Sir William Pulteney and his wife, who had inherited the fortune of her old friend Lord Bath; and she had another annuity from Mrs. Montagu after that lady had become a widow. Among Miss Carter's friends and correspondents may be mentioned—Johnson (whom she came to know through Cave the bookseller in 1737, and who printed one or two of her papers in the *Rambler*), Bishop Butler, Savage, Horace Walpole, Richardson, Reynolds, Burke, Mrs. Montagu, Hannah More, and Mrs. Vesey, the hostess of the *Bas-Bleus.* Miss Carter never married, and lived to the age of eighty-nine. She died in Clarges street, Piccadilly, 1806; and her nephew, the Rev. Montagu Pennington, published her *Memoirs* in 1808.

CARTESIANISM. By Cartesianism is here meant the philosophy developed principally in the works of Des Cartes, Malebranche, and Spinoza. It is impossible to

exhibit the full meaning of these authors except in connection, for they are all ruled by one and the same thought in different stages of its evolution. It may be true that Malebranche and Spinoza were prepared, the former by the study of Augustine, the latter by the study of Jewish philosophy, to draw from Cartesian principles consequences which Des Cartes never anticipated. But the foreign light did not alter the picture on which it was cast, but only let it be seen more clearly. The consequences were legitimately drawn. It may be shown that they lay in the system from the first, and that they were evolved by nothing but its own immanent dialectic. At the same time it is not likely that they would ever have been brought into such clear consciousness, or expressed with such consistency, except by a philosopher whose circumstances and character had completely detached him from all the convictions and prejudices of the age. In Malebranche, Cartesianism found an interpreter whose meditative spirit was fostered by the cloister, but whose speculative boldness was restrained by the traditions of the Catholic Church. In Spinoza it found one who was in spirit and position more completely isolated than any monk, who was removed from the influence of the religious as well as the secular world of his time, and who in his solitude seemed scarcely ever to hear any voice but the voice of philosophy. It is because Cartesianism found such a pure organ of expression that its development is, in some sense, complete and typical. Its principles have been carried to their ultimate result, and we have before us all the data necessary to determine their value.

Des Cartes was, in the full sense of the word, a partaker of the modern spirit. He was equally moved by the tendencies that produced the Reformation, and the tendencies that produced the revival of letters and science. Like Erasmus and Bacon, he sought to escape from a transcendent and unreal philosophy of the other world, to the knowledge of man, and the world he lives in. But like Luther, he found within human experience, among the matters nearest to man, the consciousness of God, and therefore his renunciation of scholasticism did not end either in materialism, or in that absolute distinction between faith and reason which inevitably leads to the downfall of faith. What was peculiar to Des Cartes, however, was the speculative interest which made it impossible for him to rest in mere experience, whether of things spiritual or things secular, which made him search, both in our consciousness of God and our consciousness of the world, for the links by which they are bound to the consciousness of self. In both cases it is his aim to go back to the beginning, to retrace the unconscious process by which the world of experience was built up, to discover the hidden logic that connects the different parts of the structure of belief, to substitute a reasoned system, all whose elements are inter-dependent, for an unreasoned congeries of opinions. Hence his first step involves reflection, doubt, and abstraction. Turning the eye of reason upon itself, he tries to measure the value of that collection of beliefs of which he finds himself possessed; and the first thing that reflection seems to discover is its accidental and unconnected character. It is a mass of incongruous materials, accumulated without system and untested. Its elements have been put together under all kinds of influences, without any conscious intellectual process, and therefore we can have no assurance of them. In order that we may have such assurance we must unweave the web of experience and thought which we have woven in our sleep, that we may begin again at the beginning and weave it over again with "clear and distinct" consciousness of what we are doing. *De omnibus dubitandum est.* We must free ourselves by one decisive effort from the weight of custom, prejudice, and tradition with which our consciousness of the world has been overlaid, that in that consciousness in its simplest and most elementary form we may find the true beginning of knowledge. The method of doubt is at the same time a method of abstraction, by which Des Cartes rises above the thought of the particular objects of knowledge, in order that he may find the primary truth in which lies the very definition of knowledge, or the reason why anything can be said to be true. First disappears the whole mass of dogmas and opinions as to God and man which are confessedly received on mere authority. Then the supposed evidence of sense is rejected, for external reality is not immediately given in sensation. It is acknowledged by all that the senses often mislead us as to the nature of things without us, and perhaps they may also mislead us as to there being anything without us at all. Nay, by a stretch of effort, we can even carry doubt beyond this point, we can doubt even mathematical truth When, indeed, we have our thoughts directed to the geometrical demonstration, when the steps of the process are immediately before our minds, we cannot but assent to the proposition that the angles of a triangle are equal to two right angles; but when we forget or turn away our thoughts from such demonstration, we can imagine that God or some powerful spirit is playing upon our minds to deceive them, so that even our most certain judgments may be illusory. In this naïve manner does Des Cartes express the idea that there are necessities of thought prior to, and presupposed in the truth of geometry. He is seeking to strip thought of all the "lendings" that seem to come to it from anything but itself, of all relation to being that can be supposed to be given to it from without, that he may discover the primary unity of thought and being on which all knowledge depends. And this he finds in pure self-consciousness. Whatever I abstract from, I cannot abstract from self, from the "I think" that, as Kant puts it, accompanies all our ideas; for it was in fact the very independence of this universal element on the particulars that made all our previous abstraction possible. Even doubt rests on certitude; alone with self I cannot get rid of this self. By an effort of thought I separate my thinking self from all that I think, but the thinking self remains, and in thinking I am. *Cogito ergo sum.* The objective judgment of self-consciousness is bound up with or involved in the very faculty of judging, and therefore remains when we abstract from all other objective judgments. It is an assertion involved in the very process by which we dismiss all other assertions. Have we not then a right to regard it as a primitive unity of thought and being, in which is contained, or out of which may be developed, the very definition of truth?

The sense in which Des Cartes understood his first principle becomes clearer when we look at his answers to the objections made against it. On the one hand it was challenged by those who asked, like Gassendi, why the argument should be based especially on thought, and why we might not say with as good a right *ambulo ergo sum.* Des Cartes explains that it is only as referred to consciousness that walking is an evidence of my existence; but if I say "I am conscious of walking, therefore I exist," this is equivalent to saying, "I think in one particular way, therefore I exist." But it is not thinking in a particular way, but thinking in general that is co-extensive with my existence. I am not always conscious of walking, or of any other special state or object, but I am always conscious, for except in consciousness there is no ego or self, and where there is consciousness there is always an ego. Do I then always think, even in sleep, asks the objector; and Des Cartes exposes himself to the criticisms of Locke, by maintaining that it is impossible that there should ever be an interval in the activity of consciousness, and by insisting that as man is essentially a thinking substance, the child thinks, or is self-conscious, even in its mother's womb. The difficulty disappears when we observe that the question as to the conditions under which self-consciousness is developed in the individual human subject, does not affect the nature of self-consciousness in itself, or in its relation to knowledge. The force of Des Cartes's argument really lies in this, that the world as an intelligible world exists only for a conscious self, and that therefore the unity of thought and being in self-consciousness is presupposed in all knowledge. Of this self it is true to say that it exists only as it thinks, and that it thinks always. *Cogito ergo sum* is, as Des Cartes points out, not a syllogism, but the expression of an identity which is discerned by the simple intuition of the mind.[1] If it were otherwise, the major "*omne quod cogitat existit*" would require to have been known before the minor "*cogito*;" whereas on the contrary it is from the immediate consciousness of being as contained in self-consciousness that that major can alone be derived. Again, when Hobbes and others argued that thinking is or may be a property of a material substance, Des Cartes answers that the question whether the material and the thinking substance are one does not meet us at the

[1] *Resp. ad secundas objectiones*, p. 74—quoting from the Elzevir edition.

outset, but can only be solved after we have considered what is involved in the conception of these different substances respectively.[1] In other words, to begin by treating thinking as a quality of a material substance, is to go outside of the intelligible world for an explanation of the intelligible world. It is to ask for something prior to that which is first in thought. If it be true that the consciousness of self is that from which we cannot abstract, that which is involved in the knowledge of anything, then to go beyond it and seek for a reason or explanation of it in anything else is to go beyond the beginning of knowledge; it is to ask for a knowledge before knowledge.

Des Cartes, however, is himself unfaithful to this point of view; for, strictly taken, it would involve the consequence, not only that there is nothing prior to the pure consciousness of self, but that there can be no object which is not in necessary relation to it. Hence there can be no absolute opposition between thought and anything else, no opposition which thought itself does not transcend. But Des Cartes commits the error of making thought the property of a substance, a *res cogitans*, which as such can immediately or directly apprehend nothing but thoughts or ideas; while, altogether outside of these thoughts and ideas, there is another substance characterized by the property of extension, and with which thought has nothing to do. Matter in space is thus changed, in Kantian language, into a "thing in itself," an object out of all relation to the subject; and on the other hand, mind seems to be shut up in the magic circle of its own ideas, without any capacity of breaking through the circle or apprehending any reality but itself. Between thought and being, in spite of their *subjective* unity in self-consciousness, a great gulf seems still to be fixed, which cannot be crossed unless thought should become extended, or matter think. But to Des Cartes the dualism is absolute, because it is a presupposition with which he starts. Mind cannot go out of itself, cannot deal with anything but thought, without ceasing to be mind; and matter must cease to be matter ere it can lose its absolute externality, its nature as having *partes extra partes*, and acquire the unity of mind. They are opposed as the divisible and the indivisible, and there is no possible existence of matter in thought except a representative existence. The ideal (or, as Des Cartes calls it, objective) existence of matter *in* thought and the real (or, as Des Cartes calls it, formal) existence of matter *out of* thought are absolutely different and independent things.

It was, however, impossible for Des Cartes to be content with a subjective idealism that confined all knowledge to the tautological expression of self-consciousness "I am I," "What I perceive I perceive." If the individual is to find in his self-consciousness the principle of all knowledge, there must be something in it which transcends the distinction of self and not self, which carries him beyond the limit of his own individuality. What then is the point where the subjective consciousness passes out into the objective, from which it seemed at first absolutely excluded? Des Cartes answers that it is through the connection of the consciousness of self with the consciousness of God. It is because we find God in our minds that we find anything else. The proof of God's existence is therefore the hinge on which the whole Cartesian philosophy turns, and it is necessary to examine the nature of it somewhat closely.

Des Cartes, in the first place, tries to extract a criterion of truth out of the *cogito ergo sum*. Why am I assured of my own existence? It is because the conception of existence is at once and immediately involved in the consciousness of self. I can logically distinguish the two elements, but I cannot separate them; whenever I clearly and distinctly conceive the one, I am forced to think the other along with it. But this gives me a rule for all judgments whatever, a principle which is related to the *cogito ergo sum* as the formal to the material principle of knowledge. Whatever we cannot separate from the clear and distinct conception of anything, necessarily belongs to it in reality; and on the other hand, whatever we can separate from the clear and distinct conception of anything, does not necessarily belong to it in reality. Let us therefore set an object clearly before us, let us sever it in thought so far as is possible from all other objects, and we shall at once be able to determine what properties and relations are essential, and what are not essential to it. And if we find empirically that any object manifests a property or relation not involved in the clear and distinct conception of it, we can say with certainty that such property or relation does not belong to it except by arbitrary arrangement, or, in other words, by the external combination of things which in their own nature have no affinity or connection.

Now, by the application of this principle, we might at once assure ourselves of many mathematical truths; but, as has been already shown, there is a point of view from which we may doubt even these, so long as the idea of a God that deceives us is not excluded. If it is not certain that there is a God that cannot lie, it is not certain that there is an objective matter in space to which mathematical truth applies. But the existence of God may be proved in two ways. In the first place it may be proved through the principle of causality, which is a self-evident truth. We have in our mind many ideas, and according to the principle of causality, all these ideas must be derived from something that contains a "formal" reality which corresponds to their "objective" reality, *i. e.*, which contains at least as much reality in its existence out of thought as they contain in their existence in thought. Now we might derive from ourselves not only the ideas of other minds like ourselves, but possibly also of material objects, since these are lower in the scale of existence than ourselves, and it is conceivable that the idea of them might be got by omitting some of the qualities which distinguish ourselves. But the idea of God, of a being who is eternal and immutable, all powerful, all wise, and all good, cannot be derived from our own limited and imperfect existence. The origin, therefore, must be sought in a being who contains actually in himself all that is contained in our idea of him.

To this argument it was objected by some of the critics of Des Cartes that the idea of God as the infinite Being is merely negative, and that it is derived from the finite simply by abstracting from its conditions. Des Cartes answers that the case is just the reverse—the infinite is the positive idea, and the finite is the negative, and therefore the former is the presupposition of the latter. As Kant, at a later date, pointed out that space is not a general conception, abstracted from the ideas of particular spaces, and representing the common element in them, but that, on the contrary, the ideas of particular spaces are got by the limitation of the one infinite space that is prior to them, so Des Cartes maintains in general that the idea of the finite is had only by limitation of the infinite, and not the idea of the infinite by abstraction from the particular determinations of the finite. It is a necessary consequence of this that the self-consciousness of a finite being is bound up with the consciousness of the infinite. Hence the idea of God is not merely one among other ideas which we have, but it is the one idea that is necessary to our very existence as thinking beings, the idea through which alone we can think ourselves, or anything else. "I ought never to suppose," says Des Cartes, "that my conception of the infinite is a negative idea, got by negation of the finite, just as I conceive repose to be merely negation of movement, and darkness merely the negation of light. On the contrary, I see manifestly that there is more reality in the infinite than in the finite substance, and that therefore I have in me the notion of the infinite, *even in some sense prior to the notion of the finite*, or, in other words, that the notion of myself in some sense presupposes the notion of God; for how could I doubt or desire, how could I be conscious of anything as a want, how could I know that I am not altogether perfect, if I had not in me the idea of a being more perfect than myself, by comparison with whom I recognize the defects of my own existence?"[2] Des Cartes then goes on in various ways to illustrate the thesis that the consciousness of a defective and growing nature cannot give rise to the idea of infinite perfection, but on the contrary, presupposes it. We could not think of a series of approximations, unless there were somehow present to us the idea of the completed infinite as the goal we aim at. If we had not the consciousness of ourselves as finite *in relation* to the infinite, either we should not be conscious of ourselves at all, or we should be conscious of ourselves as infinite. The image of God is so impressed by Him upon us, that we "conceive that resemblance wherein the idea of God is contained by the same faculty whereby we are conscious of ourselves." In other words, our consciousness of ourselves is at the same

[1] *Resp. ad tertias object.*, p. 94.

[2] *Meditatio tertia*, p. 21.

time consciousness of our finitude, and hence of our relation to a being who is infinite.

The principle which underlies the reasoning of Des Cartes is, that to be conscious of a limit, is to transcend it. We could not feel the limits either upon our thought or upon our existence, we could not doubt or desire, if we did not already apprehend something beyond these limits. Nay, we could not be conscious of our existence as individual selves, if we were not conscious of that which is not ourselves, and of a unity in which both self and not-self are included. Our individual life is therefore to us as self-conscious beings a part of a wider universal life. Doubt and aspiration are but the manifestation of this essential division and contradiction of a nature, which, as conscious of itself, is at the same time conscious of the whole in which it is a part. And as the existence of a self and its consciousness are one, so we may say that a thinking being is not only an individual, but always in some sense identified with that universal unity of being to which it is essentially related.

If Des Cartes had followed out this line of thought, he would have been led at once to the pantheism of Spinoza, if not beyond it. As it is, he is on the verge of contradiction with himself when he speaks of the consciousness of God as *in some sense* prior to the consciousness of self. How can anything be prior to the first principles of knowledge? It is no answer to say that the consciousness of God is the *principium essendi* while the consciousness of self is the *principium cognoscendi*. For, if the idea of God is prior to the idea of self, knowledge must begin where existence begins, with God. The words "in some sense," with which Des Cartes qualifies his assertion of the priority of the idea of God, only betray his hesitation and his partial consciousness of the contradiction in which he is involved. Some of Des Cartes's critics presented this difficulty to him in another form, and accused him of reasoning in a circle when he said that it is because God cannot lie that we are certain that our clear and distinct ideas do not deceive us. The very existence of the conscious self, the *cogito ergo sum*, which is the first of all truths and therefore prior in certitude to the existence of God, is believed only because of the clearness and distinctness with which we apprehend it. How then, they argued, could God's truthfulness be our security for a principle which we must use in order to prove the being of God? The answer of Des Cartes is somewhat lame. We cannot doubt any self-evident principle, or even any truth based on a self-evident principle, when we are directly contemplating it in all the necessity of its evidence; it is only when we forget or turn away from this evidence, and begin to think of the possibility of a deceitful God, that a doubt arises which cannot be removed except by the conviction that God is true.[1] It can scarcely be said that this is a *dignus vindice nodus*, or that God can fitly appear as a kind of second-best resource to the forgetful spirit that has lost its direct hold on truth and its faith in itself. God, truth, and the human spirit are thus conceived as having merely external and accidental relations with each other. What Des Cartes, however, is really expressing in this exoteric way, is simply that beneath and beyond all particular truths lies the great general truth of the unity of thought and existence. In contemplating particular truth, we may not consciously relate it to this unity, but when we have to defend ourselves against skepticism, we are forced to realize this relation. The ultimate answer to any attack upon a special aspect or element of truth must be to show that the fate of truth itself, the possibility of knowledge is involved in the rejection of it, and that we cannot doubt it without doubting reason itself. But to doubt reason is, in the language of Des Cartes, to doubt the truthfulness of God, for, in his view, the idea of God is involved in the very constitution of reason. Taken in this way then, the import of Des Cartes's answer is, that the consciousness of self, like every other particular truth, is not at first seen to rest on the consciousness of God, but that when we realize what it means, we see that it does so rest. But if this be so, then in making the consciousness of self his first principle of knowledge, Des Cartes has stopped short of the truth. It can only be the first principle if it is understood not as the consciousness of the individual self, but in a sense in which the consciousness of self is identical with the consciousness of God.

[1] *Resp. quartæ*, p. 234.

Des Cartes, however, is far from a clear apprehension of the ultimate unity of thought and being, which nevertheless he strives to find in God. Beginning with an absolute separation of the *res cogitans* from the *res extensa*, he is continually falling back into dualism just when he seemed to have escaped from it. Even in God the absolute unity idea and reality fall asunder; our idea of God is not God in us, it is only an idea of which God's existence is the cause. But the category of causality, if it forms a bridge between different things, as here between knowing and being, at the same time repels them from each other. It is a category of external relation which may be adequate to express the relation of the finite to the finite, but not the relation of the finite to the infinite. We cannot conceive God as the cause of our idea of him, without making God a purely objective and therefore finite existence. Nor is the case better when we turn to the so-called ontological argument,—that existence is necessarily involved in the idea of God, just as the property of having its angles equal to two right angles is involved in the idea of a triangle. If indeed we understood this as meaning that thought transcends the distinction between itself and existence, and that therefore existence cannot be a thing in itself out of thought, but must be an intelligible world that exists as such only for the thinking being, there is some force in the argument. But this meaning we cannot find in Des Cartes, or to find it we must make him inconsistent with himself. He was so far from having quelled the phantom "thing in itself," that he treated matter in space as such a thing, and thus confused externality of space with externality to the mind. On this dualistic basis, the ontological argument becomes a manifest paralogism, and lies open to all the objections that Kant brought against it. That the idea of God involves existence proves only that God, if he exists at all, exists by the necessity of his being. But the link that shall bind thought to existence is still wanting, and, in consistency with the other presuppositions of Des Cartes, it cannot be supplied.

But again, even if we allow to Des Cartes that God is the unity of thought and being, we must still ask what kind of unity? Is it a mere generic unity, reached by abstraction, and therefore leaving out all the distinguishing characteristics of the particulars under it? Or is it a concrete unity to which the particular elements are subordinated, but in which they are nevertheless included? To answer this question, we need only look at the relation of the finite to the infinite, as it is expressed in the passage already quoted, and in many others. Des Cartes always speaks of the infinite as a purely affirmative or positive existence, and of the finite in so far as it is distinguished from the infinite, as purely negative, or in other words as a nonentity. "I am," he says, "a mean between God and nothing, between the Supreme Being and not-being. In so far as I am created by God, there is nothing in me that can deceive me or lead me into error. But on the other hand, if I consider myself as participating in nothingness, or not-being, inasmuch as I am not myself the Supreme Being, but in many ways defective, I find myself exposed to an infinity of errors. Thus error as such is not something real that depends on God, but simply a defect; I do not need to explain it by means of any special faculty bestowed on me by God, but merely by the fact that the faculty for discerning truth from error with which he has endowed me is not infinite."[2] But if we follow out this principle to its logical result, we must say not only that error is a consequence of finitude, but also that the very *existence* of the finite as such is an error or illusion. All finitude, all determination, according to the well-known Spinozistic aphorism, is negation, and negation cannot constitute reality. To know the reality of things, therefore, we have to abstract from their limits, or in other words, the only reality is the infinite. Finite being, *qua* finite, has no existence, and finite self-consciousness, consciousness of a self in opposition to, or limited by, a not-self is an illusion. But Des Cartes does not thus reason. He does not see "anything in the nature of the infinite which should exclude the existence of finite things." "What," he asks, "would become of the power of that imaginary infinite if it could create nothing? Perceiving in ourselves the power of thinking, we can easily conceive that there should be a greater intelligence elsewhere. And even if we should suppose that intelli-

[2] *Meditatio quarta*, p. 26.

gence increased *ad infinitum*, we need not fear that our own would be lessened. And the same is true of all other attributes which we ascribe to God, even of his power, provided only that we do not suppose that the power in us is not subjected to God's will. In all points, therefore, He is infinite without any exclusion of created things."[1] The truth of this view we need not dispute; the question is as to its consistency with Cartesian principles. It may be a higher idea of God to conceive him as revealing himself in and to finite creatures; but it is a different idea from that which is implied in Des Cartes's explanations of error. It is an inconsistency that brings Des Cartes nearer to Christianity, and nearer, it may also be said, to a true metaphysic; but it is not the less an inconsistency with his fundamental principles which necessarily disappears in their subsequent development. To conceive the finite as not constituted merely by the absence of some of the positive elements of the infinite, but as in necessary unity with the infinite; to conceive the infinite as not merely that which has no limits or determinations, but as that which is self-determined and self-manifesting, which through all finitude and manifestation returns upon itself, may not be erroneous. But it would not be difficult to show that the adoption of such a conception involves the rejection or modification of almost every doctrine of the Cartesian system.

In connection with this inconsistency we may notice the very different relations in which Des Cartes conceives mind on the one side and matter on the other, to stand towards God, who yet is the cause of both, and must therefore, by the principle of causality, contain in himself all that is in both. Matter and mind are to Des Cartes absolute opposites. Whatever can be asserted of mind can be denied of matter, whatever can be asserted of matter can be denied of mind. Matter is passive, mind is active; matter is extended, and therefore divisible *ad infinitum;* mind is an indivisible unity. In fact, though of this Des Cartes is not conscious, the determination of the one is mediated by its opposition to the other; the ideas of object and subject, the self and not-self, are terms of a relation distinguishable but inseparable. But in the idea of God we must find a unity which transcends this difference in one way or another, whether by combining the two under a higher notion, or, as it would be more natural to expect on Cartesian principles, by abstracting equally from the particular characteristics of both. Des Cartes really does neither, or rather he acts partly on the one principle and partly on the other. In his idea of God he abstracts from the properties of matter but not from those of mind. "God," he says, "contains in himself *formaliter* all that is in mind, but only *eminenter* all that is in matter;"[2] or, as he elsewhere expresses it more popularly, he *is* mind, but he is only the creator of matter. And for this he gives as his reason, that matter as being divisible and passive is essentially imperfect. *Ipsa natura corporis multas imperfectiones involvit*, and, therefore, "there is more analogy between sounds and colors than there is between material things and God." But the real imperfection here lies in the abstractness of the Cartesian conception of matter as merely extended, merely passive; and this is balanced by the equal abstractness of the conception of mind or self-consciousness as an absolutely simple activity, a pure intelligence without any object but itself. If matter as absolutely opposed to mind is imperfect, mind as absolutely opposed to matter is equally imperfect. In fact they are the elements or factors of a unity, and lose all meaning when severed from each other, and if we are to seek this unity by abstraction, we must equally abstract from both.

The result of this one-sidedness is seen in the fact that Des Cartes, who begins by separating mind from matter, ends by finding the essence of mind in pure will, *i.e.*, in pure formal self-determination. Hence God's will is conceived as absolutely arbitrary, not determined by any end or law, for all laws, even the necessary truths that constitute reason, spring from God's determination, and do not precede it. "He is the author of the essence of things no less than their existence," and his will has no reason but his will. In man there is an intelligence with eternal laws or truths involved in its structure, which so far limits his will. "He finds the nature of good and truth already determined by God, and his will cannot be moved by anything else." His highest freedom consists in having his will determined by a clear perception of the nature of good and truth, and "he is never indifferent except when he is ignorant of it, or at least does not see it so clearly as to be lifted above the possibility of doubt."[3] Indifference of will is to him "the lowest grade of liberty," yet, on the other hand, in nothing does the image of God in him show itself more clearly than in the fact that his will is not limited by his clear and distinct knowledge, but is "in a manner infinite." For "there is no object of any will, even the infinite will of God, to which our will does not extend."[4] Belief is a free act, for as we can yield our assent to the obscure conceptions presented by sense and the imagination, and thus allow ourselves to be led into error, so on the other hand we can refuse to give this assent, or allow ourselves to be determined by anything but the clear and distinct ideas of intelligence. That which makes it possible for us to err is that also in which the divine image in us is most clearly seen. We cannot have the freedom of God whose will creates the object of his knowledge; but in reserving our assent for the clear and distinct perceptions of intelligence, we, as it were, re-enact for ourselves the divine law, and repeat, so far as is possible to finite beings, the transcendent act of will in which truth and good had their origin.

The inherent defect of this view is the divorce it makes between the form and the matter of intelligence. It implies that reason or self-consciousness is one thing, and that truth is another and quite different thing, which has been united to it by the arbitrary will of God. The same external conception of the relation of truth to the mind is involved in the doctrine of innate ideas. It is true that Des Cartes did not hold that doctrine in the coarse form in which it was attributed to him by Locke, but expressly declares that he has "never said or thought at any time that the mind required innate ideas which were separated from the faculty of thinking. He had simply used the word innate to distinguish those ideas which are derived from that faculty, and not from external objects or the determination of the will. Just as when we say generosity is innate in certain families, and in certain others diseases, like the gout or the stone, we do not mean to imply that infants in their mother's womb are affected with these complaints."[5] Yet Des Cartes, as we have seen, does not hold that these truths are involved in the very nature of intelligence as such, so that we cannot conceive a self-conscious being without them. On the contrary we are to regard the divine intelligence as by arbitrary act determining that two and two should be four, or that envy should be a vice. We are "*not* to conceive eternal truth flowing from God as rays from the sun."[6] In other words, we are not to conceive all particular truths as different aspects of one truth. It is part of the imperfection of man's finite nature that he "finds truth and good determined for him." It is something given,—given, indeed, along with his very faculty of thinking, but still *given* as an external limit to it It belongs not to his nature as spirit, but to his finitude as man.

After what has been said, it is obvious that the transition from God to matter must be somewhat arbitrary and external. God's truthfulness is pledged for the reality of that of which we have clear and distinct ideas; and we have clear and distinct ideas of the external world so long as we conceive it simply as extended matter, infinitely divisible, and moved entirely from without,—so long, in short, as we conceive it as the direct opposite of mind, and do not attribute to it any one of the properties of mind. *Omnes proprietates, quas in ea clare percipimus, ad hoc unum reducuntur, quod sit partibilis et mobilis, secundum partes.* We must, therefore, free ourselves from the obscure and confused modes of thought which arise whenever we attribute any of the secondary qualities, which exist merely in our sensations, to the objects that cause these sensations. The subjective character of such qualities is proved by the constant change which takes place in them, without any change of the object in which they are perceived. A piece of wax cannot lose its extension; but its color, its hardness, and all the other qualities whereby it is presented to sense, may be easily altered. What is objective in all this is merely an extended substance, and the modes of motion or rest through which it is made to pass. In like manner we must separate from our notion of matter all ideas of

[1] *Resp. ad sec. object.*, p. 75.
[2] Ibid., pp. 72–3.
[3] *Resp. Sextæ*, 160–163.
[4] *Principia*, i. 35.
[5] *Notæ in Programma*, p. 184.
[6] *Epistolæ*, i. 110.

actio in distans,—*e.g.*, we must explain weight not as a tendency to the centre of the earth or an attraction of distant particles of matter, but as a consequence of the pressure of other bodies, immediately surrounding that which is felt to be heavy.[1] For the only conceivable *actio in distans* is that which is mediated by thought, and it is only in so far as we suppose matter to have in it a principle of activity like thought, that we can accept such explanations of its motion. Again, while we must thus keep our conception of matter clear of all elements that do not belong to it, we must also be careful not to take away from it those that *do* belong to it. It is a defect of distinctness in our ideas when we conceive an attribute as existing apart from its substance, or a substance without its attribute; for this is to treat elements that are only separated by a "distinction of reason," as if they were distinct things. The conception of the possibility of a vacuum or empty space arises merely from our confusing the possible separation of any mode or form of matter from matter in general with the impossible separation of matter in general from its own essential attribute. Accordingly, in his physical philosophy, Des Cartes attempts to explain everything on mechanical principles, starting with the hypothesis that a certain quantity of motion has been impressed on the material universe by God at the first, a quantity which can never be lost or diminished, and that space is an absolute plenum in which motion propagates itself in circles. It is unnecessary to follow Des Cartes into the detail of the theory of vortices. It is more to the purpose to notice the nature of the reasons by which he is driven to regard such a mechanical explanation of the universe as necessary. A real or substantive existence is, in his view, a *res completa*, a thing that can be conceived as a whole in itself without relations to any other thing. Now matter and mind are, he thinks, such complete existences, so long as we conceive them, as pure intelligence must conceive them, as abstract opposites of each other; and do not permit ourselves to be confused by those mixed modes of thought which are due to sense or imagination. Des Cartes does not see that in this very abstract opposition there is a bond of union between mind and matter, that they are correlative opposites, and therefore in their separation *res incompletæ*. In other words, they are merely elements of reality substantiated by abstract thought into independent realities. He indeed partly retracts his assertion that mind and matter severed from each other are *res completæ*, when he declares that neither can be conceived as existing apart from God, and that therefore, strictly speaking, God alone is a substance. But as we have seen, he avoids the necessary inference that in God the opposition between mind and matter is reconciled or transcended, by conceiving God as abstract self-consciousness or will, and the material world not as his necessary manifestation, but simply as his creation,—as having its origin in an act of bare volition, and that only. His God is the God of monotheism and not of Christianity, and therefore the world is to God always a foreign matter which he brings into being, and acts on from without, but in which he is not revealed.

It is a natural consequence of this view that nature is essentially *dead matter*, that beyond the motion it has received from God at the beginning, and which it transmits from part to part without increase or diminution, it has no principle of activity in it. Every trace of vitality in it must be explained away as a mere false reflection upon it of the nature of mind. The world is thus "cut in two with a hatchet," and there is no attraction to overcome the mutual repulsion of its severed parts. Nothing can be admitted in the material half that savors of self-determination, all its energy must be communicated, not self-originated; there is no room for gravitation, still less for magnetism or chemical affinity, in this theory. *A fortiori*, animal life must be completely explained away. The machine may be very complicated, but it is still, and can be nothing but, a machine. If we once admitted that matter could be anything but mechanical, we should be on the way to admit that matter could become mind. When a modern physical philosopher declares that everything, even life and thought, is ultimately reducible to matter, we cannot always be certain that he means what he seems to say. Not seldom the materialist *soi-disant* when we hear his account of the properties of matter, turns out to be something like a spiritualist in disguise; but when Des Cartes asserted that everything *but* mind is material, and that the animals are automata, there is no such dubiety of interpretation. He said what he meant, and meant what he said, in the hardest sense his words can bear. *His* matter was not even gravitating, much less living; it had no property except that of retaining and transmitting the motion received from without by pressure and impact. And *his* animals were automata, not merely in the sense of being governed by sensation and instinct, but precisely in the sense that a watch is an automaton. Henry More cries out against the ruthless consequence with which he develops his principles to this result. "In this," he says, "I do not so much admire the penetrative power of your genius as I tremble for the fate of the animals. What I recognize in you is not only subtlety of thought but a hard and remorseless logic with which you arm yourself as with a sword of steel, to take away life and sensation with one blow, from almost the whole animal kingdom." But Des Cartes was not the man to be turned from the legitimate result of his principles by a scream. "Nec moror astutias et sagacitates canum et vulpium, nec quæcunque alia propter cibum, venerem, aut metum a brutis fiunt. *Profiteor enim me posse perfacile illa omnia ut a sola membrorum conformatione profecta explicare.*"[2]

The difficulty reaches its height when Des Cartes attempts to explain the union of the body and spirit in man. Between two substances which, when clearly and distinctly conceived, do not imply each other, there can be none but an artificial unity,—a unity of composition that still leaves them external to each other. Even God cannot make them one in any higher sense.[3] And as it is impossible in the nature of mind to see any reason why it should be embodied, or in the nature of matter to see any reason why it should become the organ of mind, the union of the two must be taken as a mere empirical fact. When we put on the one side all that belongs to intelligence, and on the other all that belongs to matter, there is a residuum in our ideas which we cannot reduce to either head. This residuum consists of our appetites, our passions, and our sensations, including not only the feelings of pain and pleasure, but also the perceptions of color, smell, taste, of hardness and softness, and all the other qualities apprehended by touch. These must be referred to the union of mind with body. They are subjective in the sense that they give us no information either as to the nature of things or of mind. Their function is only to indicate what things are useful or hurtful to our composite nature as such, or in other words what things tend to confirm or dissolve the unity of mind and body. They indicate that *something* is taking place in our body, or without it, and so stimulate us to some kind of action, but *what* it is that is taking place they do not tell us. There is no resemblance in the sensation of pain produced by great heat to the rending of the fibres of our body that causes it. But we do not need to know the real origin of our sensation to prevent us going too near the fire. Sensation leads us into error only when we are not conscious that its office is merely practical, and when we attempt to make objective judgments by means of its obscure and confused ideas, *e.g.*, when we say that there is heat in our hands or in the fire. And the remedy for this error is to be found simply in the clear conviction of the subjectivity of sensation.

These views of the nature of sense, however, at once force us to ask how Des Cartes can consistently admit that a subjective result such as sensation, a result in mind, should be produced by matter, and on the other hand how an objective result, a result in matter, should be effected by mind. Des Cartes explains at great length, according to his modification of the physiology of the day, that the pineal gland, which is the immediate organ of the soul, is acted on by the nerves through the "animal spirits," and again by reaction upon these spirits produces motions in the body. It is an obvious remark that this explanation either materializes mind, or else puts for the solution the very problem to be solved. It was therefore in the spirit of Des Cartes, it was only making explicit what is involved in many of his expressions when Geulincx, one of his earliest followers, formulated the theory of occasional causes. The general approval of the Cartesian school proved that this was a legitimate development of doctrine. Yet it tore away the last veil from the absolute dualism of the system, which had so far stretched the an-

[1] *Resp. Sextæ*, p. 165–6.

[2] *Epist.*, i. 66, 67

[3] *Princ.*, i. 60.

tagonism of mind and matter that no mediation remained possible, or what is the same thing, remained possible only through an inexplicable will of God. The intrusion of such a *Deus ex machina* into philosophy only showed that philosophy by its violent abstraction had destroyed the unity of the known and intelligible world, and was, therefore, forced to seek that unity in the region of the unknown and unintelligible. If our light be darkness, then in our darkness we must seek for light; if reason be contradictory in itself, truth must be found in unreason. The development of the Cartesian school was soon to show what is the necessary and inevitable end of such worship of the unknown.

To the ethical aspect of his philosophy, Des Cartes, unlike his great disciple, only devoted a subordinate attention. In a short treatise, however, he discussed the relation of reason to the passions. After we have got over the initial difficulty, that matter should give rise to effects in mind, and mind in matter, and have admitted that in man the unity of mind and body turns what in the animals is mere mechanical reception of stimulus from without and reaction upon it into an action and reaction mediated by sensation, emotion, and passion, another question presents itself. How can the mere natural movement of passion, the nature of which is fixed by the original constitution of our body, and of the things that act upon it, be altered or modified by pure reason? For while it is obvious that morality consists in the determination of reason by itself, it is not easy to conceive how the same being who is determined by passion from without should also be determined by reason from within. How, in other words, can a spiritual being maintain its character as self-determined, or at least determined only by the clear and distinct ideas of the reason which are its innate forms, in the presence of this foreign element of passion that seems to make it the slave of external impressions? Is reason able to crush this intruder, or to turn it into a servant? Can the passions be annihilated, or can they be spiritualized? Des Cartes could not properly adopt either alternative; he could not adopt the ethics of asceticism, for the union of body and mind is, in his view, natural; and hence the passions which are the results of that union are in themselves good. They are provisions of nature for the protection of the unity of soul and body, and stimulate us to the acts necessary for that purpose. Yet, on the other hand, he could not admit that these passions are capable of being completely spiritualized; for so long as the unity of body and soul is regarded as merely external and accidental, it is impossible to think that the passions which arise out of this unity can be transformed into the embodiment and expression of reason. Des Cartes, indeed, points out that every passion has a lower and a higher form, and while in its lower or primary form it is based on the obscure ideas produced by the motion of the animal spirits, in its higher form it is connected with the clear and distinct judgments of reason regarding good and evil. If, however, the unity of soul and body be a unity of composition, there is an element of obscurity in the judgments of passion which cannot be made clear, an element in desire that cannot be spiritualized. If the mind be external to the passions it can only impose upon them an external rule of moderation. On such a theory no *ideal* morality is possible to man in his present state; for, in order to the attainment of such an ideal morality, it would be necessary that the accidental element obtruded into his life as a spiritual being by his connection with the body should be expelled. What can be attained under present conditions is only to abstract so far as is possible from external things, and those relations to external things into which passion brings us. Hence the great importance which Des Cartes attaches to the distinction between things in our power and things not in our power. What is not in our power includes all outward things, and therefore it is our highest wisdom to regard them as determined by an absolute fate, or the eternal decree of God. We cease to wish for the impossible; and therefore to subdue our passions we only need to convince ourselves that no effort of ours can enable us to secure their objects. On the other hand that which is within our power, and which therefore we cannot desire too earnestly, is virtue. But virtue in this abstraction from all objects of desire is simply the harmony of reason with itself, the *ἀταραξία* of the Stoic under a slight change of aspect. Thus in ethics, as in metaphysics, Des Cartes ends not with a reconciliation of the opposed elements, but with a dualism, or at best, with a unity which is the result of abstraction.

MALEBRANCHE was prepared, by the ascetic training of the cloister and the teaching of Augustine, to bring to clear consciousness and expression many of the tendencies that were latent and undeveloped in the philosophy of Des Cartes. To use a chemical metaphor, the Christian Platonism of the church father was a medium in which Cartesianism could precipitate the product of its elements. Yet the medium was, as we shall see, not a perfect one, and hence the product was not quite pure. Without metaphor, Malebranche, by his previous habits of thought, was well fitted to detect and develop the pantheistic and ascetic elements of his master's philosophy. But he was not well fitted to penetrate through the veil of popular language under which the discordance of that philosophy with orthodox Christianity was hidden. On the contrary, the whole training of the Catholic priest, and especially his practical spirit, with that tendency to compromise which a practical spirit always brings with it, enabled him to conceal from himself as well as from others the logical result of his principles. And we do not wonder even when we find him treating as a "miserable" the philosopher who tore away the veil.

Malebranche saw "*all things in God.*" In other words, he taught that knowledge is possible only in so far as thought is the expression, not of the nature of the individual subject as such, but of a universal life in which he and all other rational beings partake. "No one can feel my individual pain; every one can see the truth which I contemplate—why is it so? The reason is that my pain is a modification of my substance, but truth is the common good of all spirits."[1] This idea is ever present to Malebranche, and is repeated by him in an endless variety of forms of expression. Thus, like Des Cartes, but with more decision, he tells us that the idea of the infinite is prior to the idea of the finite. "We conceive of the infinite being by the very fact that we conceive of being without thinking whether it be finite or no. But in order that we may think of a finite being, we must necessarily cut off or deduct something from the general notion of being, which consequently we must previously possess. Thus the mind does not apprehend anything whatever, except in and through the idea that it has of the infinite; and so far is it from being the case that this idea is formed by the confused assemblage of all the ideas of particular things as the philosophers maintain, that, on the contrary, all these particular ideas are only participations in the general idea of the infinite, just as God does not derive His being from the creatures, but all the creatures are imperfect participations of the divine Being."[2] Again, he tells us, in the same chapter, that "when we wish to think of any particular thing, we first cast our view upon all being, and then apply it to the consideration of the object in question. We could not desire to see any particular object unless we saw it already in a confused and general way, and as there is nothing which we cannot desire to see, so all objects must be in a manner present to our spirit." Or, as he puts it in another place, "our mind would not be capable of representing to itself the general ideas of genera and species if it did not see all things as contained in one; for every creature being an individual we cannot say that we are apprehending any created thing when we think the general idea of a triangle." The main idea that is expressed in all these different ways is simply this, that to determine any individual object as such, we must relate it to, and distinguish it from, the whole of which it is a part; and that, therefore, thought could never apprehend anything if it did not bring with itself the idea of the intelligible world as a unity. Des Cartes had already expressed this truth in his *Meditations*, but he had deprived it of its full significance by making a distinction between the being and the idea of God, the former of which, in his view, was only the cause of the latter. Malebranche detects this error, and denies that there is any idea of the infinite, which is a somewhat crude way of saying that there is no division between the idea of the infinite and its reality. What Reid asserted of the external world, that it is not represented by an idea in our minds, but is actually present to them, Malebranche asserted of God. No individual thing, he tells us—and an idea is but an individual thing—could represent the infinite.

[1] *Morale*, i. 1, § 2. [2] *Recherche*, iii. pt. ii. ch. 6.

On the contrary, all individual things are represented through the infinite Being, who contains them all in His substance *très efficace, et par conséquence très intelligible.*[1] We know God by himself, material things only by their ideas in God, for they are "unintelligible in themselves, and we can see them only in the being who contains them in an intelligible manner." And thus, unless we in some way "saw God, we should be able to see nothing else." The vision *of* God or *in* God, therefore, is an "intellectual institution" in which seer and seen, knower and known, are one. Our knowledge of things is our participation in God's knowledge of them. When we have gone so far with Malebranche, we are tempted to ask why he does not follow out his thought to its natural conclusion. If the idea of God is not separable from His existence, if it is through the idea of Him that all things are known, and through His existence that all things are, then it would seem necessarily to follow that our consciousness of God is but a part of God's consciousness of Himself, that our consciousness of self and other things is but God's consciousness of them, and lastly, that there is no existence either of ourselves or other things except in this consciousness. To understand Malebranche is mainly to understand how he stopped short of results that seemed to lie so directly in the line of his thought.

To begin with the last point, it is easy to see that Malebranche only asserts unity of idea and reality in God, to deny it everywhere else, which with him is equivalent to asserting it in general and denying it in particular. To him, as to Des Cartes, the opposition between mind and matter is absolute. Material things cannot come into our minds nor can our minds go out of themselves *pour se promener dans les cieux.*[2] Hence they are in themselves absolutely unknown; they are known only in God, in whom are their ideas, and as these ideas again are quite distinct from the reality, they "might be presented to the mind without anything existing." That they exist *out of* God in another manner than the intelligible manner of their existence *in* God, is explained by a mere act of His will, that is, it is not explained at all. Though we see all things in God, therefore, there is no connection between His existence and theirs. The "world is not a necessary emanation of divinity; God is perfectly self-sufficient, and the idea of the infinitely perfect Being can be conceived quite apart from any other. The existence of the creatures is due to the free decrees of God."[3] Malebranche, therefore, still treats of external things as "things in themselves," which have an existence apart from thought, even the divine thought, though it is only in and through the divine thought they can be known by us. "To see the material world, or rather to judge that it exists (since in itself it is invisible), it is necessary that God should reveal it to us, for we cannot see the result of His arbitrary will through necessary reason."[4]

But if we know external things only through their idea in God, how do we know ourselves? Is it also through the idea of us in God? Here we come upon a point in which Malebranche diverges very far from his master. We do not, he says, properly *know* ourselves at all, as we know God or even external objects. We are conscious of ourselves by inner sense (*sentiment intérieur*), and from this we know *that* we are, but we do not know *what* we are. "We know the existence of our soul more distinctly than of our body, but we have not so perfect a knowledge of our soul as of our body." This is shown by the fact that from our idea of body as extended substance, we can at once see what are its possible modifications. In other words, we only need the idea of extended substance to see that there is an inexhaustible number of figures and motions of which it is capable. The whole of geometry is but a development of what is given already in the conception of extension. But it is not so with our consciousness of self, which does not enable us to say prior to actual experience what sensations or passions are possible to us. We only know what heat, cold, light, color, hunger, anger, and desire are by feeling them. Our knowledge extends as far as our experience and no further. Nay, we have good reason to believe that many of these modifications exist in our soul only by reason of its accidental association with a body, and that if it were freed from that body it would be capable of far other and higher experiences. "We know by feeling that our soul is great, but perhaps we know almost nothing of what it is in itself." The informations of sense have, as Des Cartes taught, only a practical but no theoretical value; they tell us nothing of the external world, the real nature of which we know not through touch and taste and sight, but only through our idea of extended substances; while of the nature of the soul they do not tell us much more than that it exists and that it is not material. And in this latter case we have no idea, nothing better than sense to raise us above its illusions. It is clear from these statements that by self-consciousness Malebranche means consciousness of desires and feelings, which belong to the individual as such, and not consciousness of self as thinking. He begins, in fact, where Des Cartes ended, and identifies the consciousness of self as thinking, and so transcending the limits of its own particular being, with the consciousness or idea of God. And between the consciousness of the finite in sense, and the consciousness of the infinite in thought, or in other words, between the consciousness of the universal and the consciousness of the individual, he sees no connection. Malebranche is just one step from the pantheistic conclusion that the consciousness of finite individuality as such is illusory, and that as all bodies are but modes of one infinite extension, so all souls are but modes of one infinite thought. But while he willingly accepts this result in regard to matter, his religious feelings prevent him from accepting it in relation to mind. He is driven, therefore, to the inconsistency of holding that sense and feeling, through which in his view we apprehend the finite as such, give us true though imperfect knowledge of the soul, while the knowledge they give us of body is not only imperfect but false.[5] Thus the finite spirit is still allowed to be a substance, distinct from the infinite, though it holds its substantial existence on a precarious tenure. It is left hanging, we may say, on the verge of the infinite, whose attraction must soon prove too strong for it. Ideas are living things, and often remould the minds that admit them in spite of the greatest resistance of dead custom and traditionary belief. In the grasp of a logic that overpowers him the more easily that he is unconscious of its tendency, Malebranche is brought within one step of the pantheistic conclusion, and all his Christian feeling and priestly training can do, is *just* to save him from denial of the personality of man.

But even this denial is not the last word of pantheism. When the principle that the finite is known only in relation to the infinite, the individual only in relation to the universal, is interpreted as meaning that the infinite and universal is complete in itself without the finite and individual, when the finite and individual is treated as a mere accidental existence due to the "arbitrary will of God," it ceases to be possible to conceive even God as a spirit. Did Malebranche realize what he was saying when he declared that God was "being in general," but not any particular being? At any rate we can see that the same logic that leads him almost to deny the reality of finite beings, leads him also to seek the divine nature in something more abstract and general even than thought. If we must abstract from all relation to the finite in order to know God as he is, is it not necessary for us also to abstract from self-consciousness, for self-consciousness has a negative element in it that is something definite and therefore limited? We do not wonder, therefore, when we find Malebranche saying that reason does not tell us that God is a spirit, but only that He is an infinitely perfect being, and that he must be conceived rather as a spirit than as a body simply because spirit is more perfect than body. "When we call God a spirit, it is not so much to show positively what he is, as to signify that he is not material." But as we ought not to give him a bodily form like man's, so we ought not to think of his spirit as similar to our own spirits, although we can conceive nothing more perfect. "It is necessary rather to believe that as he contains in himself the properties of matter without being material, so he comprehends in himself the perfections of created spirits without being a spirit as we alone can conceive spirits, and that his true name is 'He who is,' *i.e.*, Being without restriction, Being infinite and universal."[6] Thus the essentially self-revealing God of Christianity gives way to pure spirit, and pure spirit in its turn to the eternal and incomprehensible substance of which we can say nothing but that it is. The divine substance contains in it, indeed, everything that is in

[1] *Recherche*, iii. pt. ii. ch. 7.
[2] *Morale*, i. 1, § 5.
[3] *Ibid.*, ch. 1.
[4] *Entretien*, i. § 5.
[5] *Recherche*, iii. pt. ii. ch. 7, § 4.
[6] *Ibid.*, ch. 9

creation, but it contains them *eminenter* in some incomprehensible form that is reconcilable with its infinitude. But we have no adequate name by which to call it except Being. The curious metaphysic of theology by which, in his later writings, Malebranche tried to make room for the incarnation by supposing that the finite creation, which *as* finite is unworthy of God, was made worthy by union with Christ, the divine Word, shows that Malebranche had some indistinct sense of the necessity of reconciling his philosophy with his theology; but it shows also the necessarily artificial nature of the combination. The result of the union of such incongruous elements was something which the theologians at once recognized as heterodox and the philosophers as illogical.

There was another doctrine of Malebranche which brought him into trouble with the theologians, and which was the main subject of his long controversy with Arnauld. This was his denial of particular providence. As Leibnitz maintained that this is the best of all possible worlds, and that its evils are to be explained by the negative nature of the finite, so Malebranche, with a slight change of expression, derived evil from the nature of particular or individual existence. It is not conformable to the nature of God to act by any but universal laws, and these universal laws necessarily involve particular evil consequences, though their ultimate result is the highest possible good. The question why there should be any particular existence, any existence but God, seeing such existence necessarily involves evil, remains insoluble so long as the purely pantheistic view of God is maintained; and it is this view which is really at the bottom of the assertion that he can have no particular volitions. To the coarse and anthropomorphic conception of particular providence Malebranche may be right in objecting, but on the other hand, it cannot be doubted that any theory in which the universal is absolutely opposed to the particular, the infinite to the finite, is unchristian as well as unphilosophical. For under this dualistic presupposition, there seem to be only two possible alternatives open to thought: either the particular and finite must be treated as something independent of the universal and infinite, which involves an obvious contradiction, or else it must be regarded as absolute nonentity. We find Malebranche doing the one or the other as occasion requires. Thus he vindicates the freedom of man's will on the ground that the universal will of God does not completely determine the particular volitions of man; and then becoming conscious of the difficulty involved in this conception, he tries, like Des Cartes, to explain the particular will as something merely negative, a defect, and not a positive existence.

But to understand fully Malebranche's view of freedom and the ethical system connected with it, we must notice an important alteration which he makes in the Cartesian theory of the relation of will and intelligence. To Des Cartes, as we have seen, the ultimate essence of mind lay in pure abstract self-determination or will, and hence he based even moral and intellectual truth on the arbitrary decrees of God. With Malebranche, on the other hand, abstraction goes a step further; and the absolute is sought not in the subject as opposed to the object, not in pure formal self-determination as opposed to that which is determined, but in a unity that transcends this difference. With him, therefore, will ceases to be regarded as the essence of intelligence, and sinks into a property or separable attribute of it. As we can conceive an extended substance without actual movement, so, he says, we can conceive a thinking substance without actual volition. But "matter or extension without motion would be entirely useless and incapable of that variety of forms for which it is made; and we cannot, therefore, suppose, that an all-wise Being would create it in this way. In like manner, if a spiritual or thinking substance were without will, it is clear that it would be quite useless, for it would not be attracted towards the objects of its perception, and would not love the good for which it is made. We cannot therefore conceive an intelligent being so to fashion it."[1] Now God need not be conceived as creating at all, for he is self-sufficient; but if he be a creator of spirits, he must create them for himself. "God cannot will that there should exist a spirit that does not love him, or that loves him less than any other good."[2] The craving for good in general, for an absolute satisfaction, is a *natural* love of God that is common to all. "The just, the wicked, the blessed, and the damned all alike love God with this love." Out of this love of God arises the love we have to ourselves and to others, which are the *natural inclinations* that belong to all created spirits. For these inclinations are but the elements of the love which is in God, and which therefore he inspires in all his creatures. "*Il s'aime, il nous aime, il aime toutes ses créatures; il ne fait donc point d'esprits qu'il ne les porte à l'aimer, à s'aimer, et à aimer toutes les créatures.*"[3] Stripping this thought of its theological vesture, what is expressed here is simply that as a spiritual being each man is conscious of his own limited and individual existence, as well as of the limited and individual existence of other beings like himself, only in relation to the whole in which they are parts, so he can find his own good only in the good of the whole, and he is in contradiction with himself so long as he rests in any good short of that. His love of happiness, his natural inclinations both selfish and social, may be therefore regarded as an undeveloped form of the love of God; and the ideal state of his inclinations is that in which the love of self and of others is explicitly referred to that higher affection; or in which his love does not proceed from a part to the whole, but from the whole to the parts.

The question of morals to Malebranche is the question how these *natural inclinations* are related to the particular passions. Sensation and passion arise out of the connection of body and soul, and their use is only to urge us to attend to the wants of the former. We can scarcely hear without a smile the simple monastic legend which Malebranche weaves together about the original nature of the passions and their alteration by the Fall. "It is visibly a disorder that a spirit capable of knowing and loving God should be obliged to occupy itself with the needs of the body." "A being altogether occupied with what passes in his body and with the infinity of objects that surround it, cannot be thinking on the things that are truly good."[4] Hence the necessity of an immediate and instinctive warning from the senses in regard to the relations of things to our organism, and also of pains and pleasures which may induce us to attend to this warning. "Sensible pleasure is the mark that nature has attached to the use of certain things in order that without having the trouble of examining them by reason, we may employ them for the preservation of the body, but not in order that we may love them."[5] Till the Fall the mind was merely united to the body, not subjected to it, and the influence of these pleasures and pains was only such as to make men attend to their bodily wants, but not to occupy the mind, or fill it with sensuous joys and sorrows, or trouble its contemplation of that which is really good. Our moral aim should therefore be to restore this state of things, to weaken our union with the body and strengthen our union with God. And to encourage us in pursuing this aim we have to remember that union with God is natural to the spirit, and that, while even the condition of union with the body is artificial, the condition of subjection to the body is wholly unnatural to it. Our primary tendency is towards the supreme good, and we only love the objects of our passions in so far as we "determine towards particular, and therefore false goods, the love that God gives us for himself." The search for happiness is really the search for God in disguise, and even the levity and inconstancy with which men rush from one finite good to another, is a proof that they were made for the infinite. Furthermore, this natural love of God, or inclination for good in general, "gives us the power of suspending our consent in regard to those particular goods which do not satisfy it."[6] If we refuse to be led by the obscure and confused voice of instinctive feeling, which arises from and always tends to confirm our union with the body, and wait for the light of reason which arises from and always tends to confirm our union with God, we have done all that is in our power, the rest is God's work. "If we only judge precisely of that which we see clearly, we shall never be deceived. For then it will not be we that judge, but the universal reason that judges in us."[7] And as our love, even of particular goods, is a confused love of the supreme good, so the clear vision of God inevitably brings with it the love of Him. "We needs must love the highest when we see it." When

[1] *Recherche*, i. pt. i. ch. 1.
[2] *Ibid.*, ch. 4.
[3] *Recherche*, iv. ch. 1.
[4] *Entretien*, iv.
[5] *Recherche*, bk. v. ch. 4.
[6] *Ibid.*, iv. ch. 1.
[7] *Morale*, pt. i. ch. 1, § 9.

it is the divine reason that speaks in us, it is the divine love that moves us, "the same love wherewith God loves himself and the things he has made."[1]

The general result of the ethics of Malebranche is ascetic. The passions like the senses have no relation to the higher life of the soul; their value is only in relation to the union of soul and body, a union which is purely accidental or due to the arbitrary will of God. As Pericles said of women that the less they were heard of in public for good or evil the better, so Malebranche would say of the sensations and passions, that the more silently they discharge their provisional function, and the less they disturb or interfere with the pure activity of spirit, the more nearly they approach to the only perfection that is possible for them. Their ideal state is to remain or become again simple instincts that act mechanically like the circulation of the blood. Universal light of reason casts no ray into the obscurity of sense; its universal love cannot embrace any of the objects of particular passion. It is indeed recognized by Malebranche that sensation in man is mixed with thought, that the passions in him are forms of the love of good in general. But this union of the rational with the sensuous nature is regarded merely as a confusion which is to be cleared up, *not* in a higher unity of the two elements, but simply by the withdrawal of the spirit from contact with that which darkens and defiles it. Of a transformation of sense into thought, of passion into duty,—an elevation of the life of sense till it becomes the embodiment and expression of the life of reason,—Malebranche has no conception. Hence the life of reason turns with him to mysticism in theory and to asceticism in practice. His universal is abstract and opposed to the particular; instead of explaining it, it explains it away. A certain tender beauty as of twilight is spread over the world as we view it through the eyes of this cloistered philosopher, and we do not at first see that the softness and ideality of the picture is due to the gathering darkness. Abstraction seems only to be purifying, and not destroying, till it has done its perfect work. Malebranche conceived himself to be presenting to the world only the purest and most refined expression of Christian ethics and theology. But if we obey his own continual advice to think clearly and distinctly, if we divest his system of all the sensuous and imaginative forms in which he has clothed it, and reduce it to the naked simplicity of its central thought, what we find is not a God that reveals Himself in the finite and to the finite, but the absolute substance which has no revelation, and whose existence is the negation of all but itself. Thus to tear away the veil, however, there was needed a stronger, simpler, and freer spirit,—a spirit less influenced by opinion, less inclined to practical compromise, and gifted with a stronger "faith in the whispers of the lonely muse" of speculation than Malebranche.

It is a remark of Hegel's that SPINOZA, as a Jew, first brought into European thought the idea of an absolute unity in which the difference of finite and infinite is lost. Some later writers have gone further, and attempted to show that the main doctrines by which his philosophy is distinguished from that of Des Cartes were due to the direct influences of Jewish writers like Maimonides, Gersonides, and Chasdai Creskas, rather than to the necessary development of Cartesian ideas. And it is undoubtedly true that many points of similarity with such writers, reaching down even to verbal coincidence, may be detected in the works of Spinoza, although it is not so easy to determine how much he owed to their teaching. His own view of his obligations is sufficiently indicated by the fact, that while in his ethics he carries on a continual polemic against Des Cartes, and strives at every point to show that his own doctrines are legitimately derived from Cartesian principles, he only once refers to Jewish philosophy as containing an obscure and unreasoned anticipation of these doctrines. "*Quod quidam Hebræorum quasi per nebulam vidisse videntur qui scilicet statuunt Deum Dei intellectum resque ab ipso intellectas unum et idem esse.*"[2] It may be that the undeveloped pantheism and rationalism of the Jewish philosophers had a deeper influence than he himself was aware of, in emancipating him from the traditions of the synagogue, and giving to his mind its first philosophical bias. In his earlier work there are Neo-Platonic ideas and expressions which in the *Ethics* are rejected or remoulded into a form more suitable to the spirit of Cartesianism. But the question, after all, has little more than a biographical interest. In the Spinozistic philosophy there are few differences from Des Cartes which cannot be traced to the necessary development of Cartesian principles; and the comparison of Malebranche shows that the development might take place under the most diverse intellectual conditions. What is most remarkable in Spinoza is just the freedom and security with which these principles are followed out to their last result. His Jewish origin and his breach with Judaism completely isolated him from every influence but that of the thought that possesses him. And no scruple or hesitation, no respect for the institutions or feelings of his time interferes with his speculative consequence. He exhibits to us the almost perfect type of a mind without superstitions, which has freed itself from all but reasoned and intelligent convictions, or, in the Cartesian phrase, "clear and distinct ideas;" and when he fails, it is not by any inconsistency, or arbitrary stopping short of the necessary conclusions of his logic, but by the essential defect of his principles.

Spinoza takes his idea of method from mathematics, and after the manner of Euclid, places at the head of each book of his *Ethics* a certain number of definitions, axioms, and postulates which are supposed to be intuitively certain, and to form a sufficient basis for all that follows. Altogether there are twenty-seven definitions, twenty axioms, and eight postulates. If Spinoza is regarded as the most consequent of philosophers it cannot be because he has based his system upon so many fragmentary views of truth; it must be because a deeper unity has been discerned in the system than is visible on the first aspect of it. We must, therefore, to a certain extent distinguish between the form and the matter of his thought, though it is also true that the defective form itself involves a defect in the matter.

What in the first instance recommends the geometrical method to Spinoza, is not only its apparent exactness and the necessity of its sequence, but, so to speak, its disinterestedness. Confusion of thought arises from the fact that we put ourselves, our desires and feelings and interests, into our view of things; that we do not regard them as they are in themselves, in their essential nature, but look for some final cause, that is some relation to ourselves by which they may be explained. For this reason, he says, "the truth might for ever have remained hid from the human race, if mathematics, which looks not to the final cause of figures, but to their essential nature and the properties involved in it, had not set another type of knowledge before them." To understand things is to see how all that is true of them flows from the clear and distinct idea expressed in their definition, and, ultimately, it is to see how all truth flows from the *essentia Dei* as all geometrical truth flows from the idea of quantity. To take a mathematical view of the universe, therefore, is to raise ourselves above all consideration of the end or tendency of things, above the fears and hopes of mortality into the region of truth and necessity. "When I turned my mind to this subject," he says in the beginning of his treatise on politics, "I did not propose to myself any novel or strange aim, but simply to demonstrate by certain and indubitable reason those things which agree best with practice. And in order that I might inquire into the matters of this science with the same freedom of mind with which we are wont to treat lines and surfaces in mathematics, I determined not to laugh or to weep over the actions of men, but simply to understand them; and to contemplate their affections and passions, such as love, hate, anger, envy, arrogance, pity, and all other disturbances of soul not as vices of human nature, but as properties pertaining to it in the same way as heat, cold, storm, thunder pertain to the nature of the atmosphere. For these, though troublesome, are yet necessary, and have certain causes through which we may come to understand them, and thus, by contemplating them in their truth, gain for our minds as much joy as by the knowledge of things that are pleasing to the senses." All our errors as to the nature of things arise from our judging them from the point of view of the part and not of the whole, from a point of view determined by their relation to our own individual being, and not from a point of view determined by the nature of the things themselves; or, to put the same thing in another way, from the point of view of sense and imagination, and not from the point of view of intelligence. Mathematics shows us

[1] *Recherche*, iv. ch. 5.

[2] *Eth.*, ii. schol. 7.

the inadequacy of such knowledge when it takes us out of ourselves into things, and when it presents these things to us as objects of universal intelligence apart from all special relation to our individual feelings. And Spinoza only wishes that the same universality and freedom of thought which belongs to mathematics, because its objects *do not* interest the passions, should be extended to those objects that *do* interest them. Purity from interest is the first condition of the philosopher's being; he must get beyond the illusion of sense and passion that makes our own lives so supremely important and interesting to us simply because they are our own. He must look at the present as it were through an inverted telescope of reason, that will reduce it to its due proportion and place in the sum of things. To the heat of passion and the higher heat of imagination, Spinoza has only one advice,—"Acquaint yourself with God and be at peace." Look not to the particular, but to the universal; view things not under the form of the finite and temporal, but *sub quadam specie æternitatis.*

The illusion of the finite,—the illusion of sense, imagination, and passion, which, in Bacon's language, tends to make men judge of things *ex analogia hominis* and not *ex analogia universi*, which raises the individual life, and even the present moment of the individual life, with its passing feelings, into the standard for measuring the universe,—this, in the eyes of Spinoza, is the source of all error and evil to man. On the other hand, his highest good is to live the universal life of reason, or what is the same thing to view all things from their centre in God, and to be moved only by the passion for good in general, "the intellectual love of God." In the treatise *De Emendatione Intellectus* Spinoza takes up this contrast in the first instance from its moral side. "All our felicity or infelicity is founded on the nature of the object to which we are joined by love." To love the things that perish is to be in continual trouble and disturbance of passion; it is to be full of envy and hatred towards others who possess them; it is to be ever striving after that which, when we attain it, does not satisfy us; or lamenting over the loss of that which inevitably passes away from us; only "love to an object that is infinite and eternal feeds the soul with a changeless and unmingled joy." But again our love rests upon our knowledge; if we saw things as they really are we should love only the highest object. It is because sense and imagination give to the finite an independence and substantiality that do not belong to it, that we waste our love upon it as if it were infinite. And as the first step towards truth is to understand our error, so Spinoza proceeds to explain the defects of common sense, or in other words, of that first and unreflected view of the world, which he, like Plato, calls opinion. Opinion is a kind of knowledge derived partly from hearsay, and partly from *experientia vaga*. It consists of vague and general conceptions of things, got either from the report of others or from an experience which has not received any special direction from intelligence. The mind that has not got beyond the stage of opinion takes things as they present themselves in its individual experience; and its beliefs grow up by association of whatever happens to have been found together in that experience. And as the combining principle of the elements of opinion is individual and not universal, so its conception of the world is at once fragmentary and accidental. It does not see things in their connection with the unity of the whole, and hence it cannot see them in their true relation to each other. "I assert expressly," says Spinoza, "that the mind has no adequate conception either of itself or of external things, but only a confused knowledge of them, so long as it perceives them only in the common order of nature, *i.e.*, so long as it is *externally determined* to contemplate this or that object by the accidental concourse of things, and so long as it is not *internally* determined by the unity of thought in which it considers a number of things to understand their agreements, differences, and contradictions." [1]

There are two kinds of errors which are usually supposed to exclude each other, but which Spinoza finds to be united in opinion. These are the errors of abstraction and imagination; the former explains its vice by defect, the latter its vice by excess. On the one hand, opinion is abstract and one-sided; it is defective in knowledge and takes hold of things only at one point. On the other hand and just because of this abstractness and one-sidedness it is forced to give an artificial completeness and independence to that which is essentially fragmentary and dependent. The word abstract is misleading, in so far as we are wont to associate with abstraction the idea of a mental effort by which parts are separated from a given whole; but it may be applied without violence to any imperfect conception, in which things that are really elements of a greater whole are treated as if they were *res completæ*, independent objects, complete in themselves. And in this sense the ordinary consciousness of man is often the victim of abstractions when it supposes itself most of all to be dealing with realities. The essences and substances of the schoolman may delude him, but he cannot think these notions clearly without seeing that they are only abstract elements of reality, and that they have a meaning only in relation to the other elements of it. But common sense remains unconscious of its abstractness because imagination gives a kind of substantiality to the fragmentary and limited, and so makes it possible to conceive it as an independent reality. Pure intelligence seeing the part as it is in itself could never see it but as a part. Thought, when it rises to clearness and distinctness in regard to any finite object, must at once discern its relation to other finite objects and to the whole,—must discern, in Spinozistic language, that it is "modal" and not "real." But though it is not possible to *think* the part as a whole it is possible to picture it as a whole. The limited image that fills the mind's eye seems to need nothing else for its reality. We cannot think a house clearly and distinctly in all the connection of its parts with each other, without seeing its necessary relation to the earth on which it stands, to the pressure of the atmosphere, &c. The very circumstances by which the possibility of such an existence is explained make it impossible to conceive it apart from other things. But nothing hinders me to rest on a house as a complete picture by itself. Imagination represents things in the externality of space and time, and is subjected to no other conditions but those of space and time. Hence it can begin anywhere, and stop anywhere. For the same cause it can mingle and confuse together all manner of inconsistent forms—can imagine a man with a horse's head, a candle blazing in vacuo, a speaking tree, a man changed into an animal. There may be elements in the nature of these things that would prevent such combinations; but these elements are not necessarily present to the ordinary consciousness, the abstractness of whose conceptions leaves it absolutely at the mercy of imagination or accidental association. To thought in this stage anything is possible that can be pictured. On the other hand, as knowledge advances, this freedom of combination becomes limited, "the less the mind understands and the more it perceives, the greater is its power of fiction, and the more it understands, the narrower is the limitation of that power. For just as in the moment of consciousness we cannot imagine that we do not think, so after we have apprehended the nature of body, we cannot conceive of a fly of infinite size, and after we know the nature of a soul we cannot think of it as a square, though we may use the words that express these ideas." [2] Thus, according to Spinoza, the range of possibility narrows as knowledge widens, until to perfected knowledge possibility is lost in necessity.

From these considerations, it follows that all thought is imperfect that stops short of the absolute unity of all things. Our first imperfect notion of things as isolated from each other, or connected only by co-existence and succession, is a mere imagination of things. It is a fictitious substantiation of isolated moments in the eternal Being. Knowledge, so far as it deals with the finite, is engaged in a continual process of self-correction which can never be completed, for at every step there is an element of falsity, in so far as the mind rests in the contemplation of a certain number of the elements of the world, as if they constituted a complete whole by themselves, whereas they are only a part, the conception of which has to be modified at the next step of considering its relation to the other parts. Thus we rise from individuals of the first to individuals of the second order, and we cannot stop short of the idea of "all nature as one individual whose parts vary through an infinite number of modes, without change of the whole individual." [3] At first we think of pieces of matter as independent individuals, either because we can picture them separately, or because they preserve a certain propor-

[1] *Eth.*, i. schol. 29.

[2] *De Emend.*, viii. § 58.

[3] *Eth.*, ii. lemma. 7 schol.

tion or relation of parts through their changes. But on further consideration, these apparent substances sink into modes, each of which is dependent on all the others. All nature is bound together by necessary law, and not an atom could be other than it is without the change of the whole world. Hence it is only in the whole world that there is any true individuality or substance. And the same principle applies to the minds of men. Their individuality is a mere semblance caused by our abstraction from their conditions. Isolate the individual man, and he will not display the character of a thinking being at all. His whole spiritual life is bound up with his relations to other minds, past and present. He has such a life, only in and through that universal life of which he is so infinitesimal a part that his own contribution to it is as good as nothing. "*Vis qua homo in existendo perseverat limitata est, et a potentia causarum externarum infinite superatur.*"[1] What can be called his own? His body is a link in a cyclical chain of movement which involves all the matter of the world, and which as a whole remains without change through all. His mind is a link in a great movement of thought, which makes him the momentary organ and expression of one of its phases. His very consciousness of self is marred by a false abstraction, above which he must rise ere he can know himself as he really is.

"Let us imagine," says Spinoza in his fifteenth letter, "a little worm living in blood which has vision enough to discern the particles of blood, lymph, &c., and reason enough to observe how one particle is repelled by another with which it comes into contact, or communicates a part of its motion to it. Such a worm would live in the blood as we do in this part of the universe, and would regard each particle of it, not as a part, but as a whole, nor could it know how all the parts are influenced by the universal nature of the blood, and are obliged to accommodate themselves to each other as is required by that nature, so that they co-operate together according to a fixed law. For if we suppose that there are no causes outside of the blood which could communicate new motions to it, and no space beyond the blood, nor any other bodies to which its particles could transfer their motion, it is certain that the blood as a whole would always maintain its present state, and its particles would suffer no other variations than those which may be inferred from the given relation of the motion of blood to lymph, chyle, &c. And thus in that case the blood would require to be considered always as a whole and not as a part. But since there are many other causes which influence the laws of the nature of blood, and are in turn influenced thereby, other motions and other variations must arise in the blood which are not due to the proportion of motion in its constituents but also to the relation between that motion and external causes. And therefore we cannot consider the blood as a whole, but only as a part of a greater whole.'

"Now we can think, and indeed ought to think, of all natural bodies in the same manner in which we have thought of this blood, for all bodies are surrounded by other bodies, and reciprocally determine and are determined by them, to exist and operate in a fixed and definite way, so as to preserve the same ratio of motion and rest in the whole universe. Hence it follows that every body, in so far as it exists under a certain definite modification, ought to be considered as merely a part of the whole universe, which agrees with its whole, and thereby is in intimate union with all the other parts; and since the nature of the universe is not limited like that of the blood, but absolutely infinite, it is clear that by this nature with its infinite powers, the parts are modified in an infinite number of ways, and compelled to pass through an infinity of variations. Moreover, when I think of the universe as a substance, I conceive of a still closer union of each part with the whole; for, as I have elsewhere shown, it is the nature of substance to be infinite, and therefore every single part belongs to the nature of the corporeal substance, so that apart therefrom it neither can exist nor be conceived. And as to the human mind, I think of it also as of part of nature, for I think of nature as having in it an infinite power of thinking, which, as infinite, contains in itself the idea of all nature, and whose thoughts run parallel with all existence."

From this point of view it is obvious that our knowledge of things cannot be real and adequate, except in so far as it is determined by the idea of the whole, and proceeds from the whole to the parts. A knowledge that proceeds from part to part must always be imperfect; it must remain external to its object, it must deal in abstractions or mere *entia rationis*, which it may easily be led to mistake for realities. Hence Spinoza, like Plato, distinguishes reason whose movement is regressive (from effect to cause, from variety to unity) from *scientia intuitiva*, whose movement is progressive, which "proceeds from the adequate idea of certain of God's attributes to an adequate knowledge of the nature of things."[2] The latter alone deserves to be called science in the highest sense of the term. For in order that our mind may correspond to the exemplar of nature, it must develop all its ideas from the idea that represents the origin and source of nature, so that that idea may appear as the source of all other ideas."[3] The regressive mode of knowledge has its highest value in preparing for the progressive. The knowledge of the finite, ere it can become perfectly adequate, must be absorbed and lost in the knowledge of the infinite. In a remarkable passage in the *Ethics*, Spinoza declares that the defect of the common consciousness of men lies not so much in their ignorance, either of the infinite or of the finite, as in their incapacity for bringing the two thoughts together, so as to put the latter in its proper relation to the former. All are ready to confess that God is the cause both of the existence and of the nature of things created, but they do not realize what is involved in this confession —and hence they treat created things as if they were substances—that is, as if they were Gods. "Thus while they are contemplating finite things, they think of nothing less than of the divine nature; and again when they turn to consider the divine nature, they think of nothing less than of their former fictions on which they have built up the knowledge of finite things, as if these things could contribute nothing to our understanding of the divine nature. Hence it is not wonderful that they are always contradicting themselves."[4] As Spinoza says elsewhere, it belongs to the very nature of the human mind to know God, for unless we know God, we could know nothing else. The idea of the absolute unity is involved in the idea of every particular thing, yet the generality of men, deluded by sense and imagination, are unable to bring this implication into clear consciousness, and hence their knowledge of God does not modify their view of the finite. It is the business of philosophy to correct this defect, to transform our conceptions of the finite by relating it to the infinite, to complement and complete the partial knowledge produced by individual experience by bringing it into connection with the idea of the whole. And the vital question which Spinoza himself prompts us to ask is how far and in what way this transformation is effected in the Spinozistic philosophy.

There are two great steps in the transformation of knowledge by the idea of unity as that idea is conceived by Spinoza. The first step involves a change of the conception of individual finite things by which they lose their individuality, their character as independent substances, and come to be regarded as modes of the infinite. But secondly, this negation of the finite as such is not conceived as implying the negation of the distinction between mind and matter. Mind and matter still retain that absolute opposition which they had in the philosophy of Des Cartes, even after all limits have been removed. And therefore in order to reach the absolute unity, and transcend the Cartesian dualism, a second step is necessary, by which the independent substantiality of mind and matter is withdrawn, and they are reduced into attributes of the one infinite substance. Let us examine these steps successively.

The method by which the finite is reduced into a mode of the infinite has already been partially explained. Spinoza follows to its legitimate result the metaphysical or logical principles of Des Cartes and Malebranche. According to the former, as we have seen, the finite presupposes the infinite, and, indeed, so far as it is real, it is identical with the infinite. The infinite is absolute reality, because it is pure affirmation, because it is that which *negationem nullam involvit*. The finite is distinguished from it simply by its limit, *i.e.*, by its wanting something which the infinite has. At this point Spinoza takes up the argument. If the infinite be the real, and the finite, so far as it is distinguished therefrom, the unreal, then the supposed substantiality or

[1] *Eth.*, iv. 3

[2] *Eth.*, ii. 40, schol. 2. [3] *De Emend.*, vii. § 42. [4] *Eth.*, ii. schol. 10.

individuality of finite beings is an illusion. In itself the finite is but an abstraction, to which imagination has given an apparent independence. All limitation or determination is negative, and in order to apprehend positive reality, we must abstract from limits. By denying the negative, we reach the affirmative; by annihilating finitude in our thought, and so undoing the illusory work of the imagination, we reach the indeterminate or unconditioned being which alone truly is. All division, distinction, and relation are but *entia rationis*. Imagination and abstraction can give to them, as they can give to mere negation and nothingness, "a local habitation and a name," but they have no objective meaning, and in the highest knowledge, in the *scientia intuitiva*, which deals only with reality, they must entirely disappear. Hence to reach the truth as to matter, we must free ourselves from all such ideas as figure or number, measure or time, which imply the separation and relation of parts. Thus in his 50th letter, in answer to some question about figure, Spinoza says, "to prove that figure is negation, and not anything positive, we need only consider that the whole of matter conceived indefinitely, or in its infinity, can have no figure; but that figure has a place only in finite or determinate bodies. He who says that he perceives figure, says only that he has before his mind a limited thing and the manner in which it is limited. But this limitation does not pertain to a thing in its 'esse,' but contrariwise in its 'non-esse' (*i.e.*, it signifies, not that some positive quality belongs to the thing, but that something is wanting to it). Since, then, figure is but limitation, and limitation is but negation, we cannot say that figure is anything." The same kind of reasoning is elsewhere (*Epist.* 29) applied to solve the difficulties connected with the divisibility of space or extension. Really, according to Spinoza, extension is indivisible, though modally it is divisible. In other words, parts *ad infinitum* may be taken in space by the abstracting mind, but these parts have no separate existence. You cannot rend space, or take one part of it out of its connection with other parts. Hence arises the impossibility of asserting either that there is an infinite number of parts in space, or that there is not. The solution of the antinomy is that neither alternative is true. There are many things *quæ nullo numero explicari possunt*, and to understand these things we must abstract altogether from the idea of number. The contradiction arises entirely from the application of that idea to the infinite. We cannot say that space has a finite number of parts, for every finite space must be conceived as itself included in infinite space. Yet, on the other hand, an infinite number is an absurdity; it is a number which is not a number. We escape the difficulty only when we see that number is a category inapplicable to the infinite, and this to Spinoza means that it is not applicable to reality, that it is merely an abstraction, or *ens imaginationis*.

The same method which solves the difficulties connected with the nature of matter is applied to mind. Here also we reach the reality, or thing in itself, by abstracting from all determination. All conceptions, therefore, that involve the independence of the finite, all conceptions of good, evil, freedom, and responsibility disappear. When Blyenburg accuses Spinoza of making God the author of evil, Spinoza answers that evil is an *ens rationis* that has no existence for God. "Evil is not something positive, but a state of privation, and that not in relation to the divine, but simply in relation to the human intelligence. It is a conception that arises from that generalizing tendency of our minds, which leads us to bring all beings that have the external form of man under one and the same definition, and to suppose that they are all equally capable of the highest perfection we can deduce from such a definition. When, therefore, we find an individual whose works are not consistent with this perfection, straightway we judge that he is deprived of it, or that he is diverging from his own nature,—a judgment we should never make if we had not thus referred him to a general definition, and supposed him to be possessed of the nature it defines. But since God does not know things abstractly, or through such general definitions, and since there cannot be more reality in things than the divine intelligence and power bestows upon them, it manifestly follows that the defect which belongs to finite things, cannot be called a privation in relation to the intelligence of God, but only in relation to the intelligence of man."[1] Thus evil and good vanish when we consider things *sub specie æternitatis*, because they are categories that imply a certain independence in finite beings. For the idea of a moral standard implies a relation of man to the absolute good, a relation of the finite to the infinite, in which the finite is not simply lost and absorbed in the infinite. But Spinoza can admit no such relation. In the presence of the infinite the finite disappears, for it exists only by abstraction and negation; or it *seems* to us to exist, not because of what is present to our thoughts, but because of what is not present to them. As we think ourselves free because we are conscious of our actions but not of their causes, so we think that we have an individual existence only because the infinite intelligence is not wholly but only partially realized in us. But as we cannot really divide space, though we can think of a part of it, so neither can we place any real division in the divine intelligence. In this way we can understand how Spinoza is able to speak of the human mind as part of the infinite thought of God, and of the human body as part of the infinite extension of God, while yet he asserts that the divine substance is simple, and not made up of parts. So far as they exist, they must be conceived as parts of the divine substance, but when we look directly at that divine substance, their separate existence altogether disappears.

It has, however, been already mentioned that this ascending movement of abstraction, does not at once and directly bring Spinoza to the absolute unity of substance. The principle that "determination is negation," and that therefore the absolute reality is to be found only in the indeterminate, would lead us to expect this conclusion; but the Cartesian dualism prevents Spinoza from reaching it. Mind and matter are so absolutely opposed, that even when we take away all limit and determination from both, they still retain their distinctness. Raised to infinity, they still refuse to be identified. We are forced, indeed, to take from them their substantial or substantive existence, for there can be no other substance but God, who includes all reality in himself. But though reduced to attributes of a common substance, the difference of thought and extension is insoluble. The independence of individual finite things disappears whenever we substitute thought for imagination, but even to pure intelligence, extension remains extension, and thought remains thought. Spinoza seems therefore reduced to a dilemma; he cannot surrender either the unity or the duality of things, yet he cannot relate them to each other. The only course left open to him is to conceive each attribute in its turn as the whole substance, and to regard their difference as the difference of expression. As the patriarch was called by the two names of Jacob and Israel, under different aspects, each of which included the whole reality of the man, so our minds apprehend the absolute substance in two ways, each of which expresses its whole nature.[2] In this way the extremes of absolute identity and absolute difference seem to be reconciled. There is a complete parallelism of thought and extension, *ordo et connexio idearum idem est ac ordo et connexio rerum*,[3] yet there is also a complete independence and absence of relation between them, for each is the whole. A thing in one expression cannot be related to itself in another expression. Hence in so far as we look at the substance under the attribute of thought, we must take no account of extension, and in so far as we look at it under the attribute of extension, we must equally refuse to take any account of thought. This parallelism may be best illustrated by Spinoza's account of the relation of the human soul and body. The soul is the idea of the body, and the body is the object of the soul, whatever is in the one really is in the other ideally; yet this relation of object and subject does not imply any connection. The motions and changes of the body have to be accounted for partly by itself, partly by the influence of other bodies; and the thoughts of the soul in like manner have to be accounted for partly by what God thinks as constituting the individual mind, and partly by what he thinks as constituting the minds of other individuals. But to account for thought by the motions of the body, or for the motions of the body by thought, is to attempt to bridge the impassable gulf between thought and extension. It involves the double absurdity of accounting for a thing by itself, and of accounting for it by that which has nothing in common with it.

[1] *Epist.*, 32

[2] *Epist.*, 27.

[3] *Eth.*, ii. 7.

In one point of view, this theory of Spinoza deserves the highest praise for that very characteristic which probably excited most odium against it at the time it was first published, namely, its exaltation of matter. It is the mark of an imperfect spiritualism to hide its eyes from outward nature, and to shrink from the material as impure and defiling. But its horror and fear are proofs of weakness; it flies from an enemy it cannot overcome. Spinoza's bold identification of spirit and matter, God and nature, contains in it the germ of a higher idealism than can be found in any philosophy that asserts the claims of the former at the expense of the latter. A system that begins by making nature godless, will inevitably end, as Schelling once said, in making God unnatural. The expedients by which Des Cartes keeps matter at a distance from God, were intended to maintain his pure spirituality; but their ultimate effect was seen in his reduction of the spiritual nature to mere will. As Christianity has its superiority over other religions in this, that it does not end with the opposition of the human to the divine, the natural to the spiritual, but ultimately reconciles them, so a true idealism must vindicate its claims by absorbing materialism into itself. It was therefore a true instinct of philosophy that led Spinoza to raise matter to the co-equal of spirit, and at the same time to protest against the Cartesian conception of matter as mere inert mass, moved only by impulse from without. "What were a God that only impelled the world from without?" says Goethe. "It becomes him to stir it by an inward energy, to involve nature in himself, himself in nature, so that that which lives and moves and has a being in him can never feel the want of his power or his spirit."

While, however, Spinoza thus escapes some of the inconsequences of Des Cartes, the contradiction that was *implicit* in the Cartesian system between the duality and the unity, the attributes and the substance, in his system becomes *explicit*. When so great emphasis is laid upon the unity of substance, it becomes more difficult to explain the difference of the attributes. The result is, that Spinoza is forced to account for it, not by the nature of substance itself, but by the nature of the intelligence to which it is revealed. "By substance," he says, "I understand that which is in itself, and is conceived through itself. By attribute I understand the same thing, *nisi quod attributum dicatur respectu intellectus substantiæ certum talem naturam tribuentis.*"[1] Hence we are naturally led with Erdmann to think of the intelligence dividing the substance as a kind of prism that breaks the white light into different colors, through each of which the same world is seen, only with a different aspect. But if the intelligence in itself is but a mode of one of the attributes, how can it be itself the source of their distinction?

The key to this difficulty is that Spinoza has really, and almost in spite of his logical principles, two opposite conceptions of substance, between which he alternates without ever bringing them to a unity. On the one hand, in accordance with the principle that determination is negation, substance must be taken as that which is utterly indeterminate, like the Absolute of the Buddhist, which we can characterize only by denying of it everything that we assert of the finite. In this view, no predicate can be applied univocally to God and to the creatures; he differs from them, not only in existence, but in essence.[2] If we follow out this view to its legitimate result, God is withdrawn into his own absolute unity, and no difference of attributes can be ascribed to him, except in respect of something else than himself. It is owing to the defects of our intelligence that he appears under different forms or expressions; in himself he is pure being, without form or expression at all. But, on the other hand, it is to be observed, that while Spinoza really proceeds by abstraction and negation, he does not *mean* to do so. The abstract is to him the unreal and imaginary, and what he means by substance is not simply Being in general, the conception that remains when we omit all that distinguishes the particulars, but the absolute totality of things conceived as a unity in which all particular existence is included and subordinated. Hence at a single stroke the indeterminate passes into the most determinate Being, the Being with no attributes at all into the Being constituted by an infinite number of attributes. And while, under the former conception, the defect of our intelligence seemed to be that it divided the substance, or saw a difference of attributes in its absolute unity, under the second conception its defect lies in its apprehending only two out of the infinite multitude of these attributes. To do justice to Spinoza, therefore, we must distinguish between the actual effect of his logic and its effect as he conceived it. The actual effect of his logic is to dissolve all in the ultimate abstraction of Being, from which we can find no way back to the concrete. But his intent was simply to relate all the parts to that absolute unity which is the presupposition of all thought and being, and so to arrive at the most concrete and complete idea of the reality of things. He failed to see what is involved in his own principle that determination is negation; for if affirmation is impossible without negation, then the attempt to divorce the two from each other, the attempt to find a purely affirmative being, must necessarily end in the barest of all abstractions being confused with the unity of all things. But even when the infinite substance is defined as the negative of the finite, the idea of the finite becomes an essential element in the conception of the infinite. Even the Pantheist, who says that God is what finite things are not, in spite of himself recognizes that God has a relation to finite things. Finite things may in his eyes have no positive relation to God, yet they have a negative relation; it is through their evanescence and transitoriness, through their nothingness, that the eternal, the infinite reality alone is revealed to him. Spinoza is quite conscious of this process, conscious that he reaches the affirmation of substance by a negation of what he conceives as the purely negative and unreal existence of finite things, but as he regards the assertion of the finite as merely an illusion due to *our* imagination, so he regards the correction of this illusion, the negation of the finite as a movement of reflection which belongs merely to our intelligence, and has nothing to do with the nature of substance in itself. We find the true affirmation by the negation of the negative, but in itself affirmation has no relation to negation. Hence his absolute being is the dead all-absorbing substance and not the self-revealing spirit. It is the being without determination, and not the being that determines itself. There is no reason in the nature of substance why it should have either attributes or modes; neither individual finite things nor the general distinction of mind and matter can be deduced from it. The descending movement of thought is not what Spinoza himself said it should be, an evolution, but simply an external and empirical process by which the elements dropped in the ascending movement of abstraction are taken up again with a merely nominal change. For the sole difference in the conception of mind and matter as well as in the conception of individual minds and bodies which is made by their reference to the idea of God, is that they lose their substantive character and become adjectives. Aristotle objected to Plato that his ideas were merely *αἰσθητὰ ἀΐδια*, that is, that his idealization of the world was merely superficial, and left the things idealized very much what they were before to the sensuous consciousness; and the same may be said of Spinoza's negation of finite things. It was an external and imperfect negation, which did not transform the idea of the finite, but merely substituted the names of attributes and modes for the names of general and individual substances.

The same defective logic, by which the movement of thought in determining the substance is regarded as altogether external to the substance itself, is seen again in Spinoza's conceptions of the relations of the attributes to each other. Adopting the Cartesian opposition of mind and matter, he does not see, any more than Des Cartes, that in their opposition they are correlative. Or if he did see it (as seems possible from a passage in his earliest treatise),[3] he regarded the correlation as merely subjective, merely belonging to our thought. They are to him only the two attributes which we happen to know out of the infinite number belonging to God. There is no necessity that the substance should manifest itself in just these attributes and no others, for abstract substance is equally receptive of all determinations, and equally indifferent to them all. Just because the unity is merely generic, the differences are accidental, and do not form by their union any complete whole. If Spinoza had seen that matter in itself is the correlative opposite of mind in itself, he need not have sought by abstracting from the difference of these

[1] *Epist.*, 27.

[2] *Eth.*, i. schol. 17.

[3] *Tractatus de Deo et homine*, ii. 19.

elements to reach a unity which is manifested in that very difference, and his absolute would have been not substance but spirit. This idea he never reached, but we find him approximating to it in two ways. On the one hand, he condemns the Cartesian conception of matter as passive and self-external, or infinitely divisible—as, in short, the mere opposite of thought.[1] And sometimes he insists on the parallelism of extension and thought at the expense of their opposition in a way that almost anticipates the assertion by Leibnitz of the essential identity of mind and matter. On the other hand, he recognizes that this parallelism is not complete. Thought is not like a picture; it is conscious, and conscious not only of itself, but of extension. It transcends therefore the absolute distinction between itself and the other attributes. It is only because he cannot rid himself of the phantom of an extended matter as a thing in itself, which is entirely different from the idea of it, that Spinoza is prevented from recognizing in mind that unity that transcends all distinctions, even its own distinction from matter. As it is, his main reason for saying that intelligence is not an attribute of God, but merely a mode, seems to be this, that the thought of God must be conceived as producing its own object, *i.e.*, as transcending the distinction of subject and object which is necessary to our intelligence.[2] But this argument of itself points to a concrete quite as much as to an abstract unity. It is as consistent with the idea of absolute spirit as with that of absolute substance. Spinoza's deliberate and formal doctrine is undoubtedly the latter; but he constantly employs expressions which imply the former, as when he speaks of God as *causa sui*. The higher idea inspires him, though his consciousness only embraces the lower idea.

The ethical philosophy of Spinoza is determined by the same principles and embarrassed by the same difficulties as his metaphysics. In it also we find the same imperfect conception of the relation of the positive to the negative elements, and as a consequence, the same confusion of the highest unity of thought, the affirmation that subordinates and transcends all negation with mere abstract affirmation. Or, to put the same thing in ethical language, Spinoza teaches a morality which is in every point the opposite of asceticism, a morality of self-assertion or self-seeking, and not of self-denial. The *conatus sese conservandi* is to him the supreme principle of virtue;[3] yet this self-seeking is supposed, under the guidance of reason, to identify itself with the love of man and the love of God, and to find blessedness not in the reward of virtue, but in virtue itself. It is only confusion of thought and false mysticism that could object to this result on the ground of the element of self still preserved in the *amor Dei intellectualis*. For it is just the power of identifying himself with that which is wider and higher than his individual being that makes morality possible to man. But the difficulty lies in this, that Spinoza will not admit the negative element, the element of mortification or sacrifice, into morality at all, even as a moment of transition. For him there is no dead self, by which we may rise to higher things, no losing of life that we may find it. For the negative is nothing; it is evil in the only sense in which evil exists, and cannot be the source of good. The higher affirmation of our own being, the higher seeking of ourselves which is identical with the love of God, must therefore be regarded as nothing distinct in kind from that first seeking of our natural self which in Spinoza's view belongs to us in common with the animals, and indeed in common with all beings whatever. It must be regarded merely as a direct development and extension of the same thing. The main interest of the Spinozistic ethics therefore lies in observing by what steps he accomplishes this transition, while excluding altogether the idea of a real division of the higher and the lower life, the spirit and flesh, and of a conflict in which the former is developed through the sacrifice of the latter.

Finite creatures exist only as modes of the divine substance, only so far as they partake in the infinite, or what is the same thing with Spinoza, in the purely affirmative or self-affirming nature of God. They therefore must also be self-affirming. They can never limit themselves; their limit lies in this, that they are not identified with the infinite substance which expresses itself also in other modes. In other words, the limit of any finite creature, that which makes it finite, lies without it, and its own existence, so far as it goes, must be pure self-assertion and self-seeking. *Unaquæque res quantum in se est in suo esse perseverare conatur*, and this *conatus* is its very essence or inmost nature.[4] In the animals this *conatus* takes the form of appetite, in man of desire, which is "appetite with the consciousness of it."[5] But this constitutes no essential difference between appetite and desire, for "whether a man be conscious of his appetite or no, the appetite remains one and the same thing."[6] Man therefore, like the animals, is purely self-asserting and self-seeking. He can neither know nor will anything but his own being, or if he knows or wills anything else, it must be something involved in his own being. If he knows other beings, or seeks their good, it must be because their existence and their good are involved in his own. If he loves and knows God, it must be because he cannot know himself without knowing God, or find his supreme good anywhere but in God.

What at first makes the language difficult to us is the identification of will and intelligence. Both are represented as affirming their objects. Des Cartes had prepared the way for this when he treated the will as the faculty of judging or giving assent to certain combinations of ideas, and distinguished it from the purely intellectual faculties by which the ideas are apprehended. By this distinction he had, as he supposed, secured a place for human freedom. Admitting that intelligence is under a law of necessity, he claimed for the will a certain latitude or liberty of indifference, a power of giving or withholding assent in all cases where the relations of ideas were not absolutely clear and distinct. Spinoza points out that there is no ground for such a distinction, that the acts of apprehension and judgment cannot be separated from each other. "In the mind there is no volition, *i.e.*, no affirmation or negation which is not immediately involved in the idea it apprehends," and therefore "intellect and will are one and the same thing."[7] If then there is no freedom except the liberty of indifference, freedom is impossible. Man, like all other beings and things, is under an absolute law of necessity. All the actions of his will, as well as of his intelligence, are but different forms of the self-assertive tendency to which he cannot but yield, because it is one with his very being, or only ideally distinguishable therefrom. There is, however, another idea of liberty. Liberty as the opposite of necessity is an absurdity—it is impossible for either God or man; but liberty as the opposite of slavery is possible, and it is actually possessed by God. The divine liberty consists in this, that God acts from the necessity of his own nature alone, and is not in any way determined from without. And the great question of ethics is, How far can man partake in this liberty? At first it would seem impossible that he should partake in it. He is a finite being, whose power is infinitely surpassed by the power of other beings to which he is related. His body acts only as it is acted on, and his mind cannot therefore apprehend his body, except as affected by other things. His self-assertion and self-seeking are therefore confused with the asserting and seeking of other things, and are never pure. His thought and activity cannot be understood except through the influence of other things which lie outside of his consciousness, and upon which his will has no influence. He cannot know clearly and distinctly either himself or anything else; how then can he know his own good or determine himself by the idea of it?

The answer is the answer of Des Cartes, that the apprehension of any finite thing involves the adequate idea of the infinite and eternal nature of God.[8] This is the primary object of intelligence, in which alone is grounded the possibility of knowing either ourselves or anything else. In so far as our knowledge is determined by this idea, or by the ideas of other things, which are referred to this idea and seen in its light, in so far its action flows from an internal and not an external necessity. In so far, on the other hand, as we are determined by the affections of the body, ideas in which the nature of our own body and the nature of other things are confused together, in so far we are determined by an external necessity. Or to put the same thing in what has been shown to be merely another way of expression, in so far as we are determined by pure intelligence we are free, but in so far as we are determined by opinion and imagination we are slaves.

From these premises it is easy to see what form the

[1] *Epist.* 29 70. [2] *Eth.*, i. schol. 17. [3] *Eth.*, iv. schol. 22.
[4] *Eth.*, iii. 6, 7. [5] *Eth.*, iii. Def. Affect. 1. [6] *Eth.*, iii. 9. [7] *Eth.*, ii. 49. [8] *Eth.*, ii. 45.

opposition of reason and passion must necessarily take with Spinoza. The passions belong to our nature as finite; they are grounded on, or rather are but another form of inadequate ideas; but we are free only in so far as our ideas either immediately are, or can be made, adequate. Our idea of God is adequate *ex vitermini;* our ideas of the affections of our body are inadequate, but can be made adequate in so far as they are referred to the idea of God. And as the idea of God is purely affirmative, this reference to the idea of God implies the elimination of the negative element from the ideas of the affections of the body, "for nothing that is positive in a false idea is removed by the presence of truth as such."[1] Brought into contact with the idea of God, all ideas become true and adequate, by the removal of the negative or false element in them. The idea of God is, as it were, the touchstone which distinguished the gold from the dross. It enables us to detect the higher spiritual element in the natural passions, and to sever the element belonging to that pure love of self which is identical with the love of perfection from the elements belonging to that impure love of our own finite individuality as such which is identical with the love of evil.

The imperfection in Spinoza's development of this principle has already been indicated. It is in fact the same imperfection which runs through his whole system. Just as he supposed that the ideas of finite things were at once made consistent with the idea of the infinite when he had named them modes, so here his conception of the change through which selfish natural desire must pass in order to become spiritual is far too superficial and external. Hence he has no sympathy with asceticism, but treats it, like Bentham, as a *torva et tristis superstitio.* Joy is the "transition from less to greater perfection," and cannot be but good; pain is the "transition from greater to less perfection," and cannot be but evil. The revolt against the mediæval opposition of the nature and spirit is visible in many of his sayings. "No Deity who is not envious can delight in my weakness or hurts, or can regard as virtues those fears and sighs and tears which are the signs of the mind's weakness; but contrariwise, the greater is our joy, the greater is our progress to perfection and our participation in the divine nature."[2] "A free man thinks of nothing less than death, his wisdom is a meditation not of death but of life."[3] The same idea, combining with the idea of necessity, leads him to condemn repentance and pity, as well as pride and humility. Unconsciously, Spinoza reproduces the principle of asceticism, while in words he utterly rejects it. For though he tells us that pure self-complacency is the highest thing we can hope, yet from this self-complacency all regard to the finite individuality of the subject is eliminated. *Qui Deum amat, conari non potest ut Deus ipsum contra amet.* In like manner, he absolutely condemns all hatred, envy, rivalry, and ambition, as springing out of an over-estimate of those finite things which one only can possess, while the highest good is that which is enjoyed the more easily and fully the greater the number of participants. Yet Spinoza's exaltation of the social life, and of the love that binds it together, is too like the Buddhist's universal charity that embraces all creatures, and all creatures equally. Both are based on an abstraction from all that is individual, only the Buddhist's abstraction goes a step further, and erases even the distinction between man and the animals. Spinoza felt the pressure of this all-levelling logic when he said, "I confess I cannot understand how spirits express God more than the other creatures, for I know that between the finite and the infinite there is no proportion, and that the distinction between God and the most excellent of created things differs not a whit from the distinction between him and the lowest and meanest of them."[4] As Pope said, God is "as full and perfect in a hair as a heart;" in all finite things there is a ray of divinity, and in nothing more than a ray. Yet in another epistle, Spinoza contradicts this view, and declares that, while he does not consider it necessary to "know Christ after the flesh, he does think it is necessary to know the eternal Son of God, *i.e.*, God's eternal wisdom, which is manifested in all things, but chiefly in the mind of man, and most of all in Christ Jesus."[5] In the *Ethics* the distinction of man and the animals is treated as an absolute distinction, and it is asserted with doubtful consistency that the human soul cannot all be destroyed along with the body, for that there is something of it which is eternal. Yet from this eternity we must of course eliminate all notion of the consciousness of the finite self as such. At this point, in short, the two opposite streams of Spinoza's thought, the positive method he *intends* to pursue, and the negative or abstracting method he really *does* pursue, meet in irreconcilable contradiction. The finite must be related to the infinite so as to preserve all that is in it of reality; and therefore its limit or the negative element in it must be abstracted from. But it turns out that with this abstraction from the existence of the finite, the positive also disappears, and God is all in all in a sense that absolutely excludes the existence of the finite. "The mind's intellectual love of God," says Spinoza, "is the very love wherewith God loves himself, not in so far as he is infinite, but in so far as he can be expressed by the essence of the human mind, considered under the form of eternity; *i.e.*, the mind's intellectual love of God is part of the infinite love wherewith God loves himself."[6] This double "in so far," which returns so frequently in Spinoza, just conceals for a moment the contradiction of two streams of thought, one of which must be swallowed up by the other, if they are once allowed to meet.

We have now reviewed the main points of the system, which was the ultimate result of the principles of Des Cartes. The importance of this first movement of modern philosophy lies in its assertion and exhibition of the unity of the intelligible world with itself and with the mind of man. In this point of view, it was the philosophical counterpart of Protestantism; but like Protestantism in its earliest phase, it passed rapidly from the doctrine that God is, without priest or authority, present to man's spirit, to the doctrine that man's spirit is as nothing before God. The object seemed too powerful for the subject, who effaced himself before God that he might be strong towards men. But in this natural movement of feeling and thought it was forgotten that the God that effaced the world and the finite spirit by his presence could not be a living God. Spinoza gives the ultimate expression to this tendency, and at the same time marks its limit, when he says that whatever reality is in the finite is of the infinite. But he is unsuccessful in showing that, on the principles on which he starts, there can be any reality in the finite at all. Yet even if the finite be a delusion, still more if it be better than a delusion, it requires to be accounted for. Spinoza accounts for it neither as illusory nor as real. It was reserved for the following generation of philosophers to assert, in different ways, the reality of the finite, the value of experience, and the futility of abstractions. Spinoza had declared that true knowledge consists in seeing things under the form of eternity, but it is impossible that things can be seen under the form of eternity unless they have been first seen under the form of time. The one-sided assertion of individuality and difference in the schools of Locke and Leibnitz, was the natural complement of the one-sided assertion of universality and unity in the Cartesian school. But when the individualistic tendency of the 18th century had exhausted itself, and produced its own refutation in the works of Kant, it was inevitable that the minds of men should again turn to the great philosopher who, with almost perfect insight working through imperfect logic, first formulated the idea of a unity presupposed in and transcending the difference of matter and mind, subject and object.

[1] *Eth.*, iv. 1. [2] *Eth.*, iv. schol. 45. [3] *Eth.*, iv. 67.
[4] *Epist.*, 57. [5] *Epist.*, 21. [6] *Eth.*, v. 36

See the Histories of Philosophy, especially those by Hegel, Feuerbach, Erdmann, and Fischer; F. Bouillier, *Histoire de la Philosophie Cartesienne*, 1854; Ollé-Laprune, *Philosophie de Malebranche;* E. Saisset, *Précurseurs et Disciples de Descartes*, 1862. The German treatises on Spinoza are too numerous to mention. Jacobi's *Letters on Spinoza*, which were the beginning of a true interpretation of his philosophy, are still worth reading. We may also mention C. Schaarschmidt, *Descartes und Spinoza*, 1850; C. Sigwart, *Spinoza's neuentdeckter Tractat von Gott, dem Menchen, und dessen Glückseligkeit*, 1866. Both these writers have published German translations of the *Tractatus de Deo.* See also Trendelenburg, *Historische Beiträge zur Philosophie*, 1867; R. Avenarius, *Ueber die beiden ersten Phasen des Spinozischen Pantheismus*, 1868; M. Joël, *Zur Genesis der Lehre Spinoza's*, 1871; R. Willis, *Benedict de Spinoza: his Ethics, Life, and Influence on Modern Religious Thought*, 1870. For

biographical particulars, see the articles DESCARTES, MALEBRANCHE, SPINOZA. (E. C.)

CARTHAGE was situated on the north coast of Africa, not far from the modern city of Tunis, just at that point where the coast approaches most nearly to the Island of Sicily. It lay in the heart of the Bay of Tunis, close to the mouth of the River Bagradas, and its site was so favorable to the natural development of a city that a hundred years after its entire destruction by the Romans it was chosen with Corinth as a place for colonization by Julius Cæsar, and rose into distinction as the third town in the empire. It was a colony of the Phœnicians, and was founded about the middle of the 9th century B.C., a hundred years before the foundation of Rome. This is not the place to discuss the position of Phœnicians in history, even if there existed sufficient material to do so with satisfactory results. The Phœnicians have generally been regarded as a purely commercial nation, forming a connecting link between the nations of antiquity, distributing the elements of culture, but producing little or no addition to the common stock. A fuller examination of Phœnician and Assyrian remains may serve to show us that this view needs correction. It is probable that a nation which gave its language to the Hebrews, and its alphabet to the Greeks, and which, after profoundly influencing both these factors of modern civilization, consolidated an empire which for four hundred years held its own against the preponderance of Greece and Rome, possessed a greater individuality of development than has been usually accorded to it. Phœnicians have had the misfortune of being for the most part described by their enemies. We must receive with caution the accounts given us by the Jews of Canaanitish cruelty, or by the Romans of Carthaginian dishonesty. The relations of native historians both of the mother-city and of her chief colony have come down to us in a garbled and fragmentary form. Our best hope of more perfect knowledge lies in the deciphering of contemporary inscriptions.

The name Cartago (the city was called Karthada by the Phœnicians, and Καρχήδων by the Greeks) signifies New City. The inhabitants called themselves Canaanites, or inhabitants of the plain. The Romans used the name Pœni or Punici, the Latin form of φοίνικες, which either signifies "red men," or refers to the palms which were the chief products, and the principal emblem of the Syrian coast. We gather from this that the first knowledge of Phœnicians was gained by the Romans from the Greeks, but the name Sarranus given to Phœnician wares, and the name Carthago itself, shows us that their knowledge of the chief products of Syrian merchandise, and of the existence of their rival city, was gained independently. Carthage was the youngest Phœnician colony founded in the territory, which she afterwards subdued. Utica, Tunis, and Hadrumetum lay close to her in the district of Zeugitana, Hippo a short distance to the west, Leptis to the east. As these towns, with the exception of Utica, eventually became subject to her, she rose like Rome on the ruins of older towns, and she owed her success to the same cause,—the possession of a situation of superior commercial capabilities. We propose to give first a sketch of the history, next of the constitution, and lastly of the topography of the city.

History. The history of ancient Carthage divides itself naturally into three periods:—the first extends from about 850 to 410 B.C., from the foundation of the city to the beginning of the wars with Syracuse; the second from 410 to 265 B.C., the beginning of the wars with Rome; the third from the commencement of the Roman (or Punic) wars till the destruction of the city, 146 B.C. It will then remain to remark the fortunes of the restored city until its destruction by the Arabs in 638 A.D. The first period of four centuries and a half contains the rise of the Carthaginian dominion and the culmination of its prosperity. Her empire was extended from the Straits of Gibraltar to the altars of the Philæni, near the Great Syrtis, where she touched on the territory of Cyrene. She possessed as provinces Sardinia, the Balearic Islands, and Malta, and a few settlements in Spain and Gaul. She had subdued the neighboring states founded from Phœnicia with the exception of Utica, and drew a large revenue from the corn lands of Byzacium and Emporia, situated on the coast south-east of the city. In Africa her subjects consisted of three classes —(1) Libyo-Phœnicians, (2) Libyans, and (3) Nomads. The first were of a mixed race, the product of intermarriages between the native Libyans and the Carthaginians or earlier settlers from Phœnicia. They cultivated the fields of Zeugitana, but were regarded with suspicion by the Carthaginians of pure blood. The Libyans, although completely subdued by Carthage, were of an entirely different race, and to a great extent did not understand the Punic language. At first they received a rent from the new settlers for the ground they occupied, but this was afterwards refused. They formed the staple of the Carthaginian army. Entire difference of race made it impossible for the new settlers to amalgamate with the original inhabitants, and the hard treatment they received led them to join the mercenaries in a revolt against their masters. Outside these limits the rest of the territory of Carthage was occupied by Nomads, who owed her a loose allegiance. They supplied her with mercenary troops, especially cavalry; but their fidelity could not be depended upon, and the Romans finally subdued Carthage by their assistance. Among these Nomad tribes were situated various cities, colonized partly from Carthage and partly from the mother-country. Towards the south the dominion of Carthage extended as far as Lake Tritonis, connected by a canal with the Lesser Syrtis.

The foreign conquests of Carthage were undertaken with the object of securing her commerce. Justin tells us of a king, Malchus (the Latin form of the royal title), who after successes in Africa and Sicily was defeated in Sardinia, and turned his arms against his country. He must have lived between 600 and 550 B.C. A more historical personage is his successor Mago (between 550 and 500 B.C.), said to be the founder of the military power of the Carthaginians. His sons were Hasdrubal and Hamilcar, his grandsons Hannibal, Hasdrubal, and Sappho, sons of Hasdrubal, and Himilco, Hanno, and Gisco, sons of Hamilcar. By the energy of this family the Carthaginian empire was established over Sardinia, which was not lost till after the first Punic war, over the Balearic Islands and part of Sicily, and over portions of Liguria and Gaul. There are, however, few events of which the chronology is certain. The first is the sea fight between the Etruscans and Carthaginians on the one hand and the Phocæans of Aleria in Corsica on the other, which occurred in 536 B.C. The Phocæans, driven from Asia Minor by Harpagus in 564, had settled at Aleria or Alalia in Corsica, but engaged in piracy, which demanded the interference of the commercial naval powers. The Phocæans won the battle, but with such loss that they abandoned Corsica, and settled at Velia in Italy, Polybius has preserved three treaties between Carthage and Rome, the first of which belongs to the year 509 B.C., the second probably to the period between 480 and 410 B.C. Their object is to restrict Roman commerce in Punic waters, and it is noticeable that the second treaty prescribes stricter limits than the first, and testifies to a considerable superiority of Carthage over Rome. To the period of about 500 B.C. belong the expeditions of Hanno and Himilco,—the one to found colonies on the west coast of Africa, which was probably explored as far as the mouths of the Senegal and Gambia, the other to obtain a knowledge of the Atlantic, which resulted in the discovery of Britain. But the most important event of the first period was the battle of Himera, fought between Hamilcar and Gelo of Syracuse, about the year 480 B.C. Terillus, tyrant of Himera, on the north coast of Sicily, driven out by Thero of Agrigentum, implored and obtained help from the Carthaginians. Thero was assisted by Gelo of Syracuse. An account of this battle is given by Herodotus. The forces of Hamilcar consisted of 3000 ships and 300,000 men,—Phœnicians, Libyans, Iberians, Ligurians, Helyci (perhaps Volscians), Sardinians, and Corsicans. He was defeated with great loss. For seventy years the Carthaginians made no further effort for the subjugation of Sicily. This battle is one of the most important in ancient history. The expedition in which it terminated was undertaken in conjunction with that of the Persians against the Greeks of Attica. The nearly simultaneous defeats of Himera and Salamis decided the question whether Semitic or Aryan nations should hold the empire of the West. The only other events of any importance in this period, of which we have an account, are the more complete subjugation of the African dependencies by the family of Mago, and the settlement of the disputed boundary between Carthage and Cyrene.

The second period of 140 years (410–269 B.C.) is occupied with the attempts of Carthage to reduce Sicily to the condition of a subject province. At this time her settlements were confined to the western corner of the island, while on the eastern coast Syracuse undertook the defence of Grecian nationality, and waged the battle of Aryans against Semites, until both combatants fell before the supremacy of Rome. The repulse of the Athenians from Syracuse, and the same rivalry between Egesta and Selinus which had invited Athenian interference in the affairs of the island, induced the Carthaginians to renew an enterprise which had been interrupted for seventy years. Hannibal, son of Gisco, stormed Selinus, and avenged at Himera the death of his grandfather. Overtures of peace were rejected, and preparations made for a more vigorous attack. In 406 Hannibal and Himilco destroyed the great city of Agrigentum, overthrew the mighty columns of her temples, and covered a flourishing site with a mass of ruins. Hannibal died before Agrigentum; Himilco proceeded to attack Gela. Syracuse was now governed by Dionysius, who from an obscure position had raised himself to the rank of despot. In 405 a treaty made by Carthage secured to her the possession of her conquests, and to Dionysius a firmer position on the throne. But he no sooner felt himself secure than he hastened to drive the enemy from the island. War broke out in 398, all Sicily fell before the Punic arms, and Dionysius, driven by Himilco to take refuge within the walls of Syracuse, was there besieged. Pestilence came to his assistance, and the Carthaginians were defeated; 150,000 Punic corpses lay unburied on Grecian soil; and Himilco, unable to bear the contempt of his fellow-citizens, starved himself to death. The Libyans rose in rebellion, and Carthage was threatened by an army of 200,000 men. The attempt of Mago between 396 and 392 to procure a more favorable result had little effect. Ten years afterwards he led another expedition. The defeat of Cabala nearly lost the possession of the whole of Sicily, but the brilliant victory of Corsica restored the balance, and the Halycus was accepted as the boundary between the two peoples. Fourteen years of peace ensued. In 368 the misfortunes of Carthage encouraged Dionysius to a new but unsuccessful effort to complete the purpose of his life. His death put an end to a renewal of the attempt, and his son and successor made peace with the Carthaginians. The weak government of Dionysius II. was favorable to the extension of Carthaginian empire in Sicily; but they found an antagonist of different mettle in the Corinthian Timoleon, who, after liberating Syracuse from its tyrants, made war against Carthage for six years (345–340 B.C.). The defeat of the Crimissus (340 B.C.) was most crushing. The Holy Legion, composed of 2500 of the best families of Carthage, was destroyed, and the host of mercenaries cut to pieces. Peace restrained the Carthaginians within their old boundary of the Halycus; the Greek cities were declared free; and Carthage promised never again to support a despot in Syracuse. The next thirty years contain little of note except a trace of friendly intercourse between Carthage and Rome, and a record of assistance given to the Tyrians when besieged by Alexander the Great. She, however, sent ambassadors to Babylon to congratulate the conqueror on his return from Asia. Agathocles was the first to discover that the secular enemies of his countrymen were vulnerable in Africa. After becoming despot of Syracuse, and establishing his authority over the great towns in Sicily, he found that he had to reckon with the Carthaginians. Unsuccessful in the island, he transferred his forces to the mainland in 310, reduced Carthage to the last extremities, and would probably have obtained more signal success had not the revolt of Agrigentum called him home. Peace made in 306 continued till the death of Agathocles in 289. His loss encouraged the extension of Punic dominion, and at last obliged the Syracusans to call in the assistance of Pyrrhus, the chivalrous king of Epirus. He left Italy in 277, and in a short time drove the Carthaginians from the west and besieged them in the distant fortress of Lilybæum. But his allies were untrue to him—Carthage and Rome were leagued against him; he left Sicily in 276, and his departure from Italy in the following year left the Carthaginians to stand in sharp antagonism to the Latin branch of the Aryan stock.

The third period of Carthaginian history extends from 264 to 146 B.C.,—from the outbreak of the first war with Rome to the final annihilation of the city by the conquerors This is not the place for a detailed account of the Punic wars, which occupy a large space in every Roman history. We must content ourselves with a hasty summary. The first war, which lasted from 264 to 241 B.C., was a contest for the possession of Sicily. The Carthaginians in undertaking it felt secure of their mastery over the sea. Their ambassadors told the Romans that they could not even wash their hands in the sea without permission of the Carthaginians. Montesquieu considers it one of the chief causes of the rise of Roman greatness that they were careful to borrow from their enemies whatever was calculated to improve their own efficiency. The Romans not only built a fleet but developed a novelty of tactics which precisely secured the object which they had in view. They were encouraged to further exertion by the victories of 260 B.C. and 256 B.C., and were schooled to caution by the defeat of the following year. The war was ended by the brilliant success of Catulus in 242 B.C., and Sicily was lost to the Carthaginians. The next three years and a half (241–237) were occupied by a civil war, which shows us on what insecure foundations the power of Carthage was based. The large army of mercenaries which had been employed against Rome was incautiously admitted into the city. Under pretence of demanding pay they rose against their employers, and were joined by the Libyans and Numidians, who cultivated the surrounding lands in unwilling subjection. The insurrection was quelled with difficulty, but a similar revolution in Sardinia was more successful; 700 Carthaginians were barbarously murdered, and the possession of the island passed to the Romans. All we know of the twenty years which elapsed before the beginning of the second war with Rome is confined to the successes of Hamilcar and his family in Spain. In 218 B.C. Hannibal, who had sworn as a boy eternal enmity to the Romans, began the enterprise to which he devoted his life. His object was not so much to conquer Italian soil or Italian cities as to break up the confederacy on which the greatness of Rome depended, and to undo the fabric of its empire stone by stone. He sought, therefore, on the one hand to rouse Greeks and Orientals to a joint attack against the common foe, and on the other to sow dissension amongst the Latin, Sabellian, and Oscan tribes, and to urge them to reduce Rome to that position of comparative inferiority which she had occupied many centuries before. Both these plans failed. Hannibal was badly supported from home; he found that to combine in unity the shifting policy of the East was to weave a rope of sand; and he discovered above all that Roman supremacy was established on a basis of complete security. How different was her position, seated among kindred peoples bound to her by affinities of blood and language as well as interest, governed by the wise policy of a patriotic senate, and restrained by the overpowering force of devoted legions, and that of the city of merchants, torn by factions, surrounded by alien and even hostile tribes, defended by mercenaries, and swayed by interest and passion. The defeat of Hasdrubal at the Metaurus in 207 B.C. crushed the last hope of the invader; Spain was recovered by the genius of Scipio, and in 203 B.C. Hannibal, not unwillingly, obeyed the order to embark from Italy to retard the ruin of his country which it was too late to save. The battle of Zama in 202 put an end to the war in the following year. It was due to the magnanimity of Scipio and Hannibal that peace was concluded on such terms that, while Rome had no longer to fear Carthage as a rival, she was content to recognize her existence as a commercial community.

For the next six years Hannibal governed the city which he had not been able to preserve. He reformed the constitution in a democratical sense, and paid with surprising facility the enormous indemnity demanded by Rome. He was engaged in planning a combination against Rome with Antiochus of Syria, when he was driven from power, and forced to take refuge in the East. Shortly afterwards he fell a victim to Roman hatred.

The interval between 183 and 150 B.C. contains little besides the history of internal dissensions,—struggles between the Roman party, the democratical party, and the party of Masinissa, which tore the city in sunder by their quarrels. The so-called third Punic war (149–146 B.C.) is one of the saddest events in all history, and the greatest blot on the reputation of the Romans. Jealousy of their old antagonists had been shown by constant acts of injustice, and at

last the sight of the prosperity and riches of the city impressed upon the narrow mind of Cato the conviction that Carthage must be blotted out. A pretext for war was wantonly invented. The anxieties of the Carthaginians to secure peace at any sacrifice was made the instrument of their destruction. When they saw that their ruin was resolved upon, and that compromise was hopeless, they defended themselves with an energy which would have saved them at an earlier period. The sentence of the senate was ruthlessly carried out. The city burned for seventeen days, and concealed its very site under a heap of ashes. The plough was passed over it, and the ground was cursed for ever. In the words of Mommsen, "where the industrious Phœnicians bustled and trafficked for five hundred years, Roman slaves henceforth pastured the herds of their distant masters."

The history of Roman Carthage must be given in a few words. In 122 B.C. Caius Gracchus led 6000 colonists to Africa, and founded the city of Junonia. The colony did not prosper. In 29 B.C. a second colony was sent out by Augustus in fulfilment of a design of Julius Cæsar. This became so prosperous that Herodian states that it disputed with Alexandria the second place in the empire. In the middle of the fifth century it became, under Genseric, the capital of the Vandal kingdom, and in 533 A.D. it was stormed by Belisarius. In 706 A.D. it was entirely destroyed by the general of the Caliph Abdulmelek.

Constitution.

The constitution of Carthage was essentially aristocratical. The little we know of it is derived from a single chapter in the *Politics* of Aristotle (ii. 8), a few scattered passages in the same treatise, and in Polybius, Livy, Nepos, and other authors. The official heads of the Government were the suffetes (Heb. *Sophetim*), who are compared to the Roman consuls and the Spartan kings; they may only have been two in number, and probably held office for a year, but were capable of re-election. Under them was the senate, which may or may not have been divided into two houses. These offices were filled by popular election, determined by the joint claims of wealth and merit, but bribery was largely practised, and Aristotle goes as far as to say that the chief offices were objects of sale and purchase. The people had a voice in the conduct of affairs, but they were not consulted if the suffetes and the senate were agreed on a course of action. There is no reason to suppose with Grote that the public banquets mentioned by Aristotle were part of the machinery of bribery. The history of England (which by some writers is spoken of as the modern Carthage) supplies us with ample examples of an aristocratical government carried on under the forms of a democracy. By the side of the regular Government stood a controlling power which gradually absorbed into itself all the authority of the state. The *pentarchies* were probably bodies of commissioners chosen from the principal families, self-elected, and so constituted that the outgoing members preserved their power for another year, and thus impressed a unity of policy on the institution. By these were elected the council of a hundred (or more strictly a hundred and four), who stood in the same relation to the suffetes as the ephors to the Spartan kings. By the gradual extension of judicial functions, like the parliaments of France, they usurped to themselves the authority of the state. To them is to be referred the cruel vengeance so often wreaked on unsuccessful generals. It was the work of Hannibal to diminish the authority of this body, and to secure a more real share of power to the people.

The Carthaginians were, like the Phœnicians, a deeply religious people. Religion entered into every important action of their lives, and their priests were held in the highest honor, yet there was no special order of priests, and we have no proof that the office was by law or custom confined to any particular family. Aristotle, writing more than half a century before the first Punic war, gives great praise to the Carthaginian constitution on the score of its stability, and its success in securing the happiness and contentment of the nation. It is, indeed, inconceivable that the Carthaginians should have attained such wealth and prosperity except under a good government; and the picture of faction, dissension, and disturbance, which we are accustomed to associate with it, belongs rather to the decline of the Punic empire, and is known to us only through the representation of its enemies.

Topography.

The general outline of the topography of Carthage is tolerably certain, but the details are involved in almost unavoidable obscurity. Two schools of topographers place the site of the city respectively on the north and south of the peninsula, which the territory of Carthage undoubtedly occupied. It seems now certain that the latter are in the right. The most important feature of the ancient city was the citadel Byrsa (Bozra) the hill now occupied by a church dedicated to St. Louis, who died at Tunis. It was surrounded by walls, and its summit was formerly crowned by a temple of Æsculapius, standing at the head of sixty steps. The name Byrsa was probably also given to the whole quarter of the city as well as to the citadel itself. The city was enclosed on the land side by a triple wall, with towers at short intervals and casemates, which afforded stabling for 300 elephants and 4000 horses. The harbors of Carthage were artificial, and consisted of two basins,—one rectangular, for the merchant ships, opening into the lagoon of Tunis, and ending in a narrow passage, capable of being closed by a chain; the other circular, for ships of war, containing an island in the centre on which the admiral lived. Their site can be easily identified, although their size is now considerably reduced. Between the lagoon of Tunis and the sea ran out a tongue of land, the Tænia of Appian, still recognizable although altered in size and shape; on it stands the fort of the Goletta. Outside the walls lay the suburb of Megara or Magalia, now the districts of Mara, covered then as now with villas and gardens; and still beyond this, towards the north of the peninsula, lay the vast necropolis marked by the modern village of Camart. The Carthaginians, like the Jews and other Semitic nations, combined a feeling of reverence for ancestors with a fear of contamination from the dead; therefore, while their sepulchres were carefully and strongly built, they were situated far away from the habitations of the living, and in this case were not even visible either from Byrsa or Megara. We shall not be surprised that so little remains of this mighty city if we remember that for centuries it has been used as a quarry not only by its African neighbors but by the rapacious merchants of the West. The Cathedral of Pisa is said to have been built out of the ruins of Carthage; and Genoese vessels, trading with Tunis in the Middle Ages, seldom returned without a ballast of Tunis marble. The most impressive remains which strike the modern traveller are the arches of the aqueduct, once fifty miles long, which cannot be referred with certainty to Carthaginian or Roman origin. Much more lies hidden under drifted sand and the silt of the Bagradas. Even lately the marble blocks of the ancient walls have been in part destroyed by the works of the Tunis railway.

The antiquarian may regret the want of evidence to assist him in reconstructing the ancient city. The historian and philosopher will feel still more deeply that the hostility of the Romans has left him so few traces of this vigorous scion of the Semitic stock. Phœnician culture still remains a tantalizing riddle to those who would unravel the course of human progress. The world has lost as well as gained by the cruel and arrogant self-assertion which culminated in the supremacy of Rome. In the history of civilization the survival of the fittest has frequently been nothing else but the survival of those who by force, obstinacy, and cunning were fittest to survive. In modern days we can give their full value to enterprise in commerce, activity in geographical discovery, and the taste which decorated the metropolis with noble buildings and works of art, and collected a library which the ignorance of the conquerors dispersed amongst the barbaric princes of the desert. Virgil, standing in the light of a wiser and more tolerant age, did his best to soften the hatred of his countrymen against their hereditary foe, and to show that generous hospitality and refinement were not foreign to the court of Dido, and that the perfidy of Hannibal was a fitting retribution for the heartless treachery of Æneas.

Notices of Carthage in the classical writers are frequent, especially in Polybius, Diodorus, Livy, Appian, and Justin. The two works which have been the foundation of most that has been written on the subject in modern times are Böttger, *Geschichte der Carthagen*, Berlin, 1827, and Heeren, *Ideen*, vol. ii. pt. 1. There is a brilliant sketch of Carthage in Mommsen's *History of Rome*, vol. ii., and some sensible remarks in Grote's *History of Greece*, vol. x. The articles on Carthage in Ersch and Gruber's *Encyclopädie*, in Smith's *Dictionary of Geography* (by Philip Smith), and in Pauli's *Real Lexicon*, are admirable. In-

dispensable for the study of the constitution is Kluge, *Aristoteles de Politia Carthaginiensium*. Illustrative of the topography may be mentioned Bealé, *Fouilles à Carthage*, and Davis, *Carthage and her Remains*. The standard work on the Phœnicians is still Movers, *Die Phönizier*, but it is probable that our knowledge of the subject may be much increased when the researches now in progress have been completed and co-ordinated. E. de Sainte Marie published in 1875 a *Bibliographie Carthaginoise* (Jourdan, Paris), of which there is a severe but instructive review in the *Literarisches Centralblatt* for May 20, 1876. (o. b.)

CARTHUSIANS, a religious order founded by St. Bruno in the year 1084. (See Bruno.) This saint, disgusted with the world, and especially with the conduct of Manasses, archbishop of Rheims, determined to live, in some remote and retired spot, a life dedicated to contemplation and religion. With six companions he went to consult Hugh, bishop of Grenoble, who led them to a spot among the mountains, about ten or twelve miles from the town, called Chartreuse; and Bruno at once fixed upon this as the site of the establishment which he was minded to found. Very many mediæval writers have exhausted the resources of language in describing the awful and terrible nature and aspect of this spot, shut in among naked and precipitous rocks, surrounded by sterile mountains, and for a large portion of the year buried in the snow; and many modern writers have celebrated the romantic and picturesque features of the place. The obscure name was destined to become familiar in every country and language of Europe, and the monastery which Bruno founded there, soon after mankind had begun to recover from the alarm caused by the belief that the world would come to an end in the 1000th year after Christ, has been the parent of all the numerous "Chartreux," "Certose," and "Charterhouses," and "Carthusian" establishments throughout Europe.

Peter the Venerable, abbot of Cluny, writing about fifty years later, speaks thus of the mode of life of the earliest Carthusians:—

"Warned by the negligence and lukewarmness of many of the older monks, they adopted for themselves and for their followers greater precaution against the artifices of the Evil One. As a remedy against pride and vain-glory they chose a dress more poor and contemptible than that of any other religious body; so that it is horrible to look on these garments, so short, scanty, coarse, and dirty are they. In order to cut up avarice by the roots, they enclosed around their cells a certain quantity of land, more or less, according to the fertility of the district; and they would not accept a foot of land beyond that limit if you were to offer them the whole world. For the same motive they limit the quantity of their cattle, oxen, asses, sheep, and goats. And in order that they might have no motive for augmenting their possessions, either of land or animals, they ordained that in every one of their monasteries there should be no more than twelve monks, with their prior the thirteenth, eighteen lay brothers, and a few paid servants. To mortify the flesh they always wear hair shirts of the severest kind, and their fasting is well-nigh continuous. They always eat bread of unbolted meal, and take so much water with their wine that it has hardly any flavor of wine left. They never eat meat, whether in health or ill. They never buy fish, but they accept it if it is given to them for charity. They may eat cheese and eggs only on Sundays and Thursdays. On Tuesdays and Saturdays they eat cooked vegetables. On Mondays, Wednesdays, and Fridays, they take only bread and water. They eat once a day only, save on the days of the octaves of Christmas, Easter, Pentecost, Epiphany, and one or two other solemnities. They live in separate little houses like the ancient monks of Egypt, and they occupy themselves continually with reading, prayer, and the labor of their hands, especially the writing of books. They recite the prayers for minor canonical hours in their own dwellings, when warned by the bell of the church; but they all assemble in church for matins and vespers. On feast days they eat twice, and sing all the offices in the church, and eat in the refectory. They do not say mass save on festivals and Sundays. They boil the vegetables served out to them in their own dwellings, and never drink wine save with their food."

As might be supposed, the rigor of this rule has been much modified. The Carthusian dress of very thick white cloth is no longer by any means the poorest or dirtiest of monastic costumes. It consists of a cassock or frock and cloak of ample and comfortable length. But the practice of each monk living in his own separate dwelling has always characterized the Carthusians. They have never been Cœnobites.

The Carthusians had no written rule till one was composed for them, about forty-five years after the foundation of the first house of the order at Chartreuse, by Guigo, their fifth prior. Some of the most special and characteristic points of it are as follows:—

It was not permitted to the members of the order to practise any greater or additional austerities than those prescribed, without special license from the prior. They were rarely to use medicine, but to be bled five times a year and shaved six times. They were forbidden to receive any charity from usurers or excommunicated persons. They declined to bury any stranger (save a monastic person who might have happened to die within their walls) within their precincts, and refused to charge themselves with the saying of any anniversary or other masses for the dead,—the reason assigned for the refusal being, that "we have heard that the majority of priests are very ready to say masses, and to make splendid banquets whenever any one goes to pay them for praying for the dead—all which destroys abstinence, and renders prayer venal, making it depend on the will of whoso gives dinners." If, says Guigo's rule, our successors should find it impossible to maintain even this small number (thirteen) without being reduced to the odious necessity of begging, and wandering to beg, we advise them rather to reduce their number to as many as can be supported, than to expose themselves to such dangers. Under the seventh general of the order, St. Anthelm, the practice of holding general chapters was first introduced among the Carthusians; these have always been held at the "Grande Chartreuse" near Grenoble, the parent establishment.

The earliest formal approbation of the Carthusian Order is attributed to Urban II. (ob. 1099). That pontiff, who had been a disciple of Bruno, when the latter was lecturing on theology at Rheims, had sent for Bruno to Rome a few years after his retirement to Chartreuse. The saint obeyed, taking all his monks with him. The latter shortly returned to Chartreuse, under Landuino, appointed by Bruno to be their second prior; but Bruno himself refused to be made archbishop of Reggio, and finding the life of Rome insupportable to him, soon obtained the Pope's permission to accept a district of forest, in the diocese of Squillace in Calabria, given to him by Count Roger, where he founded the second house of his order. The rule and constitution of the order were frequently modified on subsequent occasions. The present rule is that which was fixed in 1578 and was corrected by a congregation of cardinals, published in 1581, and reconfirmed by Innocent XI. in 1682. According to those new statutes, observes Moroni (or rather the learned writer of the article in his *Dictionary*), some of the practices as at present enjoined are more austere than in the ancient rule, since the choral service and the office used by Carthusians are peculiar to them, and are of excessive length, following in many respects the ceremonies and rites of the ancient church. By these statutes the use of linen is wholly prohibited to them. They wear next the skin a shirt of horse-hair, bound by a cord girdle, and outside this is a cassock and mantle of serge; and they sleep on a paillasse, with woollen sheets. The portrait of a Carthusian monk may be seen in Bonanni's *Catalogo*, at chapter 108, and a similar figure forms the 10th plate of Capparroni's *Raccolta degli Ordini religiosi*, published at Rome in 1826.

It is a very common error to suppose that the Carthusians are a branch or off-shoot from the great Benedictine order. It is true that the formula of their "office" or choral service is nearly the same as that used by the different orders which belong to the great Benedictine family; but there is no relationship, of parentage or other, between the Carthusians and Benedictines. The superiors of Carthusian convents are called priors, and not abbots as is the case with the Benedictine orders. Their general is the prior of the "Grande Chartreuse" near Grenoble, and resides always there, and not, as in the case of most other orders, at Rome. The order has a proctor-general (*Procuratore Generale*) who resides at Rome. Above all there is the radical difference in their mode of life,—the Benedictines being Cœnobites, the Carthusians eremitical, living each in his own separate dwelling, erected within the wall, which forms the cloister (*clausura*), but not even contiguous the one to the other.

St. Bruno and his early successors made no pretension to any exemption from the jurisdiction of the ordinary, nor sought for any privilege of the kind. On the contrary they in a special manner recognized the bishop of Grenoble, in whose diocese their first and parent establishment was situated, as the chief and abbot of their order. But the constant and unfailing tendency, which led all the regular bodies to aim at such exemptions, and to encroach in

every manner ever more and more on the authority and proper domain of the bishops and secular clergy, induced the Carthusians within little more than an hundred years after their foundation to beg and to obtain from Pope Boniface IX. a bull, dated 6th of March, 1391, granting them the exemption in question. It is remarkable, as indicating the strength of this tendency, that although the bull of Boniface is the first recognition whatever of any such exemption, the Pope says in the document in question, "A supplication has been presented in your name, setting forth, that although your order *has been for a long time reputed exempt* from the jurisdiction of the ordinary, and dependent immediately on the Holy See," &c. It had evidently come to be considered as a matter of course that monks, merely as such, were not subject to the authority of the bishop. The motive assigned for granting the exemption is that "certain persons seek by citing you to their tribunals to disturb you in the quietude and contemplation which are the object of your institute."

The order of the Carthusians has always been one of the most respectable of the monastic bodies. It has maintained to a greater degree than most of them the spirit and qualities which presided at its foundation. Nor has it ever needed, as so many of its fellow communities, to be reformed. And although the services which it has rendered to literature cannot vie with those of the Benedictines, it has by no means been valueless to the world in this respect.

The order at one time possessed 172 monasteries, of which 75 were in France. It had also numerous establishments in England (where, as is well known, the "Charter House" near Smithfield, in London, was its principal house), Italy, Germany, and Spain. Hugh, bishop of Lincoln, canonized in 1220, was a Carthusian. The order, however, has had fewer saints than almost any of the others; so much so that the Carthusian Ferrari wrote a treatise of inquiry into the causes of this fact. To which query an answer may be found in the 97th of the *Ecclesiastical Letters* of Father Sarnelli, who was vicar-general under Benedict XIII. (published in ten volumes at Venice in 1716), to the following effect:—

"For canonization not only exalted virtues but the working of miracles is required. Now miracles are rarely performed by these solitary recluses, because the result of their doing so would be to call numbers of persons together, who would necessarily destroy or greatly impede the quietude of the contemplative life which it is the object of their rule to ensure. So true is this, continues the vicar-general, that Saint Antonine has recorded in his ecclesiastical history (bk. xv. ch. 22, sec. 2), that a certain Carthusian having performed a quantity of miracles at his tomb, became thereby, in consequence of the crowds who were attracted thither, so great a nuisance that the prior was obliged to go to the grave of the sainted deceased, and there command him on his obedience to do no more miracles,—an order which the dead saint thenceforward scrupulously obeyed."

Father Petrejo published, in 1609, a *Biblioteca degli Scrittori dell' Ordine*, which has been subsequently continued by other hands. A copious account of the order may be found in Dugdale's *Monasticon*, and one yet more extended in the *Chronicle of the Chartreuse* by Dorlan; see also the *Origines Carthusianorum*, Cologne, 1609. A chronology of all the priors of the order was published at Rome in 1622. The device of the order consists of a globe surmounted by a cross, with the legend "*Stat crux dum volvitur orbis.*" (T. A. T.)

CARTIER, Jacques, a French navigator, was born at St. Malo, in Brittany, in 1494. According to the custom of the place, even his early youth was passed upon the sea; and he was probably already acquainted with the coast of Newfoundland when he was appointed by Francis I. to the command of the two ships, which, on the 20th of April, 1534, set sail from St. Malo, for the purpose of exploring the district beyond the fishing grounds. Cartier first touched at Cape Buonavista, on the east coast of Newfoundland, then passed northward along the coast, and, sailing south-west through the Straits of Belle Isle, discovered the mainland of Canada, which he claimed for France, by erecting a wooden cross with the inscription "Vive le Roy de France." Next year a second expedition was placed under his control to explore the estuary of the St. Lawrence. He penetrated as far as Hochelaga, a large fortified village at the foot of a hill, to which he gave the name of Mont Royal, and which is the site of the modern Montreal. But he did nothing more, and returned on the 16th May, 1536, disgusted with the climate and with his crew weakened by scurvy, a disease then unknown in Europe. The idea of colonizing Canada was abandoned after this, till in 1540 Jean Francis de la Roche, Seigneur de Roberval, obtained permission to form a settlement. The project was carried out partly at Roberval's and partly at the king's expense; Cartier was sent out in command of five ships, in the spring of 1541; and in the autumn he arrived at the mouth of the St. Lawrence. Near the present situation of Quebec he built a fort named Charlesbourg. But the Indians, whose king he had carried off with him on his last voyage, annoyed him so much with their attacks that he determined to return to France; and though Roberval arrived at Newfoundland in June, 1542, with three ships and a colony of 200 men and women, and commanded him to turn back, he continued his homeward voyage. Whether this was his last expedition is disputed. Some say that he returned to the assistance of Roberval, in the autumn of 1543; but if this be so, we know nothing more. The rest of his life was spent in his native town or at the village of Limoilon, of which he was created seigneur by his patron Francis I. He was alive in 1552; but the date of his death is not known.

The interesting story of his discoveries and adventures is told in the *Brief récit de la navigation faicte ès isles de Canada, &c.*, Paris, 1545. This work is extremely rare; but the information it contained is to be found in the *Voyage de Jacques Cartier . . . en* 1534, a translation from the third volume of Ramusio's *Collection* (Venice, 1565), which was published at Rouen in 1598, and was reprinted in 1865; in Lescarbot's *Histoire de la nouvelle France;* in Hakluyt's *Voyages* (1600, republished by the Hakluyt Society in 1850); and in the *Voyages de decouvertes des au Canada, entre les années* 1534 *et* 1542, a collection of reprints published in 1843 by the Historical and Literary Society of Quebec.

CARTOON (Italian, *cartone*, pasteboard), in painting, is a design drawn on thick paper or other material, which is used as a model for a large picture in fresco, oil, or tapestry. It was also formerly employed in glass and mosaic work. When cartoons are used in fresco-painting, the back of the design is covered with black-lead or other coloring matter; and, this side of the picture being applied to the wall, the artist passes over the lines of the design with a point, and thus obtains an impression. According to another method the outlines of the figures are pricked with a needle, and the cartoon, being placed against the wall, is "pounced," *i.e.*, a bag of black coloring-matter is drawn over the perforations, and the outlines are thus transferred to the wall. In fresco-painting, the portions of the cartoon containing figures were formerly cut out and fixed (generally in successive sections) upon the moist plaster. Their contour was then traced with a pointed instrument, and the outlines appeared lightly incised upon the plaster after the cartoon was withdrawn. In the manufacture of tapestries upon which it is wished to give a representation of the figures of cartoons, these figures are sometimes cut out, and laid behind or under the woof, to guide the operations of the artist. In this case the cartoons are colored.

Cartoons have been executed by some of the most distinguished masters; the greatest extant performances in this line of art are those of Raphael. They are seven in number, colored in distemper; and at present they adorn the South Kensington Museum in London, having been removed thereto from their proper home, the palace of Hampton Court. With respect to their merits, they count among the best of Raphael's productions; Lanzi even pronounces them to be in beauty superior to anything else the world has ever seen. Not that they all present features of perfect loveliness, and limbs of faultless symmetry,—this is far from being the case; but in harmony of design, in the universal adaptation of means to one great end, and in the grasp of soul which they display, they stand among the foremost works of the designing art. The history of these cartoons is curious. Leo X. employed Raphael in designing (in 1515–16) a series of Scriptural subjects, which were first to be finished in cartoons, and then to be imitated in tapestry by Flemish artists, and used for the decoration of the Sixtine Chapel. Two principal sets of tapestries were accordingly executed at Arras in Flanders; but it is supposed that neither Leo nor Raphael lived to see them. The set which went to Rome was twice carried away by invaders, first in 1527, and afterwards in 1798. In the first instance they were restored in a perfect state; but

after their return in 1814 one was wanting—the cupidity of a Genoese Jew having induced him to destroy it for the sake of the precious metal which it contained. Authorities differ as to the original number of cartoons, but there appear to have been twenty-five,—some by Raphael himself, assisted by Francesco Penni, others by the surviving pupils of Raphael. The cartoons after which the tapestries were woven were not, it would seem, restored to Rome, but remained as lumber about the manufactory in Arras till after the revolution of the Low Countries, when seven of them which had escaped destruction were purchased by Charles I., on the recommendation of Rubens. They were found much injured, "holes being pricked in them for the weavers to pounce the outlines, and in other parts they were almost cut through by tracing." It has never been ascertained what became of the other cartoons. Three tapestries, the cartoons of which by Raphael no longer exist, are in the Vatican,—representing the stoning of St. Stephen, the Conversion of St. Paul, and St. Paul in Prison at Philippi.

Besides the cartoons of Raphael, two, to which an extraordinary celebrity in art-history attaches, were those executed in competition by Leonardo da Vinci and by Michelangelo,—the former named the Battle of the Standard, and the latter the Cartoon of Pisa—Soldiers bathing, surprised by the approach of the enemy. Both these great works have perished, but the general design of them has been preserved. In recent times some of the most eminent designers of cartoons have been masters of the German School,—Cornelius, Kaulbach, Steinle, Fuhrich, &c.; indeed, as a general rule, these artists appear to greater advantage in their cartoons than in the completed paintings of the same compositions. In England cartoon-work took some considerable development in 1843 and 1844, when a competition was going on for the decoration of the new Houses of Parliament. Dyce and Maclise have left examples of uncommon mark in this line. (W. M. R.)

CARTWRIGHT, Edmund, D.D., F.R.S. (1743–1823), inventor of the power-loom, was born at Marnham, Nottinghamshire, April 24, 1743, and educated at Wakefield grammar school. He began his academical studies at Oxford in University College, but in 1762 he was elected a demy of Magdalen College, where, in 1764, he succeeded to a fellowship. In 1770 he published *Armine and Elvira*, a legendary tale in verse, which passed through seven editions in little more than a year. It was followed in 1779 by *The Prince of Peace*, the best of his poetical productions. In 1779 he was presented to the rectory of Goadby Marwood, Leicestershire, to which was added a prebend in the Cathedral of Lincoln. He would probably have passed an obscure life as a country clergyman had not his attention been accidentally turned in 1784 to the possibility of applying machinery to weaving. The result was that he invented the power-loom, for which he took out a patent in 1785. At this period he removed to Doncaster, where he established a weaving and spinning factory, which proved a failure; and in 1796 he settled in London. His first power-loom was a rude contrivance, but he afterwards greatly improved it, and made it an almost perfect machine. The first mill on his plan, that of Messrs. Grimshaw of Manchester, was wilfully destroyed by fire in 1791. In spite, however, of the opposition of the hand-weavers, the use of power-looms had in 1807 greatly increased; but as his patent was about to expire, this extraordinary mechanical genius would have derived no benefit from his invention, had not Parliament voted him a grant of £10,000 in consideration of his having contributed so largely to the commercial prosperity of the nation. Besides the power-loom Cartwright invented machines for combing wool and making ropes, and he was also the author of many improvements in the arts, manufactures, and agriculture. He passed his later years on a farm he had purchased near Sevenoaks, Kent, where he died October 30, 1823. He was the younger brother of Major John Cartwright, the subject of the following notice.

CARTWRIGHT, John (1740–1824), known as Major Cartwright, one of the earliest and most honorable of English parliamentary reformers, was born at Marnham in Nottinghamshire, September 28, 1740. He received his education at Newark grammar school, and at Heath Academy in Yorkshire, and at the age of eighteen entered the navy. He was present, in his first year of service, at the capture of Cherbourg, and served in the following year in the action between Sir Edward Hawke and Admiral Conflans. Engaged afterwards under Sir Hugh Palliser and Admiral Byron on the Newfoundland station, he was appointed to act as chief magistrate of the settlement; and the duties of this post he discharged with singular uprightness and efficiency for five years. During this period he explored the interior of the island and discovered Lieutenant's Lake. Ill health necessitated his retirement from active service for a time in 1771. When the disputes with the American colonies began, he saw clearly that the colonists had right on their side, and warmly supported their cause. At the beginning of the war he was offered the appointment of first lieutenant to the duke of Cumberland, which would have put him on the path of certain promotion. But he declined to fight against the cause which he felt to be just, and thus nobly renounced the prospects of advancement in his profession. In 1774 he published his first plea on behalf of the colonists, entitled *American Independence the Glory and Interest of Great Britain*. In the following year, when the Nottinghamshire Militia was first raised, he was appointed major, and in this capacity he served for seventeen years. He was at last illegally superseded, because of his political opinions. In 1776 appeared his first work on reform in Parliament, which, with the exception of Earl Stanhope's pamphlets (1774), appears to have been the earliest publication on the subject. It was entitled, *Take your Choice*,—a second edition appearing under the new title of *The Legislative Rights of the Commonalty vindicated*. The task of his life was thenceforth chiefly the attainment of universal suffrage and annual Parliaments. In 1778 he was an unsuccessful candidate for the representation of Nottinghamshire; and the same year he conceived the project of a political association, which took shape in 1780 as the "Society for Constitutional Information," and which included among its members some of the most distinguished men of the day. From this society sprang the more famous "Corresponding Society." Major Cartwright, working unweariedly for the promotion of reform, published many pamphlets which it is needless to enumerate here, carried on a very extensive correspondence, and attended a great number of public meetings. He was one of the witnesses on the trial of his friends, Horne Tooke, Thelwall, and Hardy, in 1794, and was himself indicted for conspiracy in 1819. He was found guilty in the following year, and was condemned to pay a fine of £100. He married in 1780, and his wife survived him. He had no children. He took up his abode in London in 1810, settled in Burton Crescent in 1819, and there spent his last years. He was warmly loved by all who knew him personally; for, while the world looked chiefly at his inflexibility of political principle, his family and friends saw his unswerving integrity, his gentle-heartedness, his warm affections, his unvarying courtesy and rare simplicity of life. His health began to fail in 1823; and his spirits were greatly depressed at the same time both by public and private sorrows. The reverses in Spain and the execution of Riego touched him deeply, and more closely still the illness of a sister and the death of his brother, noticed above. He died in London, on the 23d September, 1824. In 1826 appeared, in two volumes, *The Life and Correspondence of Major Cartwright*, edited by his niece, F. D. Cartwright. A complete list of his writings is included in this work. In 1831 a monument was erected to him in Burton Crescent, from a design by Macdowell.

CARTWRIGHT, Thomas (*c.* 1535–1603), a Puritan divine, was born in Hertfordshire about the year 1535. He studied divinity at St. John's College, Cambridge, but during the reign of Mary was compelled to adopt the legal profession. On the accession of Elizabeth, he resumed his theological studies, and was soon afterwards elected fellow of Trinity College. In 1570, he was appointed Margaret divinity professor; but Dr. Whitgift, on becoming chancellor in 1571, deprived him of the post. This was a natural consequence of the use which he made of his position. He inveighed bitterly against the hierarchy. He attacked the Elizabethan theory of a state-controlled church, advocating, on the contrary, a church-controlled state, in which the presbyter was to enjoy a lofty authority, for his use of which he was to be responsible to God alone. He even taught that no opinions but his own were to be tolerated, and that heresy against them was a sin deserving of death. Immediately after this he removed to the Con-

tinent, and officiated as clergyman to the English residents, first at Antwerp and then at Middleburg. On his return he became still further embroiled with Dr. Whitgift and the Government, on account of his *Admonition to Parliament*, which was full of the most violent attacks on the existing condition of church and state. In 1590 he was summoned before the Star Chamber and imprisoned, and in 1591 he was once more committed to the Fleet by Aylmer, bishop of London. He was finally liberated in 1592 and allowed to preach, and the remaining eleven years of his life were undisturbed.

CARTWRIGHT, William (1611–1643), an English poet, born at Northway near Tewkesbury, in September, 1611, was the son of a gentleman, who, having wasted his fortune, was reduced to the necessity of keeping an inn. William Cartwright finished his education at Oxford, entered the church, and became a popular preacher in that university. In 1642 he obtained the place of succentor in the church of Salisbury; and he was afterwards chosen junior proctor and metaphysical reader in his university. He died of camp fever at the age of thirty-two, in 1643. He was distinguished by a graceful person and attractive manner, and by extraordinary industry; and, indeed, his fame rests on his personal popularity and the praise which he received from his fellow-poets, and especially from Ben Jonson, rather than on the merit of his verses, which are, in fact, very ordinary productions. His poems and plays were published in 1651.

CARUPANO, a seaport town of Venezuela, South America, in the province of Cumana, 65 miles north-east of the town of that name. It is situated on the Caribbean Sea, at the opening of two valleys, and is defended by a fort. The chief trade is in horses and mules. Population 8600.

CARUS, Karl Gustav (1789–1869), a German physiologist and psychologist, was born at Leipsic, on the 3d January, 1789. He was educated at the Thomas School and the university of his native city, and devoted his attention first to chemistry, intending to enter upon the business of his father, who had a large dyeing establishment. But a course of lectures on anatomy which he attended caused him to alter his views, and he began the systematic study of medicine. In 1811 he graduated, and began to teach as a *privat-docent*. The subject which he selected (comparative anatomy) had not previously been lectured on at Leipsic, and Carus soon established a reputation as a medical teacher. In 1813 he became director of the military hospital at Pfaffendorf, near Leipsic, and in the following year he was summoned as professor to the new medical college at Dresden. In this town he spent the remainder of his life, rising to the highest dignities of his profession. He was made royal physician in 1827, and became a privy councillor in 1862. The last years of his life were spent in drawing up an autobiography,—which was published under the title *Lebenserinnerungen und Denkwürdigkeiten*, four volumes, 1865–6. He died on the 28th July, 1869. In philosophy Carus belongs to the school of Schelling, and his works are thoroughly impregnated with the spirit of that system. He was also distinguished as a landscape painter and as an art critic.

Carus's literary activity was very great, and the list of his works is lengthy. The most important are—*Grundzüge der vergleichende Anatomie und Physiologie*, 1828; *System der Physiologie*, 2d ed., 1847–9; *Psyche: zur Entwickelungsgeschichte der Seele*, 1846; *Physis: zur Geschichte des leiblichen Lebens; Natur und Idee*, 1861; *Symbolik des menschlichen Gestalts*, 1852; *Atlas der Kranioskopie*, 2d ed., 1864; *Vergleichende Psychologie*, 1866.

CARVAHAL, Tomas José Gonsalez (1753–1834), a Spanish poet and statesman, was born at Seville in 1753. He studied at the University of Seville, and took the degree of LL.D. at Madrid. He obtained an office in the financial department of the Government; and, in 1795, was made intendant of the colonies which had just been founded in Sierra Morena and Andalusia. During 1809–1811, he held an intendancy in the patriot army. He became, in 1812, director of the University of San Isidro; but, having offended the Government by establishing a chair of international law, he was imprisoned for five years (1815–1820). The revolution of 1820 reinstated him, but the counter-revolution of three years later forced him into exile. After four years he was allowed to return, and he died, in 1834, a member of the Supreme Council of War. Carvahal enjoyed European fame as author of metrical translations of the poetical books of the Bible. To fit himself for this work he commenced the study of Hebrew at the age of fifty-four. He also wrote other works in verse and prose, avowedly taking Luis de Leon as his model.

CARVIN, a town of France, in the department of Pas-de-Calais, 14½ miles E.S.E. of Béthune. It is a flourishing centre of industry, and carries on a large manufacture of beet-root sugar, alcohol, and starch. Population of the town in 1872, 5780, and of the commune, 7024.

CARVING. To carve (Anglo-Saxon, *ceorfan*) is to cut, whatever the material; in strict language carving is sculpture. The name of sculptor is commonly reserved for the great masters of the art, while that of carvers is given to the artists or workmen who execute subordinate decorations—*e.g.*, of architecture in marble or stone. The word is also specially applied to sculpture in ivory and its substitutes, and in wood and other soft materials.

Ivory carving.

True ivory is the tusk of the elephant, but other inferior kinds are produced by the walrus, narwhal, and hippopotamus. Long before the art of metallurgy was generally known, among the remotest pre-historic races, carvings on ivory and on reindeer horn may be mentioned in evidence of the antiquity of this kind of art. A piece of mammoth ivory with a rude engraving of a mammoth is preserved in the Museum of the Jardin des Plantes in Paris. Fragments of ivory and horn, carved with excellent representations of animals, found in caves in the Dordogne in France, may be seen in the British Museum.

Coming to historic ages we find abundant evidence of the skill of the Egyptians in ivory carving. Two daggers inlaid and ornamented with ivory, in the British Museum, are attributed to the age of Moses. In the same collection are chairs of the 16th century B.C. inlaid with ivory; two boxes in the shape of waterfowl and a small figure may perhaps be attributed to the 11th. A number of carvings in ivory and bone of these and later dates are preserved in the Egyptian galleries of the Louvre in Paris (Labarte, *Arts Industriels*, p. 186).

Ivory is mentioned among the imports of Solomon (1000 B.C.). His throne of ivory overlaid with the purest gold, and the ivory house of King Ahab, are specially recorded; the words "ivory palaces" in the 45th psalm are more exactly rendered "wardrobes"—chests of wood ornamented with ivory. Horns, benches, and beds of ivory are mentioned in the prophetical books. Amongst the Hebrews, as amongst other ancient nations, sceptres, thrones, and other insignia of royalty are often spoken of as made of ivory. These objects were frequently inlaid with precious stones.

Mr. Layard discovered many fragments of carved ivory in Nineveh, so brittle from desiccation that they were boiled in gelatine to enable them to be safely handled. The most interesting (dated by Mr. Layard about 950 B.C.) are two small tablets representing seated figures of Egyptian character with a cartouche bearing hieroglyphics. Parts of the decoration were "enamelled with a blue substance let into the ivory" (rather with slices of colored vitreous pastes, not true enamel), and the whole ground of the tablet was originally gilded, remains of the gold leaf still adhering to it (*Nineveh and its Remains*, ii. p. 9).

The Greeks made many precious objects in ivory even in the earliest times. Phidias and his successors (in the 5th century B.C.) made "chryselephantine" statues, *i.e.* of ivory and gold, and the practice was continued, probably, down to the Christian era. A great number of such statues are described by Pausanias. The most celebrated were the colossal statue of Athene at Athens, nearly 40 feet, and that of Jupiter at Olympia, about 58 feet high. They were the largest and most precious works ever executed in the material under discussion. It has been stated by writers of various dates, from Pliny downwards, that the ancients had methods of flattening and joining ivory so as to make it cover large surfaces, but modern experiments of the recipes given have not verified these statements.

A few remains of ivory carvings found in Etruscan tombs in Italy are preserved in the British Museum; others have been collected by Signor Castellani. Roman ivories earlier than the 4th century are very rare. There are, however, in various collections in England and on the Continent carved ivory tablets, called consular diptychs, meant to fold up and to contain writing on the inside. They were used by the Roman consuls, and sometimes sent by them as presents to great personages. Half of one of the

most beautiful of these works is preserved in the Kensington museum (No. 212·65), the other half is in the Hotel de Cluny in Paris—this piece is of the 3d century. The chair of St. Maximian, covered with ivory panels elaborately carved (6th century), is still in good preservation at Ravenna.

Ivory carving was carried on at Constantinople during the early Middle Ages. Charlemagne did much to encourage and establish the arts in Northern Europe. Ivory book-covers carved with Gospel subjects, pyxes, or small boxes for church use, caskets, horns, and other valuable objects were carved in ivory during his reign, and those of his immediate successors. They were set in gold or silver, and sometimes with precious stones. An example of Anglo-Saxon workmanship (10th century) is preserved in the Fitzwilliam Gallery in Cambridge. Combs both of ivory and bone of the Roman and Anglo-Saxon periods are not unfrequently found in tombs in England. Carved folding triptychs, shrines, and altar-pieces containing sacred subjects in bas-relief, or figures of saints, with rich and elaborate architectural details according to the style of the day, often decorated with gold and color, were made in great numbers from the 10th to the 16th century, in most countries of Europe. Crucifixes and images of the Virgin and the saints, made during these ages, are often graceful and beautiful examples of small sculpture. To these should be added the pastoral staves carried by bishops and abbots, and numbers of objects for secular use, such as horns, combs, caskets, hilts of arms, and the like, carved in ivory for persons of wealth, throughout the Middle Ages. They reached their highest perfection during the 13th and 14th centuries. The religious subjects carved in ivory by Spanish artists were of great excellence before the 16th century.

The great sculptors of the Renaissance are credited, though often without sufficient authority, with many works in ivory still preserved in public galleries. The scholars of Cellini and Raphael certainly carved with great skill in this material. Examples attributed to the masters themselves are shown in the galleries of Munich and Vienna. Germany, Flanders, Holland, and Spain were distinguished for ivory carvers during the 16th century. Augsburg and Nuremberg were especially renowned in this respect. The carved drums of vases and tankards, bas-relief plaques or panels set in silver gilt and gold are to be seen in the galleries of Munich, Vienna, and Berlin. Dagger and knife hilts and sheaths, powder-flasks, and statuettes of admirable execution, continued to be made in ivory down to the middle of the 17th century. There are good examples in the Green Vaults in Dresden and in many other collections. Several German princes, as well as Peter the Great, carved and turned ivory in the lathe, and remarkable specimens of their work may be seen in the Green Vaults.

Among the best Italian ivory carvers of the 16th century may be reckoned the pupils of Valerio Vicentino and Bernardo of Castel Bolognese. A fine bas-relief by Alessandro Algardi, of the 17th century, is preserved in the Basilica of St. Peter in Rome. Other well-known artists were Copé and François Du Quesnoy, called the Fleming (1594–1644), the latter of great eminence; Jacob Zeller, a Dutchman; Leo Pronner of Nuremberg; Van Obstal of Antwerp, settled in France; Leonard Kern and Angermann of Nuremberg (17th century); Barthel (died at Dresden 1694), who excelled in carving animals; Leonard Zick of Nuremberg (17th and 18th centuries), who carved puzzle balls, like those of the Chinese; Stephan Zick, who carved eyes and ears, examples of which may be seen in the Green Vaults; Belthasar Permoser, a Bavarian settled in Dresden (1650–1732); and Simon Troger (18th century), a carver of great skill in ivory who added fanciful details in brown wood; examples of his compositions are preserved in the Kensington Museum, the Royal Museum of Turin, and the Green Vaults of Dresden.

Ivory carving has long been cultivated in the East. In many parts of India, Bombay especially, ivory is carved, pierced, and inlaid with great skill. The Bombay carvers borrowed this art from the Persians. The Chinese carve slabs of ivory and entire tusks with elaborate compositions of figures and landscape. They carve and pierce puzzle balls, cut one inside another out of single pieces of ivory. The skill of the Japanese is still greater. Their groups of small figures, animals, shells, insects, &c., show a power of representing animal life, and a dexterity in inlaying ivory with metals and other substances probably never surpassed. If the art of both nations is somewhat grotesque their power of hand has had but few equals in ancient or in modern times.

A modern school of ivory carving, that has become a small trade, is established at Dieppe in France. Many crucifixes and religious images are produced there of considerable merit.

Wood carving.

Implements and furniture have been carved in wood from very ancient times. The perishable nature of the material forbids the hope of finding remains of such remote antiquity as we have in ivory, bone, and horn. It cannot be doubted, however, that the weapons and utensils of the stone age were fitted to handles of wood and bound on with thongs of hide or animal sinews. Most ethnographical collections possess paddles and weapons made by more recent races in a primitive state of knowledge and cultivation. Often these utensils are diapered over in patterns of much elegance, those, for instance, of Mexico, New Zealand, and Polynesia. The figure-head of a New Zealand canoe of brown wood carved in graceful convolutions, resembling the designs of the Scandinavian artists, was exhibited amongst the collections of the duke of Edinburgh.

Pausanias states that all the most ancient races carved statues out of wood, and mentions specially those of Egypt. According to Sir G. Wilkinson wooden statues continued to be erected in Egyptian temples till the times of the later Pharaohs. Sycamore was the wood in general use for furniture, and cedar for mummy cases, which are carved into the shape of the mummy, painted and gilt. Timber was imported into Egypt, and rare woods were inlaid both in furniture and statues (see Birch, *Trans. Roy. Soc.*, iii. p. 172). A bas-relief in hard wood, attributed to the 6th, 7th, or 8th dynasty (above 2000 years B.C.), is preserved in the Louvre.

The Hebrews of the age of Moses seem to have been more skilful as metallurgists than as wood carvers, but under Solomon, the sanctuary of the temple was lined with cedar, and the walls elaborately carved with figures of cherubims, palm trees, and open flowers all gilt. Two cherubims, 10 cubits high, were carved in olive, a very durable wood. Solomon imported ebony and other rare woods for his musical instruments and furniture.

Wood was used by the Greek sculptors before the 5th century B.C., and Pausanias enumerates many statues made of different woods, some of several kinds of wood extant in Greece in his time (bk. ii. and vii.).

The Romans, who used bronze and marble for their furniture in later times, were still curious in woods, which were carved or polished and reserved for many purposes, and when of fine grain were extravagantly valued. Tacitus speaks of the rude wooden idols of the Germans.

The fact that a great part of Europe was covered with oak, pine, and other forests made the use of timber universal during the Middle Ages; many memorials remain of the skill both of constructors and carvers in oak and other woods. Churches, houses, even entire cities were of timber; many of these remain in Northern Germany, *e.g.*, in Hanover, Hildesheim, and Brunswick, in towns of Brittany and Perigord, and in Blois, Coventry, Chester, and other cities of France and England. Beam ends, brackets, door heads and gables were often effectively carved. Two doors, remains of churches in Norway (of the 11th or 12th century), entirely constructed of timber, carved in a large-grained pine wood into a complicated but graceful composition of dragons and serpents, were exhibited at South Kensington in 1868. The most elaborate and artistic carved work of the Middle Ages is to be found in the shrines or "retables" placed on altars, some of small chamber size, others 20 to 30 feet in height. They were made in countless numbers in Germany, Spain, France, Flanders, and England. The principal space of the shrine was filled by figures standing or seated under elaborate carved tabernacle work,—sometimes with complete pictorial compositions representing well-known legends of the saints. Generally these figures were gilded and painted. Often the shutters on the sides were painted with illustrative subjects, frequently painted on both sides, so as to be seen whether the shrine was open or shut. Many Lutheran churches in Nuremberg retain these ornaments exactly as they stood in Catholic times. The 15th and 16th centuries

were prolific in these rich structures. A famous triptych by Hans Bruggemann (1515) is preserved in the cathedral of Schleswig, an earlier one by Michel Pacher of Brauneck at Wolfgang-sur-le-Lac near Ichel. To the triptychs should be added the stall-work of the 14th, 15th, 16th centuries, as in the cathedrals of Cologne, Amiens, and Ulm, and in many English churches. Another class of carvings may be studied in the vast roofs, such as that of Westminster Hall; the roofs of many churches in Norfolk, and many halls in the old colleges and Tudor mansions are decorated with carved figures and heraldry.

In the 16th century the great cities of Italy—Rome, Florence, Venice, Milan, Ferrara, Urbino, and others—abounded in richly carved gilt and inlaid furniture, chairs, wardrobes, chests—such as contained bridal trousseaux—mirror frames, caskets, even bellows. They were of walnut, cypress, cedar, ebony, and other woods,—inlaid with ivory, agates, and ornaments of hammered silver. Rich and beautiful examples of such work are preserved in the museum at South Kensington, the Hotel de Cluny, the Kunst Kammer of Berlin, and other collections. The 16th century stall-work of many Venetian churches, the panel-work of the old rooms in the Louvre in Paris, the fire-places seen in many old 16th century palaces, specially that of the Palace of Justice in Bruges, are examples of admirable decorative carving on a large scale. The Spanish wood-carvers during this period had a just celebrity. Their religious imagery is admirably designed, true to nature, and devotional, pathetic, and tender in expression. They colored the figures up to nature, but nothing was lost in this process. The great Renaissance painters and masters of Germany practised wood-carving of great excellence. Wohlgemuth of Nuremberg, Albert Dürer, Veit Stoss, Ludwig Krug, Peter Flotner, &c., carved classical subjects, portraits in medallions, delicate bas-reliefs on draughtmen made of box and other hard woods, which are to be seen in many collections. They carved as often in hone stone, and modelled medallions, statuettes, and minute busts in wax, sometimes colored up to life.

A rilievo on hone stone by Albert Dürer is preserved in the British Museum; others on wood in the united collections in Munich, on wood and hone stone by Lucas Kranach the painter in the Kunst Kammer, Berlin, on wood with the monogram of Hans Schauffin in the same collection, one attributed to Lucas Van Leyden the painter in the National Library, Paris. The Augsburg artists worked more generally in wood only. Rosary beads of box, ½ to ¾ of an inch in diameter, some made to open, carved with minute figure subjects of great excellence, may be seen in South Kensington and in other collections. During the same period minute Scripture subjects were carved in box on crosses and small triptychs by the monks of Mount Athos, the inheritors of the old Byzantine art.

In the 16th century curious minute works, entire compositions, were carved by Properzia de' Rossi in peach stones. One is preserved in the Museum of Turin. A cherry stone on which a "gloria" of saints is carved is preserved among the Florentine gems. Leo Pronner, already named, also carved microscopic work on cherry stones.

A carver of great skill, Grinling Gibbons (1650–1721), founded a school of decorative carving in England which survived till near the end of the last century. The facility of execution in carving soft woods for gilding, to make frames, carriages, and furniture, was very great during the earlier years of the last century. The taste was best in Italy and most extravagant in France. A revival of classic taste began with the reign of Louis XVI., and at about the same time in England, influenced by the brothers Adam and by many excellent carvers of furniture and decorative wood-work.

The carvings of the mountain villagers in Switzerland and the Tyrol are spirited, and are well executed, with simple tools, generally in pine wood. What has been said of the Indians, Persians, Chinese, and Japanese regarding ivory-carving, applies equally to their skill in carving and inlaying wood.

In most countries of Europe the art has been much displaced in recent times by moulded work in various materials and by metal-casting.

See Maskell's *Ivories at South Kensington;* Gori, *Thesaurus Diptychorum;* Lebarte's *Arts Industriels;* Du Sommerard, *Arts Somptuaires;* Viollet-le-Duc's *Mobilier;* Lubke's *History of Art;* Kugler's *Hand-book;* Pollen's *Ancient and Modern Furniture and Woodwork.* (J. H. P.)

CARVING AND GILDING being two operations which formerly were the most prominent features in the important industry of frame-making, the craftsmen who pursued the occupation were known as carvers and gilders. The terms still continue to be the recognized trade name of frame-making, although very little of the ornamentation of frame-work is now accomplished by carving, and a great deal of the so-called gilt ornament is produced without the use of gold. The trade has to do primarily with the frames of pictures, engravings, and mirrors, but many of the light decorative fittings of houses, finished in "composition" and gilt work, are also entrusted to the carver and gilder. Fashion in picture frames, like all fashions, fluctuates greatly. Mouldings of the prevailing sizes and patterns are generally manufactured in special factories, and supplied in lengths to carvers and gilders ready for use. A large proportion of such mouldings, especially those of a cheaper and inferior quality, are made in Germany. What is distinctively known as a "German" moulding is a cheap imitation of gilt work made by lacquering over the surface of a white metallic foil. German artisans are also very successful in the preparation of imitation of veneers of rosewood, mahogany, walnut, and other ornamental woods. The more expensive mouldings are either in wood (such as oak or mahogany), in veneers of any expensive ornamental wood, or real gilt.

A brief outline of the method of making a gilt frame, enriched with composition ornaments, may be taken as a characteristic example of the operations of the frame-maker. The foundation of such a frame is soft pine wood, in which a moulding of the required size and section is roughly run. To prevent warping the moulding is, or ought to be, made from two pieces of wood glued together. The moulding is "whitened up," or prepared for gilding by covering it with repeated coatings of a mixture of finely-powdered whiting and size. When a sufficient thickness of the whitening mixture has been applied, the whole surface is carefully smoothed off with pumice-stone and glass-paper, care being taken to keep the angles and curves clear and sharp. Were a plain gilt moulding only desired, it would now be ready for gilding: but when the frame is to be enriched, it first receives the composition ornaments. Composition, or "compo," is a mixture of fine glue, white resin, and linseed oil well boiled together, with as much rolled and sifted whiting added as makes the whole into a doughy mass while hot. This composition is worked in a hot state into moulds of boxwood, and so pressed in as to take up every ornamental detail. On its removal from the mould all superfluous matter is trimmed away, and the ornament, while yet soft and plastic, is laid on the moulding, and fitting into all the curves, &c., is fixed with glue. The ornamental surface so prepared quickly sets and becomes very hard and brittle. When very large bold ornaments are wanted for frames of unusual size they are moulded in *papier mâché.* Two methods of laying on gold—oil gilding and water gilding—are practised, the former being used for frames broken up with enrichments. For oil gilding the moulding is prepared with two coats of fine thin size, and afterwards it receives a coat of oil gold-size, which consists of a mixture of boiled linseed oil and ochre. When this gold-size is in a "tackey" or "sticky" condition, gold-leaf is laid on and carefully pressed over and into all parts of the surface; and when covered with a coat of finish-size, the gilding is complete. Water gilding is applied to plain mouldings and all considerable unbroken surfaces, and is finished either "matt" or burnished. For these styles of work the mouldings are properly sized, and after the size is dry the gold is laid on with water. Matt-work is protected with one or two coats of finish-size; but burnished gold is finished only by polishing with an agate burnisher,—no size or water being allowed to touch such surfaces. The mitring up of frames, the mounting and fitting up of paintings, engravings, &c., involve too many minor operations to be noticed here in detail; but these, with the cutting and fitting of glass, cleaning and repairing pictures and prints, and similar operations, all occupy the attention of the carver and gilder.

CARY, Henry Francis (1772–1844), translator of Dante, and miscellaneous writer, was born at Gibraltar, December 6, 1772. He was the son of a captain in the army, and was educated at Christ Church, Oxford, which

he entered at the age of eighteen, having two years earlier made his appearance as an author, in a volume of *Sonnets and Odes*. In 1796 he took his master's degree, and having entered the church was presented, in the following year, to the vicarage of Abbott's Bromley in Staffordshire. This benefice he held till his death. In 1800 he was also presented to the vicarage of Kingsbury in Warwickshire. While still at Christ Church he had devoted much time to the study of modern literature, not only English but French and Italian; and the fruits of his studies in these fields appeared in the notes to his translation of Dante, the work on which his reputation now chiefly rests. The version of the *Inferno* was published in 1805, together with the original text. The version of the whole *Divina Commedia* did not appear till 1814. It attracted little attention for some years. But when Coleridge, in his lectures at the Royal Institution, spoke of it in terms of high praise, the world was persuaded to acknowledge its merits. It gradually took its place among "standard" works, and passed through four editions in the translator's lifetime. It has the great merits of accuracy, idiomatic vigor, and readableness, and, although many rivals have since appeared in the field, still holds its honorable place. Its blank verse, however, cannot represent the close woven texture and the stately music of the *terza rima* of the original. In 1824 Cary published a translation of *The Birds* of Aristophanes. Two years later he was appointed assistant-librarian in the British Museum, a post which he held for about eleven years. He resigned in consequence of being refused the appointment, in ordinary course on a vacancy, to the post of keeper of the printed books. From this time he applied himself to literary work on his own account, for which his duties at the museum had left him little opportunity. For the old *London Magazine* he wrote a series of *Lives of the early French Poets*, and *Lives of English Poets* (from Johnson to Henry Kirke White), the latter intended as a continuation of Johnson's *Lives of the Poets*. These works were published in a collected form in 1846. He was also engaged in editing the works of Cowper, Milton, Pope, and other poets. He published about 1834 a translation of the *Odes* of Pindar, and at the time of his death was preparing a body of illustrative notes for a new edition. A pension of £200 per annum was conferred on Cary by Lord Melbourne in 1841. He died in London, August 14, 1844, and his remains were interred in Westminster Abbey. A memoir of his life, with his literary journal and letters, was published in two volumes by his son, the Rev. Henry Cary, M.A., in 1847.

CARY, Sir Lucius, second Viscount Falkland, was born at Burford, co. Oxon, in 1610 or 1611, and educated at Trinity College, Dublin, his father being at that time lord-deputy of Ireland. On leaving the university he served for a short time in the Low Countries, but failing to attain promotion returned to England, and found a refuge from domestic troubles in the study of ancient literature and the society of the most eminent men of learning. Among his intimate associates were Jonson, Suckling, and Cowley; and at his country seat, Great Tew in Oxfordshire, he subsequently gathered around him a small group of theologians whose liberal opinions were not without influence in the religious rivalries of the day. In 1633 he succeeded to his father's title, and was appointed gentleman of the privy chamber to Charles I. In 1640 he entered the House of Commons as member for Newport, Isle of Wight, and quickly assumed there a prominent part upon the side of the king, while at the same time he supported Pym in his schemes of moderate reform in church and state, and himself introduced the Bill for the exclusion of bishops from the House of Peers. But having been chosen by Charles to be one of his secretaries of state, Falkland found himself irretrievably committed to a cause which he could not wholly approve, and to the service of a king whom in his heart he distrusted, though his chivalry forbade him to abandon his cause. On the eve of the Civil War he joined his royal master at York, and having raised a troop of horse, did good service at Edgehill, Oxford, and the siege of Gloucester. In the indecisive battle of Newbury (20th September, 1643) he fell fighting in the front rank of Lord Byron's regiment, with the words "Peace, Peace" upon his lips. Had his life been spared it is possible that he might at least have succeeded in mitigating the rancor of the contending parties. His poems and political writings, published after his death, do not increase a reputation which is based rather upon single-mindedness and patriotic self-devotion than upon his contributions to literature.

CARYL, Joseph (1602–1673), a learned Nonconformist clergyman, was born in London in 1602. He was educated at Exeter College, Oxford, and after leaving the university became preacher at Lincoln's Inn. By order of the Parliament he attended Charles I. in Holmby House, and in 1650 he was sent with Owen to accompany Cromwell to Scotland. After the Restoration he continued to officiate in an Independent congregation in London till his death in 1673. Caryl is now remembered only for his learned but ponderous commentary on Job, originally published in twelve volumes 4to, afterwards in two huge volumes folio.

CASA, Giovanni della (1503–1556), an Italian poet, was born at Mugillo, in Tuscany, in 1503. He studied at Bologna, Florence, and Rome, and by his learning attracted the patronage of Alexander Farnese, who, as Pope Paul III., made him nuncio to Florence, where he received the honor of being elected a member of the celebrated academy, and then to Naples, where his oratorical ability brought him considerable success. His reward was the archbishopric of Benevento, and it was believed that it was only his openly licentious poem, *Capitoli del foro*, and the fact that the French court seemed to desire his elevation, which prevented him from being raised to a still higher dignity. He died in 1556. Casa is chiefly remarkable as the leader of a reaction in lyric poetry against the universal imitation of Petrarch, and as the originator of a style, which, if less soft and elegant, was more nervous and majestic than that which it replaced. His prose writings gained great reputation in their own day, and long afterwards, but are disfigured by apparent straining after effect, and by frequent puerility and circumlocution. The principal are—in Italian, the famous *Il Galateo*, a treatise on manners, which has been translated into several languages, and, in Latin, *De Officiis*, and translations from Thucydides, Plato, and Aristotle. A complete edition of his works was published at Florence in 1707, to which is prefixed a life by Casotti. The best edition is that of Venice, 1752.

CASA CALENDA, a town of Italy, in the province of Molise and district of Larino, about 18 miles north-east of Campobasso. It is situated in an agricultural district, and trades in silk, wine, and fruits. It is usually identified with the ancient *Calela*, where Fabius took up his station to watch Hannibal, when the latter established his quarters at *Gerunium*, now Gerione. Population, 6248.

CASALE, a town of northern Italy, in the north of the province of Alessandria. It is situated in a plain on the right bank of the Po, 38 miles east from Turin, and at a height of 249 feet above sea-level. Its fortress, founded in 1590, was strengthened and improved in 1849 under the direction of General de la Marmara. The town has been frequently besieged. It was taken from the Spaniards in 1640, and forty-one years later was sold to France by the duke of Mantua. It was taken in 1695, but was recovered from the allies by the French. Since then, it has been twice retaken by the latter. Casale is the see of a bishop; and its cathedral, a Lombard structure, is said to have been founded in 742. The church of San Domenico, another fine edifice, consecrated in 1513, contains a monument of remarkably elegant design to the memory of the Palæologi, erected in 1835. Other objects of interest are the churches of S. Ambrosio and of S. Ilario (once a pagan temple), the town-house, the clock-tower, and the library. The town also contains a college, theatre, and several palaces of the nobility. Some trade is done in fruit, wine, hemp, and the so-called "syrup of Casale." The principal manufacture is that of silk. Population, 27,514.

CASALMAGGIORE, a town of Italy in the province of Cremona, the capital of a circondario. It is situated on the left bank of the Po, and is protected from inundation by excellent embankments. Its public buildings comprise an abbey, a hospital, an orphan asylum, a custom-house, and a theatre; and its most important industries are the manufacture of glass, pottery, cream of tartar, and leather. It was the scene of a victory of Francesco Sforza over the Venetians in 1448. Population about 4500.

CASALPUSTERLENGO, a town of Italy, in the province of Milan, about 30 miles south-east of that city, on

the River Brembiolo. In carries on the manufacture of silk, linen, and earthenware, and is one of the chief seats of the trade in Parmesan cheese. Population, 6207.

CASANOVA DE SEINGALT, Giovanni Jacopo (1725–1803), one of the most noted adventurers of the 18th century, was born at Venice in 1725. His father belonged to an ancient and even noble family, but alienated his friends by embracing the dramatic profession early in life. He made a runaway marriage with Zanetta Farusi, the beautiful daughter of a Venetian shoemaker; and Giovanni was their eldest child. When he was but a year old, his parents, taking a journey to London, left him in charge of his grandmother, who perceiving his precocious and lively intellect, had him educated far above her means. At sixteen he passed his examination and entered the seminary of St. Cyprian in Venice, from which he was expelled a short time afterwards for some scandalous and immoral conduct, which would have cost him his liberty, had not his mother managed somehow to procure him a situation in the household of the Cardinal Acquaviva. He made but a short stay, however, in that prelate's establishment, all restraint being irksome to his wayward disposition, and took to travelling. Then began that existence of adventure and intrigue which only ended with his death. He visited Rome, Naples, Corfu, Constantinople, and penetrated even so far as St. Petersburg, where he was introduced to Catherine II. By turns journalist, preacher, abbé, diplomatist, he was nothing very long, except *homme à bonnes fortunes*, which profession he assiduously cultivated till the end of his days. In 1755 having returned to Venice, he was denounced to the Government as a political spy, and committed to prison. After several fruitless attempts he succeeded in establishing a communication with another prisoner, in whose company he made his escape on the night of the 31st of October, 1756. This exploit, afterwards so graphically related by him in a separate volume, and also in his *Memoirs*, gained him great celebrity. From that day he became a man of fashion, and recommenced his life of dissolute and profligate adventure. Exhibiting his effrontery and audacity at every court in Europe, he at last made his way through Germany, in which country he was presented to Frederick the Great, into France. Here he became acquainted with Rousseau, Voltaire, and many more notabilities, had interviews with Louis XV., and was almost tenderly intimate with Madame de Pompadour. Handsome, witty, and eloquent, it is not to be wondered at that such a man should have been received with open arms in the dissolute coteries of the 18th century. Consummate profligate and charlatan as he was, he was loaded with honors by the Italian princes, and even decorated by the Pope himself.

After eighteen years' absence from his native town, he endeavored to reinstate himself in the esteem of the Venetians by a refutation of the work of Amelot de la Houssaye on the constitution of the republic; and when at last serious matters took the place of his pleasures, he became, in 1782, librarian to a German prince without a library. This prince was Count Waldstein, whom he accompanied to his chateau at Dux in Bohemia, in which place he died in 1803, after having written his *Mémoires*, a work not unlike the *Confessions* of Rousseau, but far more depraved in tone. They are the frank avowal of a godless life, notwithstanding the frequent professions of Christianity in the preface. Much as they have been overrated, a certain literary merit cannot be denied to them. They are principally interesting for the faithful pictures they give us of the morals and manners of the times. The *Mémoires* were published at Leipsic, 10 vols., in 1828–38, and at Paris, 4 vols., in 1843. He also wrote several works on history in Italian; *Récit de ma Captivité*, 1788; a translation in verse of the *Iliad*, 1778; and a *Narrative of Eighty Years spent among the Inhabitants of the Interior of the Globe*, 1788–1800.

CASAS GRANDES (*i.e.*, in Spanish, Great Houses), a town of Mexico, in the province of Chihuahua, situated on the Casas Grandes or San Miguel River, about 35 miles S. of Llanos and 150 miles N.W. of the city of Chihuahua. It is celebrated for the ruins of early Mexican buildings still extant, about half a mile from its present site. They are built of "sun-dried blocks of mud and gravel, about 22 inches thick, and of irregular length, generally about 3 feet, probably formed and dried *in situ*." The walls are in some places about 5 feet thick, and they seem to have been plastered both inside and outside. The principal edifice extends 800 feet from N. to S. and 200 E. to W.; its general outline is rectangular, and it appears to have consisted of three separate piles united by galleries or lines of lower buildings. The exact plan of the whole has not as yet been made out, but the apartments have evidently varied in size from mere closets to extensive courts. The walls still stand at many of the angles with a height of from 40 to 50 feet, and indicate an original elevation of several stories, perhaps six or seven. At a distance of about 450 feet from the main building are the substructions of a smaller edifice, consisting of a series of rooms ranged round a square court, so that there are seven to each side besides a larger apartment at each corner. The whole district of Casas Grandes is further studded with artificial mounds, from which are excavated from time to time large numbers of stone axes, *metates* or corn-grinders, and earthen vessels of various kinds. These last have a white or reddish ground, with ornamentation in blue, red, brown, or black, and are of much better manufacture than the modern pottery of the country. Similar ruins to those of Casas Grandes exist near the Gila, the Salinas, and the Colorado, and it is probable that they are all the erections of one people. Squier is disposed to assign them to the Moquis.

See vol. iv. of *The Native Races of the Pacific States of North America*, by Squier, whose principal authorities are the *Noticias del Estado de Chihuahua* of Escudero, who visited the ruins in 1819; an article in the first volume of the *Album Mexicano*, the author of which was at Casas Grandes in 1842; and the *Personal Narrative* of Mr. Bartlett, who explored the locality in 1851.

CASAUBON, Isaac (1559–1614), was born at Geneva, 18th February, 1559, of French refugee parents. On the publication of the edict of January, 1561, the family returned to France and settled at Crêst in Dauphiné, where Arnold Casaubon, Isaac's father, became minister of a Huguenot congregation. Till he was nineteen, Isaac had no other instruction than what could be given him by his father amid the distractions of those troubled years. Arnold was away from home whole years together, in the Calvinist camp, or the family were flying to the hills to hide from the fanatical bands of armed Catholics who patrolled the country. Thus it was in a cave in the mountains of Dauphiné that Isaac received his first lesson in Greek, the text-book being *Isocrates ad Demonicum*.

At nineteen Isaac was sent to the Academy of Geneva, where he read Greek under Francis Portus, a native of Crete. Portus died in 1581, having recommended Casaubon, then only twenty-two, as his successor. At Geneva he remained as professor of Greek till 1596. Here he married twice, his second wife being Florence, daughter of the celebrated scholar-printer, Henri Estienne. Here, without the stimulus of example or encouragement, with few books and no assistance, in a city peopled with religious refugees, and struggling for life against the troops of the Catholic dukes of Savoy, Casaubon made himself the consummate Greek scholar, and master of ancient learning, which he became. He gave himself up to a study of the classical remains with a zeal and persistency which were fed only by an innate love of acquisition. His great wants were books and the sympathy of learned associates, both of which were wanting at Geneva. He spent all he could save out of his small salary in buying books, and in having copies made of such classics as were not then in print. Henri Estienne, Beza, and Lect were, indeed, men of superior learning. But Henri, in those last years of his life, was no longer the Estienne of the *Thesaurus;* was, besides, never at home, and would not suffer his son-in-law to enter his library. "He guards his books," writes Casaubon, "as the griffins in India do their gold!" Beza was engrossed by the cares of administration, and retained, at most, an interest for theological reading. Lect, a lawyer, had left classics for the active business of the council. The sympathy and help which Casaubon's native city could not afford him, he endeavored to supply by cultivating the acquaintance of the learned of other countries. Geneva, as the metropolis of Calvinism, received a constant succession of visitors. The Continental tour of the young Englishman of birth was not complete without a visit to Geneva. It was there that Casaubon made the acquaintance of young Henry Wotton, who lodged in his house, and borrowed his money. Of more consequence to Isaac Casaubon was the acquaintance of Richard Thomson of Clare, for it was through Thomson that the atten-

tion of Sealiger, settled in 1593 at Leyden, was directed to Casaubon. Scaliger and Casaubon first exchanged letters in 1594. Their intercourse, which was wholly by letter, for they never met, passes through the stages of civility, admiration, esteem, regard, and culminates in a tone of the tenderest affection and mutual confidence. Influential Frenchmen of letters, the Protestant Bongars, the Catholic De Thou, and the Catholic convert Canaye de Fresne, aided him by presents of books and encouragement, and endeavored to get him invited in some capacity to France.

This was effected in 1596, in which year Casaubon accepted an invitation to the university of Montpellier, with the title of "conseilleur du roi" and "professeur stipendié aux langues et bonnes lettres." In Montpellier he never took root. He held the professorship there only three years, with several prolonged absences. He was not, at any time, insensible to the attractions of teaching, and his lectures at Montpellier were followed not only by the students, but by men of mature age and position. But the love of knowledge was gradually growing upon him, and becoming a devouring passion which excluded all other ambition. He began to perceive that the editing of Greek books was an employment more congenial to his peculiar powers than teaching. At Geneva he had first tried his hand in some notes on Diogenes Laertius and on Theocritus, of small account. His *début* as an editor had been a complete Strabo (1587), of which he was so ashamed afterwards that he apologized for its erudity to Scaliger, calling it a "miscarriage." This was followed by the text of Polyænus, an *editio princeps*, 1589; a text of Aristotle, 1590; and a few notes contributed to Estienne's editions of Dionysius of Halicarnassus and Pliny's *Epistolæ*. It is not till we come to his edition of Theophrastus's *Characteres*, 1592, that we have a specimen of that peculiar style of illustrative commentary, at once apposite and profuse, which distinguishes Casaubon among annotators. At the time of his removal to Montpellier he was engaged upon what is the capital work of his life, his edition of, and commentary on, Athenæus.

In 1598 we find Casaubon at Lyons, superintending the passage of his *Athenæus* through the press. Here he lived in the house of De Vic, "surintendant de la justice," a Catholic, but a man of acquirements, whose connections were with the circle of liberal Catholics in Paris. In the suite of De Vic, Casaubon made a flying visit to Paris, and was presented to Henry IV. The king was very gracious, and said something about employing Casaubon's services in the "restoration" of the fallen university of Paris.

With the hopes thus excited he returned to Montpellier. In January, 1599, he received a summons to repair to Paris. But the terms of the letter missive were so vague that, though it bore the sign manual, Casaubon hesitated to act upon it. However, he resigned his chair at Montpellier, but instead of hastening to Paris, he lingered more than a year at Lyons, in De Vic's house, waiting for the appointment to a Paris professorship. None came, but instead there came a summons from De Vic, who was in Paris, to come to him in all haste on an affair of importance. The business proved to be the Fontainebleau Conference. Casaubon allowed himself to be persuaded to sit as one of the referees who were to adjudicate on the challenge sent to Du Plessis Mornay by Cardinal Duperron. By so doing he placed himself in a false position, as Scaliger said: "Non debebat Casaubon interesse colloquio Plessiæano; erat asinus inter simias, doctus inter imperitos" (*Scaligerana* 2ª). The issue was so contrived that the Protestant party could not but be pronounced to be in the wrong. By concurring in the decision, which was unfavorable to Du Plessis Mornay, Casaubon lent the prestige of his name to a court whose verdict would without him have been worthless, and confirmed the suspicions already current among the Reformed churches that, like his friend and patron Canaye de Fresne, he was meditating abjuration. From this time forward he became the object of the hopes and fears of the two religious parties; the Catholics lavishing promises, and plying him with arguments; the Reformed ministers insinuating that he was preparing to forsake a losing cause, and only higgling about his price. We now know enough of Casaubon's mental history to know how erroneous were these computations of his motives. But, at the time, it was not possible for the immediate parties to the bitter controversy to understand the intermediate position between Genevan Calvinism and Ultramontanism to which Casaubon's reading of the fathers had conducted him.

Meantime the efforts of De Thou and the liberal Catholics to retain him in Paris were successful. The king repeated his invitation to Casaubon to settle in the capital, and assigned him a pension. No more was said about the university. The recent reform of the university of Paris had closed its doors to all but Catholics; and though the chairs of the Collége de France were not governed by the statutes of the university, public opinion ran so violently against heresy that Henry IV. dared not appoint a Calvinist to a chair, even if he had desired to do so. But it was designed that Casaubon should succeed to the post of sub-librarian of the royal library when it should become vacant, and a patent of the reversion was made out in his favor. In November, 1604, Jean Gosselin died in extreme old age; and Casaubon succeeded him as sub-librarian, with a salary of 400 livres in addition to his pension.

In Paris Casaubon remained till 1610. These ten years were the brightest period of his life. He had attained the reputation of being, after Scaliger, the most learned man of the age,—an age in which learning formed the sole standard of literary merit. He was placed above penury, though not in easy circumstances. He had such facilities for religious worship as a Huguenot could have, though he had to go out of the city to Hablon, and afterwards to Charenton, for them. He enjoyed the society of men of learning, or who took an interest in learned publications. He had the best opportunities of seeing men of letters from foreign countries as they passed through Paris. Above all, he had wealth of Greek books, both printed and in MS., the want of which he had felt painfully at Geneva and Montpellier, and which no other place but Paris could at that period have supplied.

In spite of all these advantages we find Casaubon restless, and ever framing schemes for leaving Paris, and settling elsewhere. It was known that he was open to offers, and offers came to him from various quarters,—from Nîmes, from Heidelberg, from Sedan. His friends Lect and Diodati wished, rather than hoped, to get him back to Geneva. The causes of Casaubon's discomfort in Paris were various, but the principal source of uneasiness lay in his religion. The life of any Huguenot in Paris was hardly secure in these years, for it was doubtful if the police of the city was strong enough to protect them against any sudden uprising of the fanatical mob, always ready to reenact the St. Bartholomew. But Casaubon was exposed to persecution of another sort. Ever since the Fontainebleau Conference an impression prevailed that he was wavering. It was known that he rejected the *outré* anti-popery opinions current in the Reformed churches; that he read the fathers, and wished for a church after the pattern of the primitive ages. He was given to understand that he could have a professorship only by recantation. When it was found that he could not be bought, he was plied by controversy. Henry IV., who liked Casaubon personally, made a point of getting him to follow his own example. By the king's orders Duperron was untiring in his efforts to convert him. Casaubon's knowledge of the fathers was that of a scholar; Duperron's that of an adroit polemist; and the scholar was driven to admit that the polemist was often too hard for him. These encounters mostly took place in the king's library, over which the cardinal, in his capacity of aumonier, exercised some kind of authority; and it was therefore impossible for Casaubon to avoid them. On the other hand the Huguenot theologians, and especially Du Moulin, chief pastor of the church of Paris, accused him of conceding too much, and of having departed already from the lines of strict Calvinistic orthodoxy.

When the assassination of Henry IV. gave full rein to the Ultramontane party at court, the obsessions of Duperron became more importunate, and even menacing. It was now that Casaubon began to listen to overtures which had been faintly made before, from the bishops and the court of England. In October, 1610, he came to this country in the suite of the ambassador, Lord Wotton of Marley. He had the most flattering reception from James I., who was perpetually sending for him, to have theological talk. The English bishops were equally delighted to find that the great French scholar was an Anglican ready made, and had arrived, by independent study of the fathers, at the very *via media* between Puritanism and Romanism, which was becoming the fashion in the English Church. Casaubon

though a layman, was collated to a prebendal stall in Canterbury, and had a pension of £300 a year assigned him from the exchequer. Nor were these merely paper figures. When Sir Julius Cæsar made a difficulty about payment, James sent a note in his own hand: "Chanceler of my excheker, I will have Mr. Casaubon paid before me, my wife, and my barnes." He still retained his appointments in France, and his office as librarian. He had obtained leave of absence for a visit to England, and his permanent settlement here was not contemplated. In order to retain their hold upon him, the Government of the queen regent refused to allow his library to be sent over. It required a special request from James himself to get leave for Madame Casaubon to bring him a part of his most necessary books. Casaubon continued to speak of himself as the servant of the regent, and to declare his readiness to return when summoned to do so.

Meanwhile his situation in London gradually developed unforeseen sources of discomfort. Not that he had any reason to complain of his patrons, the king and the bishops. James continued to the last to delight in his company, and to be as liberal as the state of his finances allowed. Overal had received him and his whole family into the deanery of St. Paul's, and entertained him there for a year. Overal and Andrewes, then bishop of Ely, were the most learned men of a generation in which extensive reading was more general among the higher clergy than it has ever been since. These two were attracted to Casaubon by congenial studies and opinions. With the witty and learned bishop of Ely, in particular, Casaubon was always happy to spend such hours as he had to spare from the labors of the study. Andrewes took him to Cambridge, where he met the most gratifying reception from the notabilities of the university. They went on together to Downham, where Casaubon spent six weeks of the summer of 1611. In 1613 he was taken to Oxford by Sir H. Savile, where, amid the homage and feasting of which he was the object, his principal interest is for the MSS. treasures of the Bodleian. The honorary degree which was offered him he declined.

But these distinctions were far from compensating the serious inconveniences of his position. Having been taken up by the king and the bishops, he had to share in their rising unpopularity. The courtiers looked with a jealous eye on a pensioner who enjoyed frequent opportunities of taking James I. on his weak side—his love of book talk, —opportunities which they would have known how to use. Casaubon was especially mortified by Sir H. Wotton's persistent avoidance of him, so inconsistent with their former intimacy. His windows were broken by the roughs at night, his children pelted in the streets by day. On one occasion he himself appeared at Theobald's with a black eye, having received a blow from some ruffian's fist in the street. Mr. Hallam thinks that he had "become personally unpopular;" but these outrages from the vulgar seem to have arisen solely from the Cockney's antipathy to the Frenchman. Casaubon, though he could make shift to read an English book, could not speak English, any more than Mme. Casaubon. This deficiency not only exposed him to insult and fraud, but restricted his social intercourse. It excluded him altogether from the circle of the "wits;" either this or some other cause prevented him from being acceptable in the circle of the lay learned—the "antiquaries." Camden he saw but once or twice. Casaubon had been imprudent enough to correct Camden's Greek, and it is possible that the ex-headmaster of Westminster kept himself aloof in silent resentment of Casaubon's superior learning. With Cotton and Spelman he was slightly acquainted. Of Selden we find no mention. Though Sir Henry Savile ostensibly patronized him, yet Casaubon could not help suspecting that it was Savile who secretly prompted an attempt by Montagu to forestal Casaubon's book on Baronius. Besides the jealousy of the natives, Casaubon had now to suffer the open attacks of the Jesuit pamphleteers. They had spared him as long as there were hopes of getting him over. The prohibition was taken off, now that he was committed to Anglicanism. Not only Eudæmon-Joannes, Rosweyd, and Scioppius, but a respectable writer, friendly to Casaubon, Schott of Antwerp, gave currency to the insinuation that Casaubon had sold his conscience for English gold.

But the most serious cause of discomfort in his English residence was that his time was no longer his own. He was perpetually being summoned out of town to one or other of James's hunting residences that the king might enjoy his talk. He had come over from Paris in search of leisure, and found that a new claim on his time was established. The king and the bishops wanted to employ his pen in their literary warfare against Rome. They compelled him to write first one, then a second, pamphlet on the subject of the day,—the royal supremacy. At last, ashamed of thus misappropriating Casaubon's stores of learning, they set him upon a refutation of the *Annals* of Baronius, then in the full tide of its credit and success Upon this task Casaubon spent his remaining strength and life. He died in great suffering, 1st July, 1614. His complaint was an organic and congenital malformation of the bladder; but his end was hastened by an unhealthy life of over-study, and latterly by his anxiety to acquit himself creditably in his criticism on Baronius. He was buried in Westminster Abbey. The monument, by which his name is there commemorated, was erected many years later by his friend Thomas Morton, then (1632) become bishop of Durham.

Besides the editions of ancient authors which have been mentioned, Casaubon published with commentaries Persius, Suetonius, the *Scriptores Historiæ Augustæ*. Polybius, on which he had spent vast labor, he left unfinished. His most ambitious work was his revision of the text of Athenæus, with commentary. The Theophrastus perhaps exhibits his most characteristic excellences as a commentator. The *Exercitationes in Baronium* are but a fragment of the massive criticism which he contemplated, and failed in bringing before the reader the uncritical character of Baronius's history. His correspondence (in Latin) was finally collected by D'Almeloveen (Rotterdam, 1709), who prefixed to the letters a careful life of Isaac Casaubon. But this learned Dutch editor was only acquainted with Casaubon's diary in extract. This diary, *Ephemerides*, of which the MS. is preserved in the chapter library of Canterbury, was printed in 1850, by the Clarendon Press. It forms the most valuable record we possess of the daily life of a scholar, or a man of letters, of the 16th century.

For a characteristic of Casaubon's labors as a commentator and critic, a detailed account of his life, and a chronological list of his publications, the reader is referred to a work by the writer of the present article, *Isaac Casaubon* (1559–1614), 8vo, Lond., 1875. (M. P.)

CASBIN, Kasvin, Kazbin, a city of Persia, in the province of Irak, in 36° 12′ N. lat. and 49° 53′ E. long., and 108 miles W.N.W. of Teheran. It is built in a fertile plain, south of Mount Elburz, and is square in form, and surrounded by a wall of brick, with towers. Its extent is greater than that of Teheran; but the place has been repeatedly shaken by earthquakes, and many of the streets are in ruins, as are most of the magnificent buildings seen here by Chardin in 1674. The most remarkable remains are the palace of the Sufi princes, and the mosque, with its large dome. The city is said to have been founded in the 4th century. In the 16th century Shah Tamasp made it the capital; and it remained so till Shah Abbas the Great transferred the seat of government to Ispahan. The town still bears the name of *Dar-el-Sultanet*, or the "seat of royalty." The dust and heat of the place are very oppressive; it is furnished, however, with baths, and with cisterns fed by underground canals. The system of irrigation formerly carried on by these canals or *kanauts* rendered the Plain of Casbin one of the most productive regions of Persia. They are now mostly choked up, except in the immediate vicinity of the city. The manufactures of Casbin are velvet, brocades, carpets, a kind of coarse cotton-cloth termed *kerbas*, and sword-blades. The trade of the city is still considerable; great quantities of rice, and of silk for Baghdad and India, are brought to it from the Caspian provinces; and the bazaars are large. Casbin is also of some military importance, lying as it does at the entrance of the defile which leads into Ghilan. It is the birthplace of the poet Lokman, and of the geographer Ham el Oullah. Population in 1868 estimated at 25,000.

CASCIANO DEI BAGNI, a village of Italy in the province of Siena and district of Montepulciano, in the valley of the Paglia. It possesses warm mineral springs, and its bathing establishments attract a large number of visitors. Population, 3585.

CASERTA, the capital of the district of Terra di Lavoro,

in the province of Naples, and an episcopal see. It is situated on a rich alluvial plain, and has nearly 30,000 inhabitants. Caserta is mainly noticeable for its huge palace built by Vanvitelli for Charles III., which has a reputation that most architectural judges would probably deem to be superior to its merits. It is one of the stock sights for visitors to Naples, and has for many years served to but little other purpose. The length of the south front is stated to be 780 feet, the height 125 feet, and the number of windows in each floor 37; and such details as these best express the merits of a pile, which is in truth a monument of vulgar ostentation and wasted wealth. The harmony of the design is praised, and the building in truth possesses that easily-attained harmony which results from perfect symmetry. The travertine of which it is built was brought from the quarries of St. Jorio, near Capua. The great staircase, gorgeously lined with *lumachello* marble from Trapani, has, however, some originality of conception and merit of design and execution. Besides all the usual appurtenances of a palace, including a chapel gorgeous with lapis-lazuli and gilding, the building contains a theatre, with, as the visitor is told, forty boxes, besides that of the royal family. The palace is at present wholly useless, and serves only to lay an additional burden on the king of Italy's civil list, which is charged with the maintenance of so vast a number of now unneeded palaces, the heritage of all the sovereigns he has superseded. The gardens, adorned with numerous cascades and much decorative sculpture after the old Italian fashion, are perhaps better worthy of mention than the palace. They are extensive and command some fine points of view. The "English garden" was made by Queen Caroline in 1782. The property was bought by Charles III. from the dukes of Sermoneta, and the palace was begun in 1752. Caserta Vecchia—old Caserta—was situated on the hills behind the modern town. It was built by the Lombards, as is said, in the 8th century, and some remains of its old walls and bastions may still be seen.

CASHAN, or KASHAN, a city of Persia, in the province of Irak, 92 miles north of Ispahan, in a dry and stony plain, in 33° 52′ N. lat. and 51° 20′ E. long. The city is said to have been founded by Zobeide, wife of Haroun el Raschid. The manufactures are silk-brocades, carpets, cottons, gold and silver articles, and copper kettles. The city has a palace, many fine mosques, bazaars, and caravanseries. At the foot of the neighboring hills, four miles away, are the villa and beautiful gardens of Feen, the scene of the official murder, 9th January, 1852, of Amiru-'n-Nizam, one of the ablest ministers that Persia has had in modern times. The chief pavilion of the villa is in the form of a kiosk, with a projecting portico in front. The interior is decorated with fine arabesques. The vicinity of Cashan is famous for its scorpions. The city suffered from an earthquake in 1853. Population, 25,000.

CASHEL, an inland city of Ireland, in the county of Tipperary, 108 miles south-west from Dublin, and within 5 miles of the Great Southern and Western Railway. The town, which lies at the base of the Rock of Cashel, consists for the most part of a wide and well-built main street, and contains several public buildings, such as a court-house, a market-house, a fever hospital, barracks, and an infirmary. There are also the new cathedral, the deanery house (once the bishop's palace), and a Roman Catholic church, while immediately outside the town there is the union workhouse. Formerly an archiepiscopal see, Cashel was reduced in 1833 to a bishopric, but the bishop does not now reside there. The town's revenue is derived from landed estates in the neighborhood, the gift of Bishop Maurianus. It formerly returned one member to Parliament, but was disfranchised in 1870. Population in 1851, 4798, and in 1871, 4562.

The Rock of Cashel is the object of chief interest in the place. The elevation of limestone formation rises abruptly from the plain to a height of about 300 feet, and is a commanding object for many miles around. Its summit is occupied by the most interesting assemblage of ruins in Ireland, consisting of the remains of St. Patrick's Cathedral, a round tower, Cormack's Chapel, and an ancient cross. The chapel, which is said to have been erected by King Cormack M'Carthy in the 12th century, is considered to be the oldest stone edifice in the country. In its style it combines the high stone roof with the richest Norman decoration. The cathedral is cruciform in its design, and contains many interesting sculptures and tombs. In the adjoining cemetery there stands, on a rude pedestal, the "Cross of Cashel," with an effigy of St. Patrick sculptured on its side. The round tower, situated at the north-east angle of the cathedral, rises about 90 feet, with a circumference of 58 feet, and unlike the neighboring ruins has been built not of the limestone of the "Rock," but of freestone.

The history of Cashel belongs to the early period of Irish chronology. A stronghold in the time of Brian Boroimhe, it afterwards became noteworthy as the place where Henry II. received the homage of O'Brien, king of Limerick, and still later, where Edward Bruce held his Irish parliament. The cathedral was burnt in 1495 by the earl of Kildare. Two other interesting ruins exist at the base of the Rock, viz., Horn Abbey, founded in the 13th century, and the Dominican Priory, belonging to the same period.

CASHEW NUT, the fruit of the Cashew, Cadju, or Acajou tree, *Anacardium occidentale* (Nat. Ord. *Anacardiaceæ*), a native of the West Indian Islands. The fruit is kidney-shaped, about an inch in length, and the kernel is enclosed in two coverings, the outer of which is smooth, grey, and leathery. Inside this external rind is a dark-colored layer, containing an excessively acrid juice. The kernels have a bland, oily, pleasant taste. They are much eaten, both raw and roasted, in the tropical regions in which the tree is cultivated, and they yield a light-colored, sweet-tasted oil, said to be equal to olive oil for culinary purposes. The fruit-stalk, immediately under the fruit, is swollen and fleshy, and assumes a pear-like shape. This swollen portion of the stalk has a pleasant acid taste, and is eaten under the name of Cashew Apple. By fermentation it yields an alcoholic beverage, from which a spirit for drinking is distilled in the West Indies and Brazil. The tree also yields a gum analogous to gum arabic.

CASHGAR. See KASHGAR.

CASHMERE. See KASHMIR.

CASINO. See MONTE CASINO.

CASIRI, MICHAEL (1710–1791), a learned Maronite, was born at Tripoli in 1710. He studied at Rome, where he afterwards for ten years taught Arabic, Syriac, and Chaldee, and gave lectures in philosophy and theology. In 1748 he went to Spain, and was employed in the royal library at Madrid. He was successively appointed a member of the Royal Academy of History, interpreter of Oriental languages to the king, and joint-librarian of the Escorial. In 1763 he became principal librarian, a situation which he appears to have held till his death in 1791. Casiri published a work entitled *Bibliotheca Arabico-Hispana Escurialensis*, 2 vols. fol., Madrid, 1760–1770. It is a catalogue of above 1800 Arabic MSS., which he found in the library of the Escorial; and it also contains a number of quotations from Arabic works on history. The MSS. are classified according to the subjects of which they treat. The second volume, which is furnished with a copious index, gives an account of a large collection of geographical and historical MSS., which contain valuable information regarding the wars between the Moors and the Christians in Spain. A full view of the contents of the whole work, with some political comments, is given in the first appendix to Harris's *Philological Inquiries*, and in the second appendix to Berington's *Literary History of the Middle Ages*.

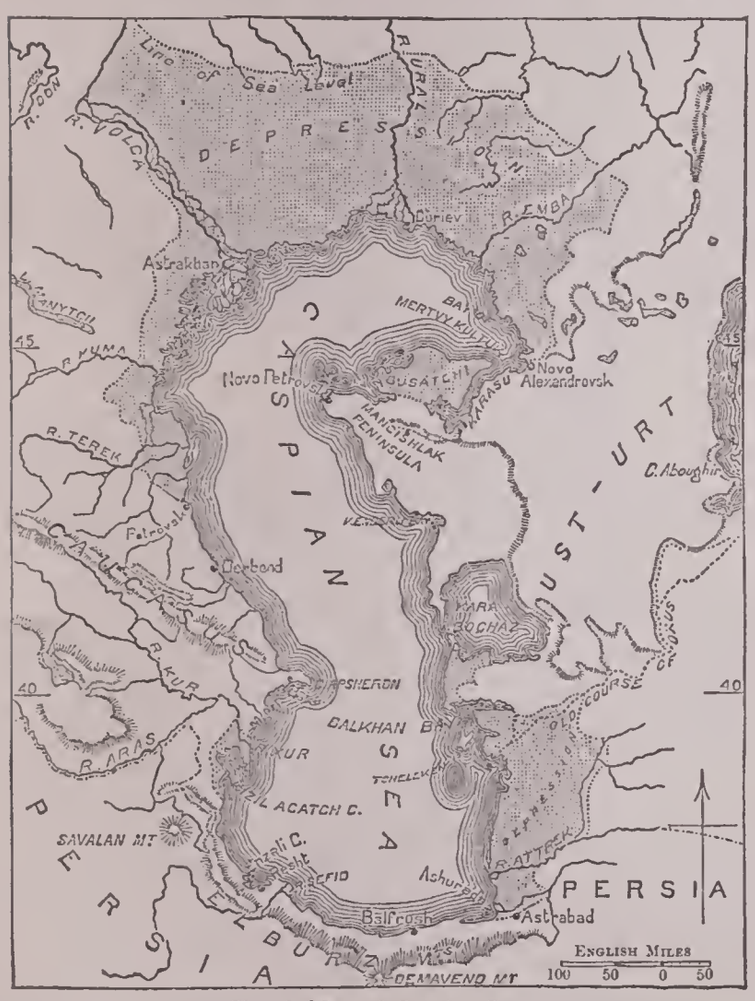
CASORIA, a town of Italy, five miles north-east of Naples, in one of the most fertile districts of the Terra di Lavoro. It is the birthplace of the painter Pietro Martino. Population about 7000.

CASPE, a city of Spain, in the province of Aragon, about 55 miles south-east of Saragossa on the banks of the River Guadaloupe, which runs into the Ebro a short distance below the town. Its prosperity is due to the mines of iron and of coal which abound in its vicinity, and which have given rise to manufactories. It has a castle and several convents and hospitals, and is famous in history as the scene of the congress of the Aragonians, Catalonians, and Valencians in 1412, which elected Ferdinand of Castile to the throne. It was captured from the Moors by Alphonso II. in 1168, and bestowed on the knights of St. John. Population in 1867, 9402.

CASPIAN SEA. The Caspian Sea, which was known under that name to the Greeks and Romans (Herodotus having given a generally accurate account of it, stating

that it is an inland sea having no connection with the ocean), is the largest of those salt lakes or closed inland seas which may be considered as "survivals" of former oceanic areas; and it is the one whose physical and biological conditions have been most fully studied.[1] These conditions are in many respects extremely peculiar; and tolerably certain conclusions of great interest may be drawn from them, in regard to the past history of the large extent of low steppes that lie—chiefly in Asia, but partly in Europe also—to the east, north, and west of its present area. These will be most fitly considered after a general survey has been taken of the existing basin of the Caspian, and of its relations to the surrounding land.

The general form of the Caspian may be described as a broad band, with sides almost straight and parallel, except near its northern end, where it turns sharply round to the east. The general direction of its axis is about N.N.E. and S.S.W., ranging from lat. 47° 20′ to 36° 40′ N.,—its most northerly point nearly coinciding with the mouth of the River Ural, and its most southerly being about half-way between the towns of Reshd and Astrabad. The distance in a straight line between these two points is about 740 miles. The average breadth of its middle portion is



Sketch Map of Caspian Sea.

about 210 miles, but the eastern extension of its northern portion into the Bay of Mertvy Kultuk increases the width of that part to 430 miles; and its southern portion also widens to nearly 300 miles. The total area is estimated at about 180,000 square miles.

The most important fact in the physical geography of the existing Caspian is that its surface is 84 feet below that of the Black Sea, which may be considered as not differing much from the general oceanic level.

The basin of the Caspian may be considered as consisting of three distinct parts,—the northern, the middle, and the southern. The *northern* portion is extremely shallow,—its bottom, which is nowhere more than 50 feet below the surface, being a continuation of the almost imperceptible slope of the steppe, so that there is no definite shore-line. It is into this portion that the Volga, the Ural, and the Kuma discharge themselves; and the deposit of alluvium which these rivers bring down is gradually raising its bottom, and will in time convert it into a salt marsh. Along the north-western border of this basin, from the delta of the Volga to that of the Kuma, a space of 250 miles, the shore is gashed with thousands of narrow channels, termed *limans*, from 12 to 30 miles in length, separated by chains of hillocks called *bugors*, which pass landward into the level ground of the steppes. In the neighborhood of the mouths of the Volga and Kuma, the excess of water which these rivers bring down at the time of the melting of the snows passes into these channels, and tends to keep them open; so that when the inundation is over, the sea again flows into them. But along the intervening part of the coast, the channels, like the intervening hillocks, are not continuous, but form chains of little lakes, separated by sandy isthmuses. Although these channels run nearly parallel to each other, yet they have a somewhat fan-like arrangement; their centre of radiation being the higher part of the isthmus which separates the basin of the Caspian from the north-east portion of the Black Sea,—a fact, as will be seen hereafter, of no small significance. The coast-line of the Bay of Mertvy Kultuk, on the other hand, is formed by a chain of low calcareous hills, constituting the rampart of the plateau of Ust Urt or Turkoman Isthmus, which divides the Caspian from the Sea of Aral; and it is between head-lands of this high plain that the long extension of this bay termed the Karasu (or Black Water) runs inland, the town of Novo Alexandrovsk being situated near its entrance.

The northern basin of the Caspian may be considered to terminate on the west side with the Bay of Kuma, and on the east with the hilly peninsula of Mangishlak, on which the town of Novo Petrovsk is situated. To the south of the line joining these points, in the parallel of 44° 10′ N. lat., the western shore-line is higher, and the water deepens considerably,—thus forming the *middle* basin of the Caspian, which may be considered to extend as far south as Cape Apsheron, the south-eastern termination of the great Caucasian range. This middle basin receives the large river Terek, which discharges itself by several mouths (some of them entering the Bay of Kuma) through an alluvial delta; and several smaller streams flow into it from the slopes of the Caucasian mountains through the low plain which intervenes between their base and the border of the Caspian. Near the most considerable of these, the Kabir Yalama, a rocky spur of the Caucasus, comes down nearly to the sea; and a narrow pass is thus formed, which has been fortified from very ancient times, being formerly known as the *Albaniæ* or *Caspiæ Pylæ*, and now as the Pass of Derbend, this being a small town built on the declivity in which the range terminates. The eastern shore of this portion of the Caspian is formed by the plateau of Ust Urt, or "high plain," a very remarkable plateau from 550 to 727 feet above the level of the Caspian, which extends from its eastern shore to the sea of Aral, rising abruptly from both seas, and ranging about 400 miles in the north and south direction; its north and south borders are formed by a precipitous face or cliff, which has much the appearance of an ancient sea-margin. As it is composed of later Tertiary strata, its elevation must have occurred at a time not geologically remote. The headlands of the Ust Urt form an abrupt coast-line along the northern part of the eastern border of the middle basin, with occasional bays into which several small streams from the plateau discharge themselves. Further south, however, the plateau recedes, and the land shelves off more gradually; and here an extensive but shallow basin presents itself (of which more will presently be said) almost entirely cut off from that of the Caspian, termed the Karaboghaz, or Black Gulf. To the south of this the coast-line rises again; and a peninsula is formed by an extension of the Balkan Mountains, which may be considered as forming the southern termination of the middle basin. Except along the shore-lines, the depth of this basin everywhere exceeds that of the northern,—being greatest in its middle portion, where over a small area it reaches 400 fathoms, whilst it shallows again towards the south, where there is a sort of ridge between Cape Apsheron and the Balkan peninsula, at the average depth of 30 fathoms, that separates it from the southern basin.

[1] See especially the "Kaspische Studien" of Prof. Von Baer, in the St. Petersburg *Bull. Sci.*, and in Erman's *Archiv. Russ.*, 1855, 1856.

The *southern* basin ranges from the Balkan Peninsula on the east and Cape Apsheron on the west to the shore-line formed by the base of the great Elburz range of mountains, which curves round its low and swampy border, from the mouth of the Kur to Astrabad, at an average distance of about 40 miles, rising in the peak of Sawalan near Tabreez to 15,800 feet, and in the snow-capped summit of Demavend, on whose southern slope Teheran is situated, to 18,600 feet. These mountains are composed of granite and porphyry, and are covered with recent volcanic deposits. South of Cape Apsheron, this basin receives the large river Kur, which drains the southern slopes of the Caucasian range; and this is joined, at no great distance from its mouth, by another large river, the Aras or Arax (the ancient *Araxes*), which forms the boundary between Russian Trans-Caucasia and Persia. The joint channel discharges its water by several mouths, part of them opening into the Gulf of Kizil-Agatch, which is the most considerable extension of the southern basin. From the mouths of the Kur to the Gulf of Enzeli, which resembles the Karaboghaz on a smaller scale, there is no considerable stream; but not far to the east of the town of Reshd, of which Enzeli is the port, the Sefid or White River discharges itself, this being formed by the confluence of the Kizil-Uzen with another considerable river, the two together draining a large portion of the slopes of the western division of the Elburz range, and of its extension towards the Caucasus. The southern border of the Caspian, between the mouth of the Sefid and Astrabad, receives numerous small streams from the northern slopes of the Elburz, but no considerable river; the Bay of Astrabad, however, receives at its northern end the Attruk, a river of considerable importance, which drains an extensive valley enclosed by the mountain ranges that form the southern border of the desert plains of Khiva. On the eastern coast, opposite to the Gulf of Kizil-Agatch, are the Balkan Bay and the Adji-Bojur Bay, which lie between extensions of the Balkan Mountains. One or both of these bays, it may now be pretty confidently stated, formerly received the mouths of the ancient *Oxus* (now Amou-Daria), when it discharged itself into the Caspian, instead of into the Sea of Aral; and there is further reason to believe that a communication here at one time existed between the Caspian and the Sea of Aral, through a furrow which lies along the southern border of the Ust Urt, and which terminates in what was formerly known as the Gulf of Aboughir, a southern extension of Lake Aral now dried up. The depth of the southern basin of the Caspian is for the most part considerable, ranging in its central portion between 300 and 500 fathoms.

Drainage-Area.—The drainage-area of the Caspian is much more extensive on the north and west than on the east and south. The Volga is estimated to drain an area of 527,500 square miles, and the Ural an area of 85,000 square miles,—these two rivers together probably bringing down more water than the Danube and the Don pour into the Black Sea. When to these we add the Kuma, the Terek, the Arax and Kur, the Sefid, and the Attruk, it is obvious that the total amount of river water annually discharged into the basin of the Caspian must be almost, if not quite, the equal of that which is discharged into the basin of the Black Sea. Yet the whole amount of fresh water returned by rain and rivers to the basin of the Caspian is only sufficient to compensate for the loss by evaporation from its surface,—as is shown by the fact that its present level remains constant, or, if it changes at all, rather sinks than rises. Now that the level of the Caspian was formerly about the same as that of the Black Sea, although at present 84 feet below it, is shown by the erosion of the rocks that formed the original sea-shore of the southern basin, which, at the height of from 65 to 80 feet above the present level, have been furrowed out into tooth-shaped points and needles; and if the water were again to rise to that level, it would overflow many hundred thousand square miles of the southern steppes, extending the area of the basin as far as Saratov. Now supposing the Caspian to have been formerly in communication with the general oceanic area (which will be hereafter shown to be almost a certainty), a reduction of its level and a contraction of its area would follow as a necessary consequence, whenever that communication was cut off. For, as the evaporation-area would have then been much greater than it is at present, whilst the drainage-area would have been the same, there must have been a great excess of loss by evaporation over the water returned by rain and rivers; and this excess, producing a reduction of level, would have reduced the area of the northern shallow portion, until it contracted itself within its present limits. That this reduction was rapid. is indicated by two sets of facts;—first, the absence of any erosion of rocks between the level of the old erosion and the present level; and second, the fan-like arrangement of the *limans* and intervening *bugors* on the north-west shore, which makes it difficult to suppose that these channels can have been formed except by the furrowing of the soft soil during the sinking of the water, corresponding to that which is seen on a small scale on the muddy banks of a reservoir in which the water is being rapidly lowered by the opening of a sluice-gate.

Salinity of the Water of the Caspian.—It might have been anticipated that such a reduction in the volume of the Caspian water as must have taken place in this lowering of its level, would have shown itself (as in the Dead Sea) in an increase of its salinity; whereas the fact is that the proportion of salt in the water of the Caspian, though varying in different parts of the basin, and also at different seasons, is generally much less than the proportion in oceanic and even in Black Sea water.

In the northern portion, whose shallowness causes the enormous amount of fresh water brought down by the Volga, the Ural, and the Terek to exert the greatest diluting influence, the salinity is so slight (especially when the ordinary volume of these rivers is augmented by the melting of the snows) that the water is drinkable, its specific gravity not being higher than 1·0016. In the central and southern basins, on the other hand, which contain a body of salt water too large to be thus affected, the salinity is stated by Von Baer to be about one-third that of ordinary sea-water, the average sp. gr. being about 1·009. This reduction from what may be presumed to have been its original amount seems fully explained by Von Baer, who traces it to the number of shallow lagoons with which the basin is surrounded, every one of them being a sort of natural salt-pan for the evaporation of the water and the deposit of its saline matter in the solid form. The process may be well studied in the neighborhood of Novo Petrovsk, where what was formerly a bay is now divided into a large number of basins presenting every degree of saline concentration. One of these still occasionally receives water from the sea, and has deposited on its banks only a thin layer of salt; a second, likewise full of water, has its bottom covered by a thick crust of rose-colored crystals like a pavement of marble; a third exhibits a compact mass of salt, on which are pools of water whose surface is more than a yard below the level of the sea; and a fourth has lost all its water by evaporation, the stratum of salt left behind being now covered with sand. A similar concentration is taking place in the Karasu; for notwithstanding the proximity of the mouths of the Ural and Volga, the proportion of salt there rises to such a degree (the sp. gr. being 1·057) that animal life is almost, if not entirely, suppressed. In the Peninsula of Apsheron, again, there are ten salt lakes, from one of which 10,000 tons of salt are annually obtained.

This process of elimination goes on, however, upon its greatest scale in the Karaboghaz, whose nearly circular shallow basin, about 90 miles across, is almost entirely cut off from the Caspian by a long narrow spit of land, communicating with it by a channel which is not more than about 150 yards broad and 5 feet deep. Through this channel a current is stated by Von Baer to be continually running inwards (during the summer months, at least) at an average rate of three miles per hour; this rate being accelerated by westerly and retarded by easterly winds, but never flowing at less than a mile and a half per hour. The navigators of the Caspian, and the Turcoman nomads who wander on its shores, struck with the constant and unswerving course of this current, have supposed that its waters pass down into a subterranean abyss, through which they reach either the Persian Gulf or the Black Sea, —an hypothesis for which there is not the least foundation, and which is directly negatived by comparison of levels. The current is really due to the indraught produced by the excess of evaporation from the surface of the basin, which is exposed to every wind and to intense summer heat, and which receives very little return from streams.

The small depth of the bar seems to prevent the return of a counter-current of highly saline water, such as, in the Strait of Gibraltar, keeps down the salinity of the Mediterranean (see MEDITERRANEAN), none such having been detected by the careful investigations of Von Baer. And thus there is a progressively increasing concentration of the contents of the basin of the Karaboghaz, so that seals which used to frequent it are no longer found there, and its borders are entirely destitute of vegetation. Layers of salt are being deposited on the mud at the bottom; and the sounding-line, when scarcely out of the water, is covered with saline crystals. Taking the lowest estimates of the salinity of the Caspian water, of the width and depth of the channel, and of the speed of the current, Von Baer has shown that the Karaboghaz daily withdraws from the Caspian the enormous quantity of 350,000 tons of salt.

Now, if such an elevation of the bar were to take place as should cut off the basin of the Karaboghaz from that of the Caspian, the former would quickly diminish in extent, and the concentration of its waters would cause an increased deposit of salt to take place on its bottom. According to the proportion between the evaporation from the area so reduced and the return of fresh water by rain and streams, the Karaboghaz would either be converted into a shallow lake of extremely salt water, or into a salt marsh, or might altogether dry up and disappear, leaving behind it a thick bed of "rock-salt" resembling the deposits contained in the Saliferous strata of various geological periods. These several conditions all obtain at the present time in different parts of the great area of the steppes of Southern Russia. There are several small salt lakes which receive water enough from rain, snow, and streams to compensate for the loss they sustain by evaporation; these especially occur in the Kirghiz steppes, which lie to the north-east of Astrakhan, between the Volga and the Mongodjar Hills that form the southern extremity of the Ural range; the most notable of them being Lake Elton, which lies about 200 miles to the north of the present border of the Caspian, and from which large quantities of salt are annually procured. There are large tracts of these steppes, again, which are alternately muddy and white with salt, according as they are moistened by rain or dried up by the heat of the sun; one of these, lying between Lake Elton and the River Ural, occupies a depressed area about 79 feet below the present level of the Caspian, and more than 160 feet below that of the Black Sea. Everywhere the sand of these steppes contains an admixture of salt; and there are various local accumulations of salt, often associated with marl, having shells and fish-bones imbedded in them, and thus clearly marking the sites of lakes which survived for a time the reduction of level and recession of the northern border of the Caspian, but which are now entirely dried up.

Climate of the Caspian.—The temperature of the Caspian area is remarkable for its wide range, both geographical and seasonal,—the difference between the mean winter temperatures of its northern and southern extremities being very great, whilst over its whole extent a high summer temperature prevails. The January isotherm of 15° skirts its northern border; that of 20° crosses it at the line of division between its northern and middle basins; that of 30° crosses it between its middle and its southern portions; and that of 40° skirts its southern border. Thus between the mean winter temperatures of the northern and southern extremities of the Caspian there is a *geographical range* of 25°. These means, however, do not indicate the extremely low temperatures which prevail over the whole region of the steppes during the prevalence of north-east winds; the thermometer then sinking to −20°, or even lower, on the level areas, whilst on the elevated plateau of Ust Urt a temperature of −30° is nothing remarkable.[1] The July isotherm of 75°, again, crosses the middle basin of the Caspian, nearly coinciding with the January isotherm of 25°; and that of 80° skirts the southern border of the sea, nearly coinciding with the January isotherm of 40°; so that the *mean annual range* is 50° over the northern portion of the basin, and 40° at its southern extremity. These summer means give no truer indication than the winter means of the extremes of temperature occasionally reached; thus Major Wood saw the thermometer mark 110° in the shade on the bank of the Oxus, recalling to his recollection the intense heat of the Annesly Bay in the Abyssinian expedition.

The shallow northern basin of the Caspian is frozen during the entire winter, and the ice sometimes extends to the middle basin; the deep southern basin, on the other hand, is never frozen over.

The prevalent winds of the Caspian are the south-east, which usually blow between October and March, and the north or north-west, which are common between July and September. They sometimes continue with great violence for days together, rendering navigation dangerous, and inundating the shores, wherever these are low and flat, against which they blow. The same cause tends to disturb the general level of the water, which is raised or lowered by from 4 to 8 feet at the north or the south end of the basin, according to the direction of the wind; and when this changes suddenly, as it often does, strong currents are generated. There are no perceptible tides in the Caspian; and the changes of level occasionally observed without any wind to account for them seem attributable on the one hand to inequality between the evaporation and the return of water by rain and rivers, and on the other to differences in atmospheric pressure between one part of the area and another, such as alter the level of the Baltic (see BALTIC). It was stated by Colonel Monteith (*Royal Geographical Journal*, vol. iii.), that during his residence in that part of Asia from 1811 to 1828, the Caspian, "as well as every other lake in Persia, had sensibly decreased in depth;" but according to the information given him by the inhabitants of Enzeli, there is a rise and fall of several feet in periods of thirty years; and Von Baer, by whom the question was carefully examined, could not obtain an evidence that any continuous reduction of level is at present in progress. There is indeed reason to believe that the level of the Caspian was once much *lower* than it is at present; for at Derbend, whose foundation is assigned to Alexander, masonry has been ascertained to exist at a depth of 50 feet below the present surface level; and as it is recorded that the Khorasmians made an offer to Alexander to conduct his army to Colchis, it would seem as if the ridge at the southern end of what is now the middle basin could then have been crossed dry-shod. This does not appear very improbable, if, as ancient geographers and historians explicitly state, the Volga flowed in their time, not into the Caspian, but into the Sea of Azoff,—a condition which seems to have persisted as late as the 5th century. The channel of its lower part would then have been that of the present River Don, which at one part approaches so closely to that of the Volga, that the two are united by a canal of less than 50 miles' length.

Fauna of the Caspian.—The animal life of this inland sea presents a remarkable admixture of marine and fresh-water types. The presence of seals and herrings seems an unmistakable indication of its former communication with the ocean,—and this rather northwards with the Polar Sea than westwards through the Black Sea and Mediterranean. Again, the Caspian abounds in salmon, a fish that may be considered essentially marine, though resorting to rivers to breed. And among its most notable and valuable inhabitants are four species of *Sturionidæ*—the sturgeon, the sterlet, the sevriouga, and the beluga—which are essentially estuary fish, ascending rivers from their mouths. The fisheries are extremely valuable,—a very large amount of fish being salted for transmission to distant parts, while the Sturionidæ afford the principal supply of caviare (prepared from their roe) and of isinglass (their swim-bladders cut into strips) for the whole world. The Molluscan fauna is not by any means proportionally numerous or varied. It principally consists of those wide-spread marine forms which are able to adapt themselves to a variety of conditions, and especially to a reduction in the salinity of the waters they inhabit, which (as in the parallel case of the Baltic) tends to dwarf the races of mollusks subjected to it.

Naphtha and Petroleum Springs.—Various parts of the shore of the Caspian abound in naphtha and petroleum. This is especially the case with the Peninsula of Apsheron, and with the Island of Tchilehon or Naphthalia, which lies near the opposite coast, off the Bay of Balkan. The whole soil of Apsheron is said to be saturated with naphtha, which rises wherever a hole is bored; and round the town of Baku there are nearly a hundred bituminous springs, from many of which considerable supplies of

[1] It was here that the expedition of Peroffsky, in 1839–40, lost all but 200 of its 12,800 camels.

naphtha are drawn. Some of these are constantly burning; and one of them, termed the "burning field," was formerly a celebrated "shrine of grace" to the Ghebers or Parsees, multitudes of pilgrims resorting to it, as Mahometans do to Mecca.

Former Extent of the Caspian.—From what has been stated, there can be no reasonable doubt (1) that the area of the Caspian must have formerly been much more extensive than at present, and (2) that it must at some time have had free communication with the ocean. It was long since pointed out by Pallas that the presence of salt lakes, dry saline deposits, and sea shells of the same species as those now inhabiting the Caspian, over a very large extent of the steppes to the east, north, and west of the present basin, can only be accounted for on such an hypothesis; and he traced out what may probably be regarded as a northern shore-line, along the base of the Mongodjar hills. Further, the fauna of the Caspian corresponds so remarkably with that of the Black Sea on the one side, and with that of the Sea of Aral on the other, that it can scarcely be doubted they were formerly in free communication with one another; and the lines of this communication can be pretty certainly traced out by the peculiar lowness of the levels. Thus between the Caspian and the Black Sea, or rather the Sea of Azoff, it would have lain across the low-lying portion of the steppe, which is at present a receptacle for the drainage of the surrounding area, forming the long and shallow Lake Manytsch. And between the Caspian and the Aral Sea it probably followed both the northern and the southern borders of the Ust Urt, which would have thus formed an insulated platform. If the elevation of level were sufficiently great to raise the water in Lake Aral to the height which it had in former times (as is shown by various clearly discernible landmarks), it would have overflowed a large area to the south also; and of this again, some parts of the coast-line are traceable. A very slight further elevation would bring it into communication with the Arctic Sea.

There is much to support this view, not only in the writings of ancient geographers and in the incidental notices which have been gleaned from the records of early travel, but also in the physical relations of the three basins now forming separate seas. For if the outlet of the Bosphorus were closed, the progressive accumulation of the excess of fresh water which at present escapes from the Black Sea by that channel (see BLACK SEA), would in no long time cause an overflow into the basin of the Caspian; since, although the Black Sea proper is separated from the southern portion of the Caspian by the mountainous region of the Caucasus, yet between the Sea of Azoff and the northern portion of the Caspian there is only the low steppe inhabited by the Don Cossacks and the Kalmucks; and, according to Major Wood, an elevation of the Black Sea to no more than 23 feet above its present level would cause it to overflow into the basin of the Caspian by the line of the Manytsch. The continuance of such an overflow would in time raise the Caspian to the same level, and would thus produce (as already shown) an immense extension of its area. For although that area would be prevented by the interposition of the Ust Urt from directly spreading towards the Sea of Aral, yet a continued rise of the Caspian would enable its water to find its way along the north and south of that plateau, so as to extend itself over a large part of the Aralo-Caspian depression, including what is now the isolated Sea of Aral, and completely surrounding the Ust Urt, which would rise as an island in the midst of it. A rise of 158 feet above the sea would bring it up to the level of the Sea of Aral; and it is considered by Major Wood that a further rise of about 62 feet, making 220 feet in all, of which there is distinct evidence in horizontal water-marks, would cause this Asiatic Mediterranean to overflow its northern boundary into the watershed of the Tobol, one of the tributaries of the Obi, through which its water would be discharged into the Polar Sea. And it is a fact of no little interest, that the existence of such a communication between the Aralo-Caspian basin and the Northern Ocean was most distinctly affirmed by Strabo and other ancient geographers.

Now, as there is strong reason to suspect, from the evidence of recent volcanic change in that locality, that the opening of the Bosphorus took place within a period which, geologically speaking, was very recent, it does not seem at all improbable that this event (which some writers identify with the deluge of Deucalion) was the commencement of a series of changes, by which the "Asiatic Mediterranean" came to be divided into the three separate basins which now constitute its "survivals." Supposing, then, the level and extent of this great inland sea to have been formerly such as just described, the effect of the opening of the Bosphorus would of course be to lower its surface and to contract its area. So long as the Caspian retained its communication with the Black Sea, it would remain at the general oceanic level,—the excess of the river drainage into the western basin (including that of the Volga) supplying what was deficient in the eastern. But if, by a slight elevation of the intervening isthmus, this communication were cut off, the excess of evaporation over the Caspian area (which would have been previously separated from the Aral Sea) would have reduced its level all the more rapidly, when the Volga, which now furnishes its principle supply, was not one of its affluents; and we can thus account for that depression of its surface much below its present level, which seems to have existed in the time of Alexander. By the subsequent deflection of the lower part of the Volga from the Sea of Azoff into the basin of the Caspian, the level of the latter would have been raised again, and its area extended, until that equality came to be established between the evaporation-loss and the river-supply which obtains at the present time.

The changes produced in the eastern portion of the "Asiatic Mediterranean" by the opening of the Bosphorus would have been yet more considerable. In consequence of the greater elevation of the Aralian area, a comparatively slight reduction of level would have served to lay dry a large proportion of it, and to cut off all communication with the Caspian except by a narrow outlet; and the maintenance of the level in what thenceforth existed as an isolated basin would depend upon the relation between its evaporation and its river-supply. This supply is mainly derived from two principal rivers:—the Syr Darya (the ancient *Jaxartes*), which takes its rise in the high valleys to the east of Kokand, flows through that khanate in a westerly direction, and now, after passing Khojend, turns suddenly northwards, and then to the north-west, and finally discharges itself into the Sea of Aral near its northern extremity; and the Amou Darya (the ancient *Oxus*), which rises in the plateau of Pamir and the high valleys of the Hindu Kush—its sources being in close proximity to those of the Indus,—and then, rapidly descending into the great Turcoman Plain, at present continues onwards in a north-west direction to Khiva, after passing which it flows into the southern end of the Aral Sea. A large proportion of the water of both these rivers, however, is withdrawn from them in the latter part of their course,—partly by percolation through the sandy soil (there being no defined river-beds), and partly through the extensive irrigation by which the dwellers along their course render productive the otherwise barren land. The supply which they bring to the existing Aral Sea does not suffice to keep it up to its present level, as is proved by recent exact observation; and it is clear, therefore, that even the whole body of water they bring down could not have maintained the level of the far larger area over which it must have originally spread, and that this must consequently have been rapidly reduced. Now there is very distinct evidence, both historical and physical, that the Oxus, within a comparatively recent period, flowed westwards across the desert of Khwarezm, near the parallel of 39° N., and discharged itself into the Caspian basin through the Balkan Bay. And there is also much reason to believe that the Syr Darya also, or a considerable part of it, once flowed westwards where it now takes its northerly bend, crossed the desert of Kizzel Koom, and finding its way into the Uzboy furrow which skirts the southern border of the Ust Urt, poured its water into the Caspian. Thus the area now occupied by the Aral Sea, deprived of its two main affluents, must either have entirely dried up, or have been reduced to a salt marsh, until a change in their course filled its basin to somewhat above its present level.

Thus it would appear that the condition of the Aralo-Caspian area must have undergone very considerable alterations within the historic period; and it is maintained by Major Wood (*The Shores of Lake Aral*, 1876)—who has recently investigated the whole subject both physically and historically,—that these alterations may have taken place without any such geological disturbances as some physi-

cal geographers have supposed necessary. Some of these changes, he argues, may be fairly attributed to human agency, which can be shown to have exerted a considerable influence, not only on the amount of water carried along by the two great rivers of the Aralian area, but even, it is probable, on their course.

But the hypothesis of an Asiatic Mediterranean will not of itself account for the facts which indicate that its basin was formerly in free communication with the general oceanic area. For as the water of this great inland sea must have risen to 220 feet above its present level, to have escaped across the ridge that formed its northern boundary, into the watershed of the Obi, only an outward or overflow current could have passed that ridge, and no sea-water could have entered the basin from the outside. Hence the saltness, not only of the water of the Caspian and Aral seas, but of that of the numerous lakes still remaining in the most depressed spots formerly covered by the Asiatic Mediterranean, together with the large admixture of salt in the sand that covers what is now its dried-up bed, can only be accounted for on the supposition that this Asiatic Mediterranean was itself a "survival" of an extension of the oceanic area properly so called,—retaining not only much of its salinity, but a portion of its characteristic fauna. And this conclusion derives confirmation from the fact (ascertained by the researches of the Russian naturalist, Bogdanoff) that the polar fauna may be traced through the succession of salt lakes lying to the north of the Aral Sea, and that its proportion increases as we approach the Polar Ocean. Now it is certain that the whole of this area was submerged during the Cretaceous period,—what is now the North Atlantic Ocean having then extended (with little interruption of its continuity) from the American continent to Siberia. The general rise of the Asiatic and European part of its sea-bed, which took place at the end of the Secondary period, may not improbably have cut off the Asiatic Mediterrancan, enclosing it within the limits already pointed out, and at the same time elevating it above the general level of the sea. Under these conditions it would have for some time retained much of its original saltness; and this seems the explanation of the fact that the marine shells which are now scattered over the ancient sea-bed, and are occasionally found accumulated in masses, are much larger than the shells of the same species now inhabiting the weakly-saline Caspian. If the river-drainage into this area were more than sufficient to equalize its loss by evaporation, it may have remained without any essential alteration of its conditions, until the opening of the Bosphorus initiated a new succession of changes, which in the case of the Aral Sea appear to be still in progress. In this later succession, such alterations in the courses of the two great rivers of the Aralian area as are distinctly indicated by historical as well as physical evidence must have exerted a very important influence; and a due appreciation of the results of these alterations seems (as already shown) to afford the clue to the differences in the accounts that have been given of the Aral Sea within the historic period.

Bibliography.—In addition to the writings of Professor Von Baer and Major Wood, of which special mention has already been made, the student of the physical geography of the Aralo-Caspian area should refer to the discussion between Sir Roderick Murchison and Sir Henry Rawlinson in the *Journal of the R. Geog. Soc.* for 1867; the paper of Professor Eichwald in the same journal; the *Aralseefrage* of Roesler (Vienna, 1873); and the learned *Das alte Bett des Oxus* of Professor Gocje (Leyden, 1875). (W. B. C.)

CASS, Lewis (1782–1866), an American general and statesman, was born at Exeter, New Hampshire, in the United States, on the 9th October, 1782. He began life as a law-student, and was called to the bar at the age of twenty. Four years later he became a member of the Ohio legislature. During the war with England (1812–1814) he served in the army, and rose to the rank of general. In 1813 he was appointed governor of Michigan,—a position which gave him the chief control of Indian affairs, for the territory was then occupied almost entirely by natives, there being only 6000 white settlers. This post he held for eighteen years, during which he obtained large tracts of territory from the Indians, instituted surveys, constructed roads, and explored the lakes and sources of the Mississippi. (For an account of these explorations see *North American Review*, l., lv.) About this time also he amassed the greater part of his large fortune by judicious purchase of land. In 1831 he became secretary of war under General Jackson, and he fulfilled the duties of this office during the first two years of the Florida war. Five years later he was appointed minister plenipotentiary to France, where he became acquainted with Louis Philippe, to whom he gives the highest praise in his *France: its King, Court, and Government* (1840). The cause of his resigning this appointment was that he disapproved of the concessions granted to England in the treaty concluded with Lord Ashburton by Daniel Webster, the American secretary of state, for the purpose of settling the dispute between England and the United States with regard to the north-eastern frontiers of the latter country. General Cass was nominated as Democratic candidate for the presidency in 1848, but was defeated by General Taylor. The last public office which he held was that of secretary of state under Buchanan; and, in the end of 1860, he retired into private life, upon the refusal of the president to send reinforcements to Fort Sumter. He died on the 17th June, 1866. The chief points of the policy of General Cass were his advocacy of views acceptable to the Southern States, his consequent attack upon the quintuple treaty, which aimed at the suppression of the slave-trade, his support of the annexation of Texas, and his support of the cause of national unity, notwithstanding his expressed opinion that the Union had no right to coerce the separate States. As an author, General Cass is known by the writings already mentioned, and by his history of the Indians of the United States, which appeared in 1823. Accounts of his life have been published by H. R. Schoolcraft (1848), W. T. Young (1852), and W. L. G. Smith (1856).

CASSABA, or Casaba, a town of Asia Minor, in the Sanjak of Manisa, 63 miles east of Smyrna, with which it is connected by rail. An abundant supply of water is conveyed to the town from a distance of two or three miles by an ancient aqueduct of very solid construction, which passes about 40 feet below the level of the soil, and is ventilated by air-shafts every 200 yards. Fountains are consequently numerous, and a stream of water flows down the middle of many of the streets; but the lack of underground sewers keeps the channels in a very filthy condition. There is a large bazaar, and a very flourishing trade is carried on in the produce of the surrounding district. Cotton is the most important article, and there are four ginning factories in the town; the silk-worm is largely raised and exported; and the "melons of Cassaba" are sent not only to Smyrna but to Constantinople. The influence of the connection with Smyrna is shown by the comparative neglect of several Eastern customs and the very general use of the Greek language. Though no identification has been attempted, the town probably occupies the site of some ancient city; it is only 21 miles distant from the ruins of Sardis. Its population is estimated at 15,000, of whom about 10,000 are Turks and the rest Greeks and Armenians. In 1865 a large number of houses were destroyed by fire, and the inhabitants were decimated by cholera.

CASSANA, Niccolò (1659–1714), often called Nicoletto, an Italian painter, was born at Venice, and became a disciple of his father, Giovanni Francesco Cassana, a Genoese, who had been taught the art of painting by Bernardino Strozzi ("il Prete Genovese"). Having painted portraits of the Florentine court, and also of some of the English nobility, Nicoletto was invited to England, and introduced to Queen Anne, who sat to him for her likeness, and conferred on him many marks of favor. He died in London in 1714, having given way to drinking in his later years. Cassana was a man of the most vehement temper, and would wallow on the ground if provoked with his work. One of his principal paintings is the Conspiracy of Catiline, now in Florence.

CASSANDER (*c.* 354–297 B.C.), king of Macedonia, was probably born about 354 B.C. He first appears in history at the court of Alexander, defending his father Antipater against the accusations of his enemies. Whether it be true or not that he brought himself into disfavor by manifesting his contempt for the Eastern customs with which the king had surrounded himself, it is certain that he conceived a great hatred for Alexander, a hatred so well known that he was accused of having caused the king's death by poison. When his father became regent of Macedonia, Cassander was made chiliarch; but, when Poly-

sperchon succeeded Antipater, he was not content with this position, but allied himself with Ptolemy Soter and Antigonus, and declared war against the regent. His success was such as to win over most of the Greek States; and he also effected an alliance with Eurydice, the ambitious wife of King Arrhidæus. Both she and her husband, however, together with Cassander's brother Nicanor, and a number of others, were soon after slain by Queen Olympias. Cassander at once marched against Olympias, and, having forced her to surrender in Pydna, put her to death. Not long afterwards he also murdered Roxana and Alexander, the wife and son of Alexander the Great. He had already connected himself with the royal family by marriage with Thessalonica, Alexander's half-sister, and, having formed an alliance with Seleucus, Ptolemy, and Lysimachus, and defeated Antigonus and Demetrius near Ipsus, in 301, Cassander became undisputed sovereign of Macedonia and nominal king of Greece. He died some three years after, in 297 B.C. For the history of his campaigns (which is given in Diodorus, xviii.–xxi.) see MACEDONIA. Cassander is said to have been a man of cultivated literary taste, and we are told that his delight in Homer was such that he could repeat from memory every line of his poems.

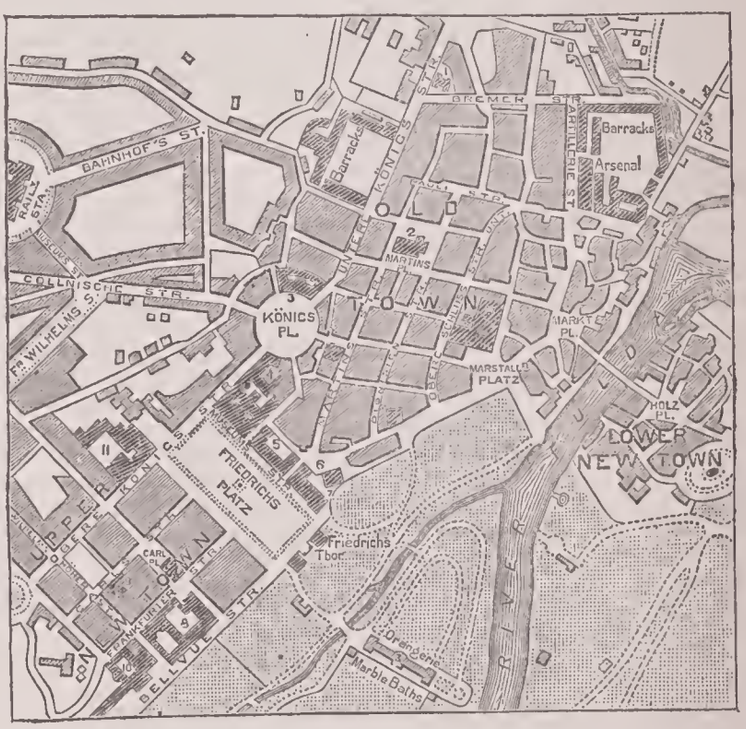
CASSANDER, GEORGE (1515–1566), a Flemish theologian, was born at Cadzand (whence his name), a village in Zeeland. He was for some time professor of classics and theology at Bruges and Ghent; but most of his life was spent in the endeavor to effect a reunion of the Roman Catholic and Protestant churches. In 1561 he published *De Officio Pii Viri in hoc Dissidio Religionis*, in which he argues that no one has a right, on account of a few abuses, utterly to subvert the church; but, on the other hand, he expresses his disagreement with those who regard the Pope as a deity. His standard is Scripture, explained by the tradition of the fathers, especial deference being paid to those who lived before Gregory I. Four years later, in 1565, he published his famous *Consultatio de Articulis Fidei inter Papistas et Protestantes controversis*, in which he strives to put a Catholic interpretation into each of the articles of the Confession of Augsburg. Both these books were fiercely attacked by Calvin; and they were also both condemned by the Council of Trent. Cassander's complete works were published at Paris in 1616.

CASSANDRA, in Grecian story, daughter of Priam and Hecuba, was beloved of Apollo, who promised to bestow on her the spirit of prophecy if she would comply with his desires. Cassandra accepted the proposal; but no sooner had she obtained the gift than she laughed at the tempter, and refused to fulfil her promise. Apollo revenged himself by ordaining that her predictions should be discredited; and hence it was in vain that she prophesied the ruin of Troy. On the capture of that city she was ravished by Ajax, the son of Oïleus, in the Temple of Minerva. In the distribution of the booty, Cassandra fell to the lot of Agamemnon, who loved her deeply; but again her foresight was useless, for he would not believe her prediction that he should perish in his own country. The prophecy was fulfilled, for both were slain through the intrigues of Clytemnestra.

CASSANO, a town and bishop's seat of Italy, in the province of Calabria Citra, seven miles E.S.E. of Castrovillari. It stands in a concave recess of a steep mountain, around an isolated rock, on which are the ruins of a grand feudal castle. It has hot sulphurous baths, of great local reputation, and is surrounded by beautiful scenery. Macaroni, stamped leather, table linens, and cotton and silk stuffs are manufactured; and corn, fruits, and oil are raised in the vicinity. Cassano is usually identified with the *Castellum Carissanum* of Pliny, and *Cosa in Agro Thurino* of Cæsar; and one of the towers of its castle is still known as *Torre di Milo* or Milo's Tower, in memory of the death of Cicero's famous client. Population, 9035.

CASSAVA is the name given to the farinaceous root stocks of two species of Euphorbiaceous plants, the Bitter Cassava, *Manihot utilissima*, and the Sweet Cassava, *M. Aipi*, both highly important sources of food starches. The plants are natives of South America, but the Bitter Cassava, which is the most important of the two in an economic sense, has been introduced into most tropical regions, and is extensively cultivated in the East Indian Archipelago, from which, as well as from Brazil and other South American states, its starch in the form of tapioca is a staple article of export. The Bitter Cassava root is fusiform, sometimes attaining a length of 3 feet and a weight of about 30 lbs. Its sap contains hydrocyanic acid, and being therefore highly poisonous, the root cannot be eaten in a fresh condition; while on the other hand the Sweet Cassava is perfectly innocuous, and is employed as a table vegetable. Exposure to heat dissipates the poisonous principle, and the concentrated juice is in that state used as the basis of Cassareep and other sauces. From the Bitter Cassava roots many different food preparations are made in Brazil. The roots are preserved for use by being simply cleaned, sliced, and dried; from such dried slices manioc or cassava meal used for cassava cakes, &c., is prepared by rasping. The starch also is separated and used for food under the name of Brazilian arrowroot; and this, when agglomerated into pellets on hot plates, forms the tapioca of commerce. Cassava starch has a stellate hilum, which readily distinguishes it under the microscope from other starches. Its microscopic appearance is figured under ARROWROOT, vol. ii. p. 552, fig. 6.

CASSEL, or KASSEL, the capital of the former electorate of Hesse Cassel, in Western Germany, and, since its annexation by Prussia in 1866, the capital of the province of Hesse Nassau, is pleasantly situated on both sides of the River Fulda, over which a stone bridge leads to the lower new town. The river is navigable, and railways connect the town with all parts of Germany. The streets of the old town are narrow and crooked, but those of the upper and lower new town, and the three suburbs, are not surpassed by any in Germany. The principal streets are the Königsstrasse (5100 feet long and 60 broad), the Bellevue-Strasse, and the Friedrich Wilhelm Strasse (180 feet broad with four rows of linden trees). The Friedrich's Platz is the largest square in Germany, being 1000 by 450 feet. It contains a marble statue of Landgrave Frederick II., and commands a fine view from the open side. The former residence of the electors fronts this square, as well as the Museum, considered the finest building in the town. This museum contains various valuable collections of curiosities, interesting mosaics, a library of 100,000 volumes and valuable manuscripts. In the cabinet of curiosities there is a complete collection of clocks and watches (including the so-called Egg of Nuremberg), from the earliest



Plan of Cassel.

1. Synagogue.
2. St. Martin's Church.
3. Post-Office.
4. Palace.
5. Museum.
6. Military School.
7. Catholic Church.
8. Bellevue Castle.
9. Town Hall.
10. Picture Gallery.
11. Theatre.

to the present time. Among other public places and buildings worthy of notice are the Roman Catholic church, with a splendid interior; the Military School; the Königs Platz, with a remarkable echo; the Karl's Platz, with the statue of Landgrave Charles; the Martin's Platz, with a large church containing the burial-vaults of the Hessian princes.

The Gallery of Paintings in the Bellevue Castle has attracted of late many visitors to Cassel, as it contains numerous *chefs d'œuvre*, the most of which, before 1866, were not accessible to the public. Among these are fine specimens of Holbein, Cranach, Dürer, Rembrandt, Vandyck, Rubens, Mabuse, Teniers, Metzu, Wouvermann, P. Potter, Ruysdael, Titian, Guido Reni, C. Dolce, the Caraccis, Veronese, Murillo, and many other eminent painters. The town contains numerous educational institutions, including a polytechnic school, an academy of the fine arts, a lyceum, and a military academy. The descendants of the French refugees who founded the upper new town have a church of their own and a hospital, and the Jews, a very handsome synagogue. Music is much cultivated and there is a good opera with a first-rate orchestra, of which Louis Spohr was at one time conductor. The opera house or theatre was built by Jerome Napoleon. Trade has very much increased of late, and among the manufactures are steam engines and locomotives, articles in silver and gold, philosophical instruments, tobacco, sugar, cotton and linen cloths, hats, leather, carriages, porcelain, soap, and chemicals. There are also several breweries; and two fairs are held annually. The celebrated chemists Bunsen and Kolbe are natives of Cassel. In the vicinity of the town are the Orangerie Château, and the Auegarten, a favorite promenade, with a marble bath.

On a slope of the Habichtswald Mountains, three miles from Cassel, and approached by an avenue, is the famous summer palace (with park and forest) of Wilhelmshöhe, sometimes called the Versailles of Germany. Napoleon III. resided here after the battle of Sedan. The surrounding gardens are beautifully adorned with fountains, cascades, lakes, and grottoes, the principal fountain sending up a jet of water 180 feet high and 12 feet in diameter. Here also is an interesting building called the Loewenburg, erected a century ago in the style of a fortified castle, and containing among other things portraits of the Tudors and Stuarts. The principal curiosity is the Karlsburg cascade, which is placed in a sort of broad ravine, thickly wooded on both sides. A staircase of 900 steps leads to the top. On one of the landings is a huge rudely-carved stone figure of the giant Enceladus, and at the top is an octagon building called the Riesenschloss, surmounted by a colossal copper figure of the Farnese Hercules, 31 feet high, whose club alone is sufficiently capacious to accommodate from eight to ten persons. In different parts of the park, and especially from the Octagon, charming views are obtained. The park was first formed by Landgrave Frederick II. (whose consort was Mary, daughter of George II. of England), and was finished by his successor, after whom it was named, and who is said to have employed 2000 workmen for fourteen years in its construction.

Perhaps the earliest mention of Cassel occurs in a document of the year 913, when the name appears in the form of Chassala. The town was fortified by the Landgrave Philip the Magnanimous in the 16th century; and in 1687 it was augmented by the formation of the Upper New Town by the Landgrave Charles. In 1762 it was captured by Frederick of Brunswick, after an obstinate siege, during which it had been defended by the French under Diesbach; and not long after its fortifications were dismantled. In 1807 it became the capital of the kingdom of Westphalia; in 1813 it was bombarded and captured by the Russian general Chemicheff; in 1830, 1831, and 1848 it was the scene of violent commotions; from 1850 to 1851 it was occupied by the Prussians, the Bavarians, and the Austrians; and in 1866 it passed definitively into the possession of Prussia. Of late it has become a very thriving town, and is now a very favorite residence for strangers. Population (1875), 50,000.

CASSEL, a town of France, in the department of Nord, and arrondissement of Hazebrouck, is situated 28 miles N.W. of Lille, on an isolated hill, 800 feet high, which commands a most extensive view in all directions. Portions of the three kingdoms of France, Belgium, and England can be seen, with 32 towns and 100 villages, including St. Omer, Dunkirk, Ypres, and Ostend. The public buildings comprise a castle, a communal college, and a museum; and the ancient mansion known as La Noble Cour de Cassel is classed among the historic monuments of France. The manufactures of the town are lace, thread, stockings, pottery, leather, and oil; and it also trades in cattle. It is supposed to occupy the site of the *Castellum Morinorum*, and was certainly a Roman station, as the numerous remains of the Gallo-Roman period sufficiently attest. It is frequently mentioned in the wars of the Middle Ages, and was the scene of important battles in 1071, 1328, and 1677. In 1771 General Vandamme was born in the town. Population in 1872, 3250.

CASSIA BARK is the aromatic bark derived from various species of *Cinnamomum* other than *C. zeylanicum*, which is the source of the true cinnamon of commerce. The greater part of the supply coming from China, it is sometimes termed Chinese cinnamon. The tree or trees which yield the Chinese supplies are very extensively cultivated throughout the southern provinces of that empire, and grow with little call for attention in situations unsuited for other forms of cultivation. From various species of *Cinnamomum*, cassia is also obtained in Northern India and Nepal, in Java, Borneo, Sumatra, and the Philippine Islands. The bark is imported into England in bundles, which are from 1 foot to 18 inches in length, and weigh about 1 lb. The bundles consist of quills of bark from half an inch to an inch in diameter, generally single, rarely double. The bark is much thicker than that of true cinnamon; the taste is more pungent and the flavor less delicate, though somewhat similar to that of cinnamon. A large quantity of thick, woody bark, of inferior quality, is now imported under the name *Cassia vera*, or Wild Cassia. The properties of cassia bark depend on the presence of a volatile oil—the oil of cassia, which is imported in a pretty pure state as an article of commerce from Canton. Cassia bark is in much more extensive demand on the Continent of Europe than in Great Britain, being preferred to cinnamon by Southern nations. Both oil and bark are useful in medicine; but their chief use is for flavoring liqueurs and chocolate, and in cooking generally. When ground as a spice it is difficult to distinguish cassia from cinnamon, and it is a common practice to substitute the cheap common spice for the more valuable article. The adulteration may be detected by the behavior of a decoction in presence of iodine, which, in the case of cinnamon, produces little effect, but with cassia strikes a deep blue color. *Cassia Buds*, which have a pleasing cinnamon flavor, are the immature fruits of the tree or trees which yield Chinese cassia. They are brought in considerable quantities from Canton, and used as a spice and in confectionery. Some confusion occasionally arises from the fact that *Cassia* is the generic name of an extensive genus of leguminous plants, which, in addition to various other medicinal products, is the source of the senna leaves which form a most important article of materia medica.

CASSIANUS, Joannes Eremita, or Joannes Massiliensis, a celebrated recluse, and one of the first founders of monastic institutions in Western Europe, was probably born about 360, and is supposed to have died about the year 448. The place of his nativity has been much disputed, but he spent the early part of his life in the monastery of Bethlehem, with his friend Germanus. In company with that monk he visited Egypt, and dwelt for several years among the ascetics of the desert near the banks of the Nile. In 403 he repaired to Constantinople, where he received ordination as deacon from the hands of Chrysostom. At Marseilles he founded two religious societies—a convent for nuns, and the abbey of St. Victor, which during his time is said to have contained 5000 inmates. In later times his regulations enjoyed a high reputation, and were adopted by the monks and nuns of Port Royal. He was eventually canonized; and a festival in his honor long continued to be celebrated at Marseilles on the 25th of July. Cassianus was one of the first and most prominent of the Semi-Pelagians, a sect who rejected the Augustinian positions that man, since the fall of Adam, is by nature wholly worthless and incapable of even right desire, and that everything holy in him is the Divine gift, bestowed without reference to any merit, or even wish, on his part; but did not assert, with Pelagius, that man is born perfectly pure, and that the exercise of his free-will is sufficient to secure salvation. Cassianus maintained that while

man is by nature sinful, he yet has some good remaining in him, and that, while the immediate gift of God's grace is necessary to salvation, conversion may also be commenced by the exercise of man's will. He further asserted that God is always willing to bestow his grace on all who seek it, though, at the same time, it is true that he sometimes bestows it without its being sought. These views have been held by a very large part of the church from his time, and embrace much of the essence of Arminianism. The style of Cassianus is careless and even slovenly, and displays no marks of literary polish, but its direct simplicity is far superior to the rhetorical conceits and affectations which disfigure most of the writings of that age. He has left *Collationes Patrum*, or conferences of the fathers of the desert; *De Institutione Cœnobiorum*, in twelve books, of which the first part gives an account of the Eastern monasteries, and the second contains discourses on the eight worst sins; and seven books upon the *Incarnation*, in confutation of the Nestorian heresy. The first edition of his collected works is that of Basel, 1559; the best are those of Frankfort, 1722, and of Leipsic, 1733, which contain commentaries by Gazet.

See G. F. Wiggers, *De Joanne Cassiano Massiliensi*, Rostock, 1824, 1825; and Geffken, *Historia Semipelagianismi*, Göttingen, 1826.

CASSINI, the name of a family of distinguished astronomers, who succeeded one another as directors of the Observatory at Paris for four generations.

Giovanni Domenico Cassini, the first and most famous, was born at Perinaldo, near Nice, on 8th June, 1625, and died on 14th September, 1712. He was educated by the Jesuits of Genoa, among whom he gained some reputation as a writer of Latin verse. His study of astronomy was introduced by a fancy for astrology; but, notwithstanding the success of several of his predictions, he became convinced of the baseless character of the art, and thenceforth gave himself entirely to the pursuit of the science, in which, at the age of twenty-five, he had made so much progress that he was appointed professor of astronomy in the University of Bologna. Here he made the observations on the comet of 1652 which formed the subject of his first book; in this he denied that comets are free from subjection to law, and explained them as the result of a mixture of exhalations from the earth and from the stars. About this time he gave a good deal of attention to experiments on the transfusion of blood, and on the habits and structure of insects. Five years later he had an opportunity of displaying his ability, as a man of business, on the occasion of a dispute between Bologna and Ferrara caused by the inundations of the Po; and his success was such that he was asked to continue to act as the representative of the Bolognese. He was also, soon after, appointed to take charge of the repairing of Fort Urban; and already he had gained the patronage of the Pope, Alexander VII. Clement IX., too, valued him so highly that it was only on condition that he should return to Italy after two or three years that he would consent to his accepting Colbert's offer of the directorship of the Observatory at Paris. Cassini, however, became attached to his new situation, was naturalized, and married a French lady. On 14th September, 1671, he commenced his observations; and his discoveries soon made him the best known astronomer in Europe, and gained him a reputation of an extravagant character. See Astronomy, vol. ii.

Jacques Cassini (1677–1756), was the son of Domenico Cassini. After his father's death he became director of the Observatory at Paris, and was also appointed to the post of *maître des comptes*. His work, like his father's, was purely that of an observer, and he does not appear to have had any adequate knowledge of the state of philosophic thought in his own science. Though he had some personal acquaintance with Newton he does not seem to have understood his theories, and he was quite ignorant of the discoveries of nutation and the aberration of light. Nevertheless, largely on account of his father's fame, he enjoyed a high reputation throughout Europe.

César Francois Cassini, or Cassini de Thury (1714–1784), was son of the preceding, whom he succeeded in both his appointments. Like his father and grandfather, he was a patient and accurate observer, but such work by itself no longer brought renown. He published *Elémens d'Astronomie* (1740); but his most important work was his topographical map of France, which was completed by his son.

Jacques Dominique Cassini, Count de Thury (1748–1845), son of the preceding, completed the line of Cassinis, who for a hundred and twenty-two years filled the post of director of the Observatory at Paris. He appears to have held more philosophical views than his predecessors; but his plans to improve the Observatory, by obtaining larger instruments, and by other means, were cut short in 1793. In that year the National Assembly decreed that three of his pupils should be united with him in his office, an arrangement to which he refused to submit. Next year he was in consequence imprisoned for seven months; and after this he abandoned astronomy, and spent the rest of his life in retirement. The chief events of his life as an astronomer were the voyage which he undertook to test the chronometers of Le Roy (1769), and his association with Mechain and Legendre in the work of connecting the observatories of Paris and Greenwich by means of a chain of triangles (1779).

CASSIODORUS, Magnus Aurelius, a Roman historian, statesman, and monk, was born at Scylaceum (Squillace), about 468. According to his own statement, he began public life under Odoacer as head of financial affairs, with the title of *Comes sacrarum largitionum*. By Theodoric he was raised to the highest offices; and, while the Ostro-Gothic power lasted, notwithstanding the intrigues which surrounded the throne, he continued (with the exception of a short period of retirement at the tyrannous close of the reign of Theodoric), to regulate the affairs of the Western empire, and to support it by alliances with the Eastern. After the triumph of Belisarius, he retired, at seventy years of age, to the monastery of Viviers, which he had founded in his native province of Bruttium, where he spent about thirty years of far more importance to the world than the fifty during which he held the highest political authority. He deserves to be reckoned as one of the first and most influential of those who set the monks to literary work, and thus preserved the continuity of ancient and modern learning. He has also left a number of books, as the *De Artibus ac Disciplinis Liberalium Literarum*, the *De Institutione Divinarum Literarum*, and the *De Arte Grammatica*, which were much valued and used in the Middle Ages. But the work which is most valuable to us is his *Variarum Epistolarum Libri XII.*, which contains the decrees of Theodoric, and of his successors, Amalasontha, Athalaric, Theodatus, and Vitiges, and is the best source of our knowledge of the Ostro-Gothic empire in Italy. The writings of Cassiodorus evince great erudition, ingenuity, and labor, but are disfigured by incorrectness and an affected artificiality, and his Latin partakes much of the corruptions of the age. His complete works were published by Garet, with an account of his life, at Rouen, 1679, and Venice, 1729. See also Sainte Marthe's *Vie de Cassiodore* (Paris, 1694), and De Buat's account in the *Transactions of the Royal Academy of Munich*, vol. i.

CASSIS, a small seaport-town of France, in the department of Bouches-du-Rhône, stands in a narrow valley on the Mediterranean, 10 miles south-east of Marseilles. Its harbor is small, but it has some building yards, and a considerable trade in fruits and muscatel wine. The lighthouse is situated in 42° 12′ 50″ N. lat. and 5° 31′ 54″ E. long. The town is supposed by D'Anville to occupy the site of the Roman *Carsicis Portus*. It was destroyed by the Lombards in 573, but rebuilt in its present situation in the 13th century. The Abbé Barthélemy was born here in 1716. Population in 1872, 2976.

CASSIUS LONGINUS, Caius, is best known in history as one of the leaders in the assassination of Julius Cæsar. Little is known of his early life. In 53 B.C. he served in the Parthian campaign under Crassus, and displayed great courage and skill. He succeeded in bringing off a division of the army after the defeat of Carrhæ, and in the following year, 52 B.C., the government of the province having fallen into his hands, he was able, by cautious and skilful dispositions, to drive back the Parthians. In 61 B.C. he was compelled to retreat before a large force of the Parthians under Osaces and Pacorus, but managed to throw himself into Antioch, a strongly fortified town, which the invaders found impregnable. They were compelled to retreat, and Cassius, pursuing them rapidly, gained a complete victory. He returned to Rome soon after, with a large fortune, and in 49 B.C. became tribune of the plebs.

He at first united his fortunes with those of Pompey, but after Pharsalia he surrendered to Cæsar, and was treated by him with great generosity. He was made one of the legates, and in 44 B.C. became prætor peregrinus with the promise of the Syrian province for the ensuing year. He does not seem, however, to have been at all conciliated by these favors. He was one of the busiest of the conspirators against his benefactor, and took an active part in the assassination on the Ides of March. Brutus and Cassius soon afterwards left Italy, and gathered together their forces in Macedonia and Syria. They succeeded in overcoming the slight opposition that was offered them in the provinces, and after taking Rhodes, united at Sardis to make a stand against the second triumvirate. They took up their position at Philippi, where they were attacked by Antony and Octavianus. The division under Cassius was defeated, and Cassius himself, thinking all was lost, commanded his freedman to slay him. He was buried at Thasos.

CASSOWARY (*Casuarius*), a genus of Struthious Birds, only inferior in size to the ostrich, and, according to Professor Owen, approximating more closely than any other living birds to the extinct moas of New Zealand. Not many years ago only a single species of cassowary was known, but recent researches among the Australasian islands have led to the identification of at least four other species. They are all characterized by short rudimentary wings, consisting of four or five barbless shafts, a few inches long, and apparently useless for purposes of flight, of running, or of defence; and by loosely webbed feathers, short on the neck, but of great length on the rump and back, whence they descend over the body, forming a thick hair-like covering. They possess stout limbs, with which they kick in front, and have the inner toe armed with a long powerful claw. The Galeated Cassowary (*Casuarius galeatus*) stands 5 feet high, and has a horny, helmet-like protuberance on the crown of its head; the front of the neck is naked and provided with two brightly-colored wattles; the tail is not apparent. It is a native of the Island of Ceram, where it is said to live in pairs, feeding on fruits and herbs, and occasionally on small animals. The Mooruk, or Bennett's Cassowary (*Casuarius Bennettii*), is a shorter and more robust bird, approaching in the thickness of its legs to the moas. It differs further from the preceding species in having its head crowned with a horny plate instead of a helmet. It has hitherto only been found in New Britain, where the natives are said to regard it with some degree of veneration. When captured by them shortly after being hatched, and reared by the hand, it soon becomes tame and familiar; all the specimens which have reached Europe alive have been thus domesticated by the natives. The adult bird in the wild state is exceedingly shy and difficult of approach, and, owing to its great fleetness and strength, is rarely if ever caught. It eats voraciously, and, like the ostrich, will swallow whatever comes in its way. It has the curious habit, says Bennett (*Gatherings of a Naturalist in Australasia*), "of squatting down on its tarsi like a dog."

CASTAGNO, Andrea del (1390–1457), a painter of the Florentine School, was born in 1390, probably at Castagno, in the district of Mugello, and died in August, 1457. He imitated Masaccio and the naturalists of his time in boldness of attitude, but was deficient in grace and coloring. His name has for about four centuries been burdened with the heinous charge of murder; it was said that he treacherously assassinated his colleague, Domenico Veneziano, in order to monopolize the then recent secret of oil painting as practised in Flanders by the Van Eycks. This charge is now at last a proved untruth; Domenico died four years after Andrea. The latter is commonly called "Andrea (or Andreino) degl' Impiccati" (of the Hanged Men); this was in consequence of his being commissioned in 1435 to paint, in the Palazzo del Podestà in Florence, the fallen leaders of the Peruzzi and Albizzi—not (as currently said) the men of the Pazzi conspiracy, an event which did not occur until 1478, long after this painter's death. One of his principal works now extant (most of them have perished) is the equestrian figure of Nicola di Tolentino, in the cathedral of Florence.

CASTALIA, or Fons Castalius, a celebrated fountain in Greece, now called the Fountain of St. John, which rises at the foot of Mount Parnassus, in the neighborhood of Delphi. It was sacred to Apollo and the Muses, and its water was used in the religious purifications of the "Pythian Pilgrims." From its connection with the Muses it is frequently referred to both by classical and by modern poets as a source of inspiration. For further details see Delphi.

CASTANOS, Don Francisco Xavier de (*c.* 1756–1852), duke of Baylen, a Spanish general, who served in the Peninsular War, was born at Madrid. The exact year of his birth is not known, but it was probably about 1756. He was the son of a military officer; at the age of twelve he had received a commission as captain; and, while still very young, he was sent to study the art of war at the court of Frederick the Great. His first success was at Baylen, where, on the 22d of July, 1808, 18,000 French under Dupont surrendered to him. It is, however, said that the chief credit in this engagement is due to the Swiss, Aloys Reding. In November of the same year, Castanos was defeated at Tudela; and during the rest of the war he occupied subordinate positions. He, however, distinguished himself at Vitoria, and was placed at the head of the army which was sent to assist the Allies in 1815; and till his death, which took place on the 24th September, 1852, he held a high political position, being senator and guardian to Queen Isabella.

CASTE. There are not many forms of social organization on a large scale to which the name Caste has not been applied in a good or in a bad sense. Its Portuguese origin simply suggests the idea of family; but before the word came to be extensively used in modern European languages, it had been for some time identified with the Brahmanic division of Hindu society into classes. The corresponding Hindu word is *varna*, or color, and the words *gati*, *kula*, *gotra*, *pravara*, and *karana* are also used with different shades of meaning. Wherever, therefore, a writer has seen something which reminds him of any part of the extremely indeterminate notion, Indian caste, he has used the word, without regard to any particular age, race, locality, or set of social institutions. Thus Palgrave[1] maintains that the colleges of operatives, which inscriptions prove to have existed in Britain during the Roman period, were practically castes, because by the Theodosian code the son was compelled to follow the father's employment, and marriage into a family involved adoption of the family employment. But these *collegia opificum* seem to be just the forerunners of the voluntary associations for the regulation of industry and trade, the Frith-gilds, and Craft-gilds of later times, in which, no doubt, sons had great advantages as apprentices, but which admitted qualified strangers, and for which intermarriage was a matter of social feeling. The history of the formation of guilds shows, in fact, that they were really protests against the authoritative regulation of life from without and above. In the Saxon period, at any rate, there was nothing resembling caste in the strict sense. "The ceorl who had thriven so well as to have five hides of land rose to the rank of a thegn; his wergild became 1200 shillings; the value of his oath and the penalty of trespass against him increased in proportion; his descendants in the third generation became gesithcund. Nor was the character of the thriving defined; it might, so far as the terms of the custom went, be either purchase, or inheritance, or the receipt of royal bounty. The successful merchant might also thrive to thegn-right. The thegn himself might also rise to the rank, the estimation, and status of an earl."[2] It has been said that early German history is, as regards this matter, in contrast with English, and that true castes are to be found in the military associations (*Genossenschaften*) which arose from the older class of Dienstmannen, and in which every member—page, squire, or knight—must prove his knightly descent; the Bauernstand, or rural non-military population; the Bürgerstand, or merchant-class. The ministry of the Roman Catholic Church was, however, never restricted by blood relation. There is no doubt that at some time or other professions were in most countries hereditary. Thus Prescott[3] tells us that in Peru, notwithstanding the general rule that every man should make himself acquainted with the various arts, "there were certain individuals carefully trained to those occupations which minister to the wants of the more opulent classes. These occupations, like every other calling and office in Peru, always descended from

[1] *History of Rise and Progress of the English Constitution*, i. 362.
[2] Stubb's *Constitutional History of England*, i. p. 162.
[3] *History of Peru*, i. 143.

father to son. The division of castes was in this particular as precise as that which existed in Hindustan or Egypt." Again, Zurita[1] says that in Mexico no one could carry on trade except by right of inheritance, or by public permission. The Fiji carpenters form a separate caste, and in the Tonga Islands all the trades, except tattoo-markers, barbers, and club-carvers, are hereditary,—the separate classes being named matabooles, mooas, and tooas. Nothing is more natural than that a father should teach his son his handicraft, especially if there be no organized system of public instruction; it gives the father help at a cheap rate, it is the easiest introduction to life for the son, and the custom or reputation of the father as a craftsman is often the most important legacy he has to leave. The value of transmitted skill in the simple crafts was very great; and what was once universal in communities still survives in outlying portions of communities which have not been brought within the general market of exchange. But so long as this process remains natural, there can be no question of caste, which implies that the adoption of a new profession is not merely unusual, but wrong and punishable. Then, the word caste has been applied to sacred corporations. A family or a tribe is consecrated to the service of a particular altar, or all the altars of a particular god. Or a semi-sacred class, such as the Brehons or the Bards, is formed, and these, and perhaps some specially dignified professions, become hereditary, the others remaining free. Thus in Peru, the priests of the Sun at Cuzco transmitted their office to their sons; so did the Quipu-camayoc, or public registrars, and the *amantas* and *haravecs*, the learned men and singers. Benjamin Constant[2] has ventured on the ambitious generalization that in the South, as in Judæa and Mexico, such corporations were hereditary, but that in the North and West they were in general elective.[3] In many countries political considerations, or distinctions of race, have prevented intermarriage between classes. Take, for example, the patricians and the plebeians at Rome, or the Σπαρτιᾶται, Λάκωνες, or περίοικοι, and the Εἵλωτες at Sparta. In Guatemala it was the law that if any noble married a plebeian woman he should be degraded to the caste of *mazequal*, or plebeian, and be subject to the duties and services imposed on that class, and that the bulk of his estate should be sequestered to the king.[4] In Malagasy marriage is strictly forbidden between the four classes of Nobles, Hovas, Zarahovas, and Andevos,—the lowest of whom, however, are apparently mere slaves. All nations have at one time opposed themselves to marriage with foreigners, known chiefly as enemies; and all nations have oppressed, industrially and politically, the races whom they have conquered. In one sense slavery might be called the lowest of castes, because in most of its actual forms it does permit some small customary rights to the slave. In another sense, the marriage of the queen's daughter with a commoner might be described as an infraction of caste rule.

Besides the forms of caste we have mentioned, there are many isolated communities which resemble one another in the fact that their members constantly intermarry, and which generally devote themselves to some one particular trade or industry. This "endogamy" seems to be characteristic of early social arrangements, and therefore the existing specimens of endogamous societies in Europe and Asia do not exhibit any high form of civilization. Among others may be mentioned the descendants of the "Bounty" mutineers, who still occupy Pitcairn Island;[5] a community of Javans, near Surabaya, on the Tengger Hills, numbering about 1200 persons, distributed in about forty villages, and still following the ancient Hindu religion;[6] the inhabitants of various fishing villages in Great Britain, such as Itchinferry, near Southampton, Portland Island, Bentham in Yorkshire, Mousehole and Newlyn in Mountsbay, Cornwall, Boulmer near Alnwick (where almost all the inhabitants are called Stephenson, Stanton, or Stewart), Burnmouth, Ross, and (to some extent) Eyemouth in Berwickshire, Boyndie in Banffshire, Rathen in Aberdeenshire, Buckhaven in Fifeshire, Portmahomack and Balnabruach in Easter Ross. In France may be mentioned the commune of Batz, near Le Broisic in Loire Inférieure; many of the central cantons of Brétagne; the singular society called Foréatines, supposed to be of Irish descent, and living between St. Armand and Bourges; the sailor population of Pauillac (Gironde), Granville, Arromanches, Portel (near Boulogne), and other fishing villages; the Republic of Andorre in the Pyrenees; the papermakers of Angoumois, Limoisin, and Auvergne, whose trade seems to have doomed them to an hereditary weakness of constitution; the Marans of Auvergne, a race of Spanish converted Jews, accused of introducing syphilis into France; the Hautponnais and Lyzelards of St. Omer, who have also a separate Flemish dialect; the Burins and Sermoyers, chiefly cattle-breeders, scattered over the department of Ain and the arrondissement of Bourg en Bresse. The Vaquéros, shepherds in the Asturias Mountains; the Jewish Chuetas of Majorca; the Petits-Créoles or Petits-Blancs, descendants of the original French settlers in Réunion, are also good examples of what biologists call "in-and-in breeding," as opposed to "crossing." On a larger scale the Icelanders, the ancient Samaritans (now almost extinguished, see *Times*, 4th April, 1874), and the great and prosperous Jewish nation, may be called castes, so far as intermarriage is concerned. It must not be imagined, however, that this is a *general* characteristic of a certain stage of social development. "Exogamy," or the rule requiring either absolutely or in certain circumstances marriage with a stranger, is recognized very widely even by modern tribes, especially in Asia; and both these conditions of things seem to have been preceded by a primitive state, in which the relations of the sexes were promiscuous.[7] This is illustrated in the case of the Thlinkeets, or Kolosches, who inhabit the coasts and islands from Mt. St. Elias to the river Nass. This singular tribe, which has an elective chief and systematic slavery (chiefly supplied from the Flatheads of Oregon), is divided into two castes, the Wolf and the Raven, the symbols of which appear on their houses, boats, robes, and shields. The Wolf caste is subdivided into the bear, eagle, dolphin, shark, and alca; the Raven, into frog, goose, sea lion, owl, and salmon. "The young Wolf warrior must seek his mate among the Ravens; and while celebrating his nuptials one day, he may on the next be called to fight his father-in-law over some hereditary feud." Similarly, the Kutchin tribe of the Tinneh family, inhabiting the Yukon, Tananah, and Peel river valleys, have a singular system of *totems*. There are three castes; and persons of the same caste are not allowed to marry each other. The mother gives caste to the children, so that as the fathers die off the caste constantly changes. It also happens that when a child is named, the father adopts that name and drops his own. The system prevents civil war.[8]

Caste in India is a question of more than historical interest. It is the great difficulty in the way of Government in framing laws and in governing the army, of native religious reformers in attacking the Brahmanic superstitions, and of the Protestant missionaries, who are unable to offer in the British society of India a sympathizing and protecting caste in place of that which it costs the convert so much to leave. Probably owing to the extent of our Indian Empire, and the great varieties of caste custom which prevail, one hears very conflicting accounts and opinions of the institution. Writers such as Robertson and Dubois have regarded it as the great safeguard of social tranquillity, and therefore as the indispensable condition of the progress in certain arts and industries which the Hindus have undoubtedly made. Others, such as James Mill, denounce it as now at least a great political blunder, fatal to free competition, and opposed to individual happi-

[1] *Rapport sur les différentes classes de chefs dans la nouvelle Espagne*, 1840, p. 223.

[2] *De la Religion*, ii. 83.

[3] Something like this is to be found in the Russian notion of *tchine*, or status according to official hierarchy of ranks, as modified by the custom of *myestnitchestvo*, by which no one entering the public service could be placed beneath a person who had been subject to his father's orders. Hereditary nobility at one time belonged to every servant, military or civil, above a certain rank, and a family remaining out of office for two generations lost its rights of nobility; but in 1854 the privilege was confined to army colonels and state councillors of the 4th class. At one time, therefore, the *razriadnyia knighi*, or special registers, superseded by Peter the Great's *barkhatnaia kniga*, or Velvet Book, contained a complete code of social privilege and precedence. Peter's "*tabel o rangakh*" contained fourteen classes. The subject is treated of in the 1600 articles of the ninth volume of the Russian Code *Svod Zakonof*. The Russian nobility, though deprived of their exemptions from conscription, personal taxation, and corporal punishment, still retain many advantages in the public service. ("L'Empire des Tsars," in *Revue des deux Mondes*, 1876.)

[4] Juarros, *Hist. of Guatemala*, Tr., London, 1823.

[5] See *Times*, 21st November, 1874.

[6] Waitz, *Anthropologie der Naturvölker*, i. p. 482.

[7] See Huth *On the Marriage of Near Kin*, London, 1875.

[8] Bancroft, *Races of the Pacific*, vol. i.

ness. The latter view assumes a state of facts which is denied by Mr. Colebrooke, one of the highest authorities on Indian matters. Writing in 1798 he says,[1] after pointing out that any person unable to earn a subsistence by the exercise of his profession may follow the trade of a lower caste or even of a higher: "Daily observation shows even Brahmans exercising the menial profession of a Sudra. We are aware that every caste forms itself into clubs or lodges, consisting of the several individuals of that caste residing within a small distance, and that these clubs or lodges govern themselves by particular rules or customs or by-laws. But though some restrictions and limitations, not founded on religious prejudices, are found among their by-laws, it may be received as a general maxim that the occupation appointed for each tribe is entitled merely to a preference. Every profession, with few exceptions, is open to every description of persons; and the discouragement arising from religious prejudices is not greater than what exists in Great Britain from the effects of municipal and corporation laws. In Bengal the numbers of people actually willing to apply to any particular occupation are sufficient for the unlimited extension of any manufacture." This is corroborated by Elphinstone,[2] who states that, during a long experience of India, he never heard of a single case of degradation from caste; and it is illustrated by the experience of the British army, in which men of all castes unite.

The popular notion of modern caste is that it involves certain restrictions on marriage, on profession, and on social intercourse, especially that implied in eating and drinking together. But how far intermarriage is permitted, what are the effects of a marriage permitted but looked on as irregular, what are the penalties of a marriage forbidden, whether the rules protecting trades and occupations are in effect more than a kind of unionism grown inveterate through custom, by what means caste is lost, and in what circumstances it may be regained,—these are questions on which very little real or definite knowledge exists. It is very remarkable that the Vedas, on which the whole structure of Brahmanic faith and morals professes to rest, give no countenance to the later regulations of caste. The only passage bearing on the subject is in the Purusha Sukta, the 90th Hymn of the 10th Book of the Rigveda Sanhita. "When they divided man how many did they make him? What was his mouth? what his arms? what are called his thighs and feet? The Brahmana was his mouth, the Raganya was made his arms, the Vaisya became his thighs, the Sudra was born from his feet." Haug finds in this a subtle allegory that the Brahmans were teachers, the Kshatriyas the warriors of mankind. But this is opposed to the simple and direct language of the Vedic hymns, and to the fact that in the accounts of creation there the origin of many things besides classes of men is attributed in the same fanciful manner to parts of the divine person. It is in the Puranas and the Laws of Manu, neither of which claims direct inspiration, where they differ from the letter of the Veda, that the texts are to be found on which all that is objectionable in caste has been based. Even in the Vishnu Purana, however, the legend of caste speaks of the four classes as being at first "perfectly inclined to conduct springing from religious faith." It is not till after the whole human race has fallen into sin that separate social duties are assigned to the classes. The same hymn speaks of the evolution of qualities of Brahma. Sattva, or goodness, sprang from the mouth of Brahma; Rajas, or passion, came from his breast; Tamas, or darkness, from his thighs; others he created from his feet. For each one of these gunas, or primitive differences of quality, a thousand couples, male and female, have been created, to which the distinct heavens, or places of perfection of Prajapati, Indra, Maruts, and Gandharvas are assigned. To the gunas are related the yugas, or ages: 1st, the Krita, or glorious age of truth and piety, in which apparently no distinctions, at least no grades of excellence were known; 2d, the Treta, or period of knowledge; 3d, the Dvapara, or period of sacrifice; 4th, the Kali, or period of darkness. Bunsen supposes there may be an historical element in the legend that Pururava, a great conqueror of the Treta age, founded caste. The yugas are hardly periods of historical chronology, but there is no doubt that the Vayu Purana assigns the definite origin of caste to the Treta period. "The perfect beings of the first age, some tranquil, some fiery, some active, and some distressed, were again born in the Treta, as Brahmans, &c., governed by the good and bad actions performed in former births." The same hymn proceeds to explain that the first arrangement did not work well, and that a second was made, by which force, criminal justice, and war were declared to be the business of the Kshatriyas; officiating at sacrifices, sacred study, and the receipt of presents to belong to the Brahmans; traffic, cattle, and agriculture to the Vaisyas; the mechanical arts and service to the Sudras. The Ramayana hymn suggests that in the four great periods the castes successively arrive at the state of *dharma* or righteousness. Thus, a Sudra cannot, even by the most rigorous self-mortification, become righteous in the period proper to the salvation of the Vaisyas. As the hymn speaks in the Dvapara age, it speaks of the salvation of Sudras as future, and not yet possible. Wholly in opposition to the story of a fourfold birth from Brahma is the legend that the castes sprang from Manu himself, who is removed by several generations of gods and demi-gods from Brahma. Then, again, the Santiparvan alleges that the world, at first entirely Brahmanic, was separated into castes merely by the evil works of man. Castehood consists in the exercise of certain virtues or vices. *Munis*, or persons born indiscriminately, frequently rise to the caste of Brahmans, and the offspring of Brahmans sinks to a lower level. The serpent observes: "If a man is regarded by you as being a Brahman only in consequence of his conduct, then birth is vain, until action is shown." But this change of caste takes place only through a second birth, and not during the life which is spent in virtue. Another poetical conception of caste birth is expressed in the Harivansa. The Brahmans were formed from an imperishable element (Akshara), the Kshatriyas from a perishable element (Kshara), the Vaisyas from alteration, and the Sudras from a modification of smoke. The general result of the foregoing texts is that there are several contradictory accounts of the origin of caste, and that these are for the most part unintelligible. Caste is described as a late episode in creation, and as born from different parts of different gods, from the mortal Manu, from abstract principles, and from non-entity. It is also described as coeval with creation, as existing in perfection during the Krita period, and subsequently falling into sin. It is also said that only Brahmans existed at first, the others only at later periods. Then the rationalistic theories of the Santiparvan upset the very foundation of caste; viz., hereditary transmission of the caste character.[3] It seems clear that when the Vedas were composed, many persons who were not Brahmans acted as priests, and saints, the "preceptors of gods," by their "austere fervor," rose from a lower rank to the dignity of Brahmanhood. Originally, indeed, access to the gods by prayer and sacrifice was open to all classes of the community. As the Brahmans grow in political importance, they make religion an exclusive and sacred business. We find them deciding questions of succession to the throne, and enforcing their decisions. While in the earlier literature there are several instances of Brahmans receiving instruction from the hands of Kshatriyas, in the Puranas and Manu death is made to overtake Kshatriyas who are not submissive to the Brahmans; and in one case Visvamitra, the son of Gadhi, actually obtains Brahmanhood as a reward for his submission. It seems certain that many of the ancient myths were expressly manufactured by the Brahmans to show their superiority in birth and in the favor of Heaven to the Kshatriyas,—a poetical effect which is sometimes spoiled by their claiming descent from their rivals. This brings us to a consideration of the theories which have been started to account for the appearance of Brahmanic caste, as it is stereotyped in the Laws of Manu. James Mill, who invariably underestimated the influence on history of "previous states of society," has suggested that the original division must have been the work of some inspired individual, a legislator or a social reformer, who perceived the advantages which would result from a systematic division of labor. The subordination of castes he accounts for by the superstitious terror and the designing lust of power which have so frequently been invoked to explain the natural supremacy of the religious class. Because the ravages of war were dreaded most after the calamities sent by heaven, he finds that the military class properly occupy

[1] *Life and Essays of H. T. Colebrooke*, i. p. 104. [2] *History of India.*

[3] Muir's *Sanskrit Texts*, vol. i., 1868.

the second place. This arrangement he apparently contemplates as at no time either necessary or wholesome, and as finally destroyed by the selfish jealousies of caste, and by the degradations which the multiplication of trades made inevitable. Heeren[1] and Klaproth have contended that the division into castes is founded on an original diversity of race, and that the higher castes are possessed of superior beauty. The clear complexion and regular features of the Brahmans are said to distinguish them as completely from the Sudras as the Spanish Creoles were distinguished from the Peruvians. "The high forehead, the stout build, and the light copper color of the Brahmins and other castes allied to them, appear in strong contrast with the somewhat low and wide heads, slight make, and dark bronze of the low castes" (Stevenson, quoted by Müller, *Chips*, ii. p. 327).[2] This explanation is, however, generally conjoined with that founded on the tradition of conquest by the higher castes. There is no doubt that the three castes of lighter color (traivarnika), the white Brahmans, the red Kshatriyas, the yellow Vaisyas, are, at least in the early hymns and Brahmanas, spoken of as the Aryas, the Sanskrit-speaking conquerors, in contradistinction to the dark cloud of the Turanian aborigines Dasyus. In fact, ârya, which means noble, is derived from ărya, which means housholder, and was the original name of the largest caste, now called Vaisyas. Roth, in his "Brahma and the Brahmans,"[3] holds that the Vedic people advanced from their home in the Punjab, drove the aborigines into the hills, and took possession of the country lying between the Ganges, the Jumna, and the Vindhya range. "In this stage of complication and disturbance," he says, "power naturally fell into the hands of those who did not possess any direct authority," *i.e.*, the domestic priests of the numerous tribal kings. The Sudras he regards as a conquered race, perhaps a branch of the Aryan stock, which immigrated at an earlier period into India, perhaps an autochthonous Indian tribe. The latter hypothesis is opposed to the fact that, while the Sudra is debarred from sharing three important Vedic sacrifices, the Bhagasata Purana expressly permits him to sacrifice "without *mantras*," and imposes on him duties with reference to Brahmans and cows which one would not expect in the case of a nation strange in blood. But unless a previous subordination of castes among the conquering race be supposed, it seems difficult to see why the warrior-class, who having contributed most to the conquest must have been masters of the situation, should have consented to degradation below the class of Brahmans. The position of the Sudra certainly suggests conquest. But are there sound historical reasons for supposing that Brahmans and Sudras belonged to different nations, or that either class was confined to one nation? The hypothesis is slightly modified by Meiners,[4] who supposes that instead of one conquest there may have been two successive immigrations,—the first immigrants being subdued by the second, and then forming an intermediate class between their conquerors and the aborigines; or, if there were no aborigines, the mixture of the two immigrant races would form an intermediate class. In the same way Mr. Talboys Wheeler[5] suggests that the Sudra may be the original conquerors of the race now represented by the Pariahs. Most of these explanations seem rather to describe the mode in which the existing institutions of caste might be transplanted from one land to another, from a mother-land to its colonies, and altered by its new conditions. Military conquest, though it often introduces servitude, does not naturally lead to the elevation of the priesthood. It is unscientific to assume large historical events, or large ethnological facts, or the existence of some creator of social order.[6]

As Benjamin Constant[7] points out, caste rests on the religious idea of an indelible stain resting on certain men, and the social idea of certain functions being committed to certain classes. The idea of physical purity was largely developed under the Mosaic legislation; in fact the internal regulations of the Essenes (who were divided into four classes) resemble the frivolous prohibitions of Brahmanism. As the daily intercourse of men in trade and industry presents numberless occasions on which the stain of real or fancied impurity might be caught, the power of the religious class who define the rules of purity and the penalties of their violation becomes very great. Macleod has also stated two important elements which enter into the conception of caste: "That our place in the world is assigned to us by divine sovereignty; and that the co-operation and sympathy of a brotherhood are essential to our usefulness and happiness in the world."[8] There is no doubt that the Hindu mind is deeply religious, and therefore naturally prepared for Purohiti, or priest-rule. They were also passionately attached to their national hymns, some of which had led them to victory, while others were associated with the benign influences of nature. Only the priest could chant or teach these hymns, and it was believed that the smallest mistake in pronunciation would draw down the anger of the gods. But however favorable the conditions of spiritual dominion might be, it seems to have been by no more natural process than hard fighting that the Brahmans finally asserted their supremacy. We are told that Parasurama, the great hero of the Brahmans, "cleared the earth thrice seven times of the Kshatriya caste, and filled with their blood the five large lakes of Samauta." Mr. Wheeler thinks that the substitution of blood-sacrifices for offerings of parched grain, clarified butter, and *soma* wine marks an adaptation by the Brahmans of the great military banquets to the purposes of political supremacy. It is not therefore till the Brahmanic period of Indian history, which ends with the coming of Sakya Mouni, in 600 B.C., that we find the caste-definitions of Manu realized as facts. These are—"To Brahmans he (*i.e.*, Brahma) assigned the duties of reading the Vedas, of teaching, of sacrificing, of assisting others to sacrifice, of giving alms if they be rich, and if indigent of receiving gifts."[9] The duties of the Kshatriya are "to defend the people, to give alms, to sacrifice, to read the Veda, to shun the allurements of sensual gratification." The duties of a Vaisya are "to keep herds of cattle, to bestow largesses, to sacrifice, to read the scripture, to carry on trade, to lend at interest, and to cultivate land." These three castes (the twice born) wear the sacred thread. The one duty of a Sudra is "to serve the before-mentioned classes without depreciating their worth."[10] The Brahman is entitled by primogeniture to the whole universe; he may eat no flesh but that of victims; he has his peculiar clothes. He is bound to help military and commercial men in distress. He may seize the goods of a Sudra, and whatever the latter acquires by labor or succession beyond a certain

[1] *Ideen*, i. 610.

[2] The idea of a conquering white race is strangely repeated in the later history of India. The Rajputs and Brahmans are succeeded by the Mussulmans, the Turks, the Afghans. There was an aristocracy of color under the Moghul dynasty. But under an Indian climate it could not last many generations. The Brahmans of Southern India were as black as the lowest castes; the Chandalas are said to be descended from Brahmans. According to Manu the Chandala must not dwell within town; his sole wealth must he dogs and asses; his clothes must consist of the mantles of deceased persons; his dishes must be broken pots. Surely this vituperative description must apply to an aboriginal race.

[3] *Journal of the German Oriental Society*, vol. i. (quoted by Muir, *ubi supra*).

[4] *De Origine Castarum*, Göttingen.

[5] *History of India*, vol. i.

[6] For a characteristic appreciation of caste see Comte, *Cours de Philosophie Positive*, vi. c. 8. He regards the hereditary transmission of functions under the rule of a sacerdotal class as a necessary and universal stage of social progress, greatly modified by war and colonization. The morality of caste was, he contends, an improvement on what preceded; hut its permanence was impossible, because "the political rule of intelligence is hostile to human progress." The seclusion of women and the preservation of industrial inventions were features of caste; and the higher priests were also magistrates, philosophers, artists, engineers, and physicians.

[7] *De la Réligion*, ii. 8.

[8] *Peeps at the Far East*, p. 186.

[9] The great mass of the Brahmans were in reality mendicants, who lived on the festivals of birth, marriage, and death, and on the fines exacted for infractions of caste rule. Others had establishments called Muths, endowed with Jageer villages. There were two distinct orders of officiating priests,—the Purohita, or family priest, who performed all the domestic rites, and probably gave advice in secular matters, and the Guru, who is the head of a religious sect, making tours of superintendence and exaction, and having the power to degrade from caste and to restore. In some cases the Guru is recognized as the Mehitra or officer of the caste-assembly, from whom he receives Huks, or salary, and an exemption from house and stamp taxes, and service as hegarree (Steele's *Law and Customs of Hindoo Castes within the Dekhun Provinces*, 1826; new edition, 1868). Expulsion from caste follows on a number of moral offences (*e.g.*, assault, murder, &c.), as well as ceremonial offences (*e.g.*, eating prohibited food, eating with persons of lower caste, abstaining from funeral rites, having connection with a low-caste woman). Exclusion means that it is not allowed to eat with or enter the houses of the members of the caste, the offender being in theory not degraded but dead. For some heinous offences, *i.e.*, against the express letter of the Shasters, no re-admission is possible. But generally this depends on the ability of the outcast to pay a fine, and to supply the caste with an expiatory feast of sweetmeats. He has also to go through the Sashtanyam, or prostration of eight members, and to drink the Panchakaryam, *i.e.*, drink of the five products of the cow (*Description of the People of India*, Abbé J. A. Duhois,[a] Missionary in Mysore, Eng. Tr., London 1817. There is a valuable new edition of this work by Mr. Pope, Madras, 1862).

[10] *Manu*, x. 88–90.

[a] [Born in Languedoc, 1765; died in Paris, 1848; was thirty-two years a missionary in India. His *Description* was a remarkable, multifarious, and influential work.—AM. ED.]

amount. The Sudra is to serve the twice born; and even when emancipated cannot be anything but a Sudra. He may not learn the Vedas, and in sacrifice he must omit the sacred texts.[1] A Sudra in distress may turn to a handicraft; and in the same circumstances a Vaisya may stoop to service. Whatever crime a Brahman might commit, his person and property were not to be injured; but whoever struck a Brahman with a blade of grass would become an inferior quadruped during twenty-one transmigrations. In the state the Brahman was above all the ministers; he was the rajah's priest, exempt from taxation, the performer of public sacrifices, the expounder of Manu, and at one time the physician of bodies as well as of souls. He is more liable than less holy persons to pollution, and his ablutions are therefore more frequent. A Kshatriya who slandered a Brahman was to be fined 100 panas (a copper weight of 200 grains); a Vaisya was fined 200 panas; a Sudra was to be whipped. A Brahman slandering any of the lower castes pays 50, 25, or 12 panas. In ordinary salutations a Brahman is asked whether his devotion has prospered; a Kshatriya whether he has suffered from his wounds; a Vaisya whether his health is secure; a Sudra whether he is in good health.[2] In administering oaths a Brahman is asked to swear by his veracity; a Kshatriya by his weapons, house, or elephant; a Vaisya by his kine, grain, or goods; a Sudra by all the most frightful penalties of perjury. The Hindu mind is fertile in oaths; before the caste assembly the Dhurm, or caste custom, is sometimes appealed to, or the feet of Brahma, or some cow or god or sacred river, or the bel (the sacred creeper), or the roots of the turmeric plant. The castes are also distinguished by their modes of marriage. Those peculiar to Brahmans seem to be,—1*st*, Brahma, when a daughter, clothed only with a single robe is given to a man learned in the Veda whom her father has voluntarily invited and respectfully receives; 2*d*, Devas or Daiva, when a daughter, in gay attire is given, when the sacrifice is already begun, to the officiating priest. The primitive marriage forms of Rashasas or Rachasa, when a maiden is seized by force from home, while she weeps and calls for help, is said to be appropriate to Kshatriyas. To the two lower castes the ceremony of Asura is open, in which the bridegroom, having given as much wealth as he can afford to the father and paternal kinsman and to the damsel herself, takes her voluntarily as his bride. A Kshatriya woman on her marriage with a Brahman must hold an arrow in her hand; a Vaisya woman marrying one of the sacerdotal or military classes must hold a whip; a Sudra woman marrying one of the upper castes must hold the skirt of a mantle.

How little the system described by Manu applies to the existing castes of India may be seen in these facts—(1) that there is no artisan caste mentioned by Manu; (2) that eating with another caste, or eating food prepared by another caste, is not said by him to involve loss of caste, though these are now among the most frequent sources of degradation. The system must have been profoundly modified by the teaching of Buddha: "As the four rivers which fall into the Ganges lose their names as soon as they mingle their waters with the holy river, so all who believe in Buddha cease to be Brahmans, Kshatriyas, Vaisyas, and Sudras." After Buddha, Sudra dynasties ruled in many parts of India, and under the Moghul dynasty the Cayets, a race of Sudras, had almost a monopoly of public offices. But Buddha did not wish to abolish caste. Thus it is related that a Brahman Pundit who had embraced the doctrines of Buddha nevertheless found it necessary, when his king touched him, to wash from head to foot.[3] Alexander the Great found no castes in the Punjab, but Megasthenes has left an account of the ryots and tradesmen, the military order and the gymnosophists (including the Buddhist Germanes) whom he found in the country of the Ganges.[4] From his use of the word gymnosophist it is probable that Megasthenes confounded the Brahmans with the hermits or fakeers; and this explains his statement that any Hindu might become a Brahman. Megasthenes spent some time at the court of Sandracottus, a contemporary of Seleucus Nicator. All the later Greeks[5] follow his statement and concur in enumerating seven Indian castes,—sophists, agriculturists, herdsmen, artisans, warriors, inspectors, councillors. On the revival of Brahmanism it was found that the second and third castes had disappeared, and that the field was now occupied by the Brahmans, the Sudras, and a host of mixed castes, sprung from the original twelve, Unooloom and Pruteeloom, left-hand and right-hand, which were formed by the crossing of the four original castes. Manu himself gives a list of these impure castes, and the Ayeen Akberi (1556–1605) makes the positive statement that there were then 500 tribes bearing the name of Kshatriya, while the real caste no longer existed. Most of these subdivisions are really trade-organizations, many of them living in village-communities, which trace descent from a pure caste. Thus in Bengal there are the Vaidya or Baidya, the physicians, who, Manu says, originated in the marriage of a Brahman father and a Vaisya mother. In Mysore alone Major Puckle reports that there are 110 different castes; and the varieties of custom in the Deccan are well brought out in the book of Mr. Steele, to which we have already referred. As Colebrooke said, Brahmans and Sudras enter into all trades, but Brahmans (who are profoundly ignorant even of their own scriptures) have succeeded in maintaining their monopoly of Vedic learning, which really means a superficial acquaintance with the Puranas and Manu. Though they have succeeded in excluding others from sacred employment, only a portion of the caste are actually engaged in religious ceremonies, in sacred study, or even in religious begging. Many are privates in the army, many water-carriers, many domestic servants. And they have like other castes many subdivisions which prevent intimate association and intermarriage. The ideal Brahman is gone. Instead of a priest "with his hair and beard clipped, his passions subdued, his mantle white, his body pure, golden rings in his ear," you have a mean, selfish, often extremely dirty, person, whose remaining power lies in extortion by dishonesty. But the hold which caste has on the Hindu minds may, perhaps, be most clearly seen in the history of the Christian missions and in comparatively recent times. The Jesuits Xavier and Fra dei Nobili did everything but become Brahmans in order to convert the south of India,—they put on a dress of ivy or yellow color, they made frequent ablutions, they lived on vegetables and milk, they put on their foreheads the sandal-wood paste used by the Brahmans,—and Gregory XV. published a bull sanctioning caste regulations in the Christian churches of India. The Danish mission of Tranquebar, the German mission of the heroic Schwarz, whose headquarters were Tanjore, also permitted caste to be retained by their followers. Even the priests of Buddha, whose life was a protest against caste, re-erected the system in the island of Ceylon, where the *radis* or *radias* were reduced to much the same state as the Pariahs.[6] At the present day the progress of Protestant missions amounts almost to nothing. In Dr. Mullen's report down to 1871 the whole force of 579 English missionaries, 323 native ordained ministers, and 1993 other native preachers had produced a native Christian community of only 280,600. There was probably a much larger Roman Catholic population in the south of India about the middle of the 18th century.

It is still the general law that to constitute a good marriage the parties must belong to the same caste, but to unconnected families.[7] Undoubtedly, however, the three higher castes were always permitted to intermarry with the caste next below their own, the issue taking the lower caste or sometimes forming a new class. A Sudra need not marry a wife of the same caste or sect as himself. So recently as 1871 it was decided by the Judicial Committee of the Privy Council that a marriage between a Zemindar of the Malavar class, a sub-division of the Sudra caste, with a woman of the Vellala class of Sudras is lawful. Generally also a woman may not marry beneath her own caste. The feeling is not so strong against a man marrying even in the lowest caste, for Manu permits the son of a Brahman and a Sudra mother to raise his family to the highest caste in the seventh generation. The illegitimacy resulting from an invalid marriage does not render incapable of caste; at least it does not so disqualify the lawful children of the bastard. On a forfeiture of caste by either spouse intercourse ceases between the spouses: if the out-caste be a sonless woman, she is accounted dead and funeral rites are performed for her; if she have a son, he is bound to maintain her. It is remarkable that the

[1] As to the rights of the castes to participate in domestic rites, see BRAHMANISM, vol. iv. p. 184.
[2] Wheeler, ii. 533.
[3] *Travels of Fah Hian*, c. 27.
[4] Strabo, *Ind.*, sec. 59.
[5] Arrian, *Indic.*, c. 11, 12; Diod. Sic., ii. c. 40, 41; and Strabo, xv. 1.
[6] Irving, *Theory and Practice of Caste*, London, 1859.
[7] See BRAHMANISM, vol. iv. p. 184.

professional concubinage of the dancing-girl does not involve degradation, if it be with a person of the same caste. This suggests that whatever may be the function of caste, it is not a safe guardian of public morality. The rules as to prohibited degrees in marriage used to be very strict, but they are now relaxed. An act of 1856 legalized re-marriage by widows in all the castes, with a conditional forfeiture of the deceased husband's estate, unless the husband has expressly sanctioned the second marriage. The recent Marriage Act was directed against the iniquitous child marriages; it requires a *minimum* age. In many ways the theoretical inferiority of the Sudra absolves him from the restraints which the letter of the law lays on the higher castes. Thus, a Sudra may adopt a daughter's or sister's son, though this is contrary to the general rule that the adopter should be able to marry the mother of the adopted person. The rule requiring the person adopted to be of the same caste and *gotra* or family as the adopter is also dispensed with in the case of Sudras. In fact, it is only a married person whom a Sudra may not adopt. As regards inheritance the Sudra does not come off so well in competition with the other castes. "The sons of a Brahamana in the several tribes have four shares or three or two or one; the children of a Kshatriya have three portions or two or one; and those of a Vaisya take two parts or one." This refers to the case permitted by law, and not unknown in practice, of a Brahman having four wives of different castes, a Kshatriya three, and so on. But all sons of inferior caste are excluded from property coming by gift to the father; and a Sudra son is also excluded from land acquired by purchase. It must be recollected, however, that under an Act of 1850, *loss* of caste no longer affects the capacity to inherit or to be adopted. In cases of succession *ab intestato* on failure of the preceptor, pupil, and fellow-student (heirs called by the Hindu law after relatives), a priest, or any Brahman, may succeed. Where a Sudra is the only son of a Brahman, the Sapinda, or next of kin, would take two-thirds of the inheritance; where he is the only son of any other twice-born father, the Sapinda would take one-half. Possibly, the rule of equal division among sons of equal caste did not at first apply to Brahmans, who, as the eldest sons of God, would perhaps observe the custom of primogeniture among themselves. On the other hand it was laid down in the Judicial Committee in 1869, contrary to the collected opinions of the Pundits of the Sudder Court, that, in default of lawful children, the illegitimate children of the Sudra caste inherit their putative father's estate, and, even if there be lawful children, are entitled to maintenance out of the estate. It had previously been decided by Sir Edward Ryan in 1857 that the illegitimate children of a Rajput, or of any other member of a superior caste, have no right of inheritance even under will, but a mere right to maintenance, provided the children are docile. It seems then that the Kshatriya and Vaisya castes, though in one sense non-existent, still control Hindu succession.[1]

With regard to Persia the *Zend Avesta* speaks of a fourfold division of the ancient inhabitants of Iran into priests, warriors, agriculturists and artificers; and also of a sevenfold division corresponding to the seven amschespands, or servants of Ormuzd. This was no invention of Zoroaster, but a tradition from the golden age of Jemshid or Diemschid. The priestly caste of Magi was divided into Herbeds or disciples, Mobeds or masters, and Destur Mobeds or complete masters. The last-named were alone entitled to read the liturgies of Ormuzd; they alone predicted the future and carried the sacred *costi*, or girdle, *havan*, or cup, and *barsom*, or bunch of twigs. The Zend word *baresma* is supposed to be connected with Brahma, or sacred element, of which the symbol was a bunch of kusa grass, generally called veda. The Persian and Hindu religions are further connected by the ceremony called Homa in the one and Soma in the other. Haug, in his *Tract on the Origin of Brahmanism* (quoted by Muir, *ubi supra*), maintains that the division in the *Zend Avesta* of the followers of Ahura Mazda into Atharvas, Rathaesvas, and Vastrya was precisely equivalent to the three superior Indian castes. He also asserts that only the sons of priests (Atharvas) could become priests, a rule still in force among the Parsis. The Book of Daniel rather suggests that the Magi were an elective body; and as regards the secular classes there does not seem to be a trace of hereditary employment or religious subordination. There is a legend in the Dabistan of a great conqueror, Mahabad, who divided the Abyssinians into the usual four castes; and Strabo mentions a similar classification of the Iberians into kings, priests, soldiers, husbandmen, and menials.

At one time it was the universal opinion that in Egypt there were at least two great castes, priests and warriors, the functions of which were transmitted from father to son, the minor professions grouped under the great castes being also subject to hereditary transmission. This opinion was held by Otfried Müller,[2] Meiners of Göttingen, and others. Doubts were first suggested by Rossellini, and after Champollion had deciphered the hieroglyphic inscriptions, J. J. Ampère[3] boldly announced that there were in Egypt no castes strictly so called; that in particular the professions of priest, soldier, judge, &c., were not hereditary; and that the division of Egyptian society was merely that which is generally found in certain stages of social growth between the liberal professions and the mechanical arts and trades. No difference of color, or indeed of any feature, has been observed in the monumental pictures of the different Egyptian castes. From an inspection of numerous tombs, sarcophagi, and funeral stones, which frequently enumerate the names and professions of several kinsfolk of the deceased, Ampère has concluded that sacerdotal and military functions were sometimes united in the same person, and might even be combined with civil functions; that intermarriage might certainly take place between the sacred and military orders; and that the members of the same natural family did frequently adopt the different occupations which had been supposed to be the exclusive property of the castes. The tombs of Beni Hassan show in a striking manner the Egyptian tendency to accumulate, rather than to separate, employments. Occasionally families were set apart for the worship of a particular divinity. An interesting "section" of Egyptian society is afforded by a granite monument preserved in the Museum at Naples. Nine figures in bas-relief represent the deceased, his father, three brothers, a paternal uncle, and the father and two brothers of his wife. Another side contains the mother, wife, wife's mother, and maternal aunts. The deceased is described as a military officer and superintendent of buildings; his elder brother as a priest and architect; his third brother as a provincial governor, and his father as a priest of Ammon. The family of the wife is exclusively sacerdotal. Egyptian caste, therefore, permitted two brothers to be of different castes, and one person to be of more castes than one, and of different castes from those to which his father or wife belonged. The lower employments, commerce, agriculture, even medicine, are never mentioned on the tombs. The absolute statements about caste in Egypt, circulated by such writers as Reynier and De Goguet, have, no doubt, been founded on passages in Herodotus (ii. 143, 164), who mentions seven classes, and makes war an hereditary profession; in Diodorus Siculus (i. 2–8), who mentions five classes and an hereditary priesthood; and in Plato, who, anxious to illustrate the principle of compulsory division of labor, on which his republic was based, speaks in the *Timæus* of a total separation of the six classes,—priests, soldiers, husbandmen, artisans, hunters, and shepherds. Heeren (ii. 594) does not hesitate to ascribe the formation of Egyptian caste to the meeting of different races. According to the chronology constructed by Bunsen the division into castes began in the period 10,000–9000, and was completed along with the introduction of animal worship and the improvement of writing under the third dynasty in the 6th or 7th century of the Old Empire. The Scholiast of Apollonius Rhodius, on the authority of Dicæarchus, in the Second Book of *Hellas*, mentions a king, Sesonchosis, who, about 3712 B.C., "enacted that no one should abandon his father's trade, for this he considered as leading to avarice." Bunsen conjectures that this may refer to Sesostoris, the lawgiver of Manetho's third or Memphite dynasty, the eighth from Menes, who introduced writing, building with hewn stone, and medicine; possibly, also, to Sesostris, who, Aristotle says (*Polit.*, vii. 1), introduced caste to Crete. He further observes that in Egypt there was never a conquered indigenous race. There was one

[1] For an account of the actual condition of castes see the magnificently illustrated Government publication *The People of India*, edited by Kaye and Watson. 6 vols. 4to, 1868–72; also Sherring's *Castes of Benares*.

[2] *Manual of Archæology*.

[3] *Revue des deux Mondes*, 15th September, 1848

nation with one language and one religion; the public panegyrics embraced the whole people; every Egyptian was the child and friend of the gods. The kings were generally warriors, and latterly adopted into the sacerdotal caste. Intermarriage was the rule, except between the swine-herds and all other classes. "Every shepherd is an abomination unto the Egyptians" (Gen. xlvi. 34).

(W. C. S.)

CASTEL, Louis Bertrand (1688–1757), a learned mathematician, was born at Montpellier in 1688, and entered the order of the Jesuits in 1703. At first he was a student of literature, but he afterwards devoted himself entirely to mathematics and natural philosophy. He wrote several scientific works, that which attracted most attention at the time being his *Optique des Couleurs*, or treatise on the melody of colors. He endeavored to illustrate the subject by a *clavecin oculaire*, or ocular harpsichord; but the treatise and the illustration were quickly forgotten. He also published a critical account of the system of Sir Isaac Newton in French.

CASTEL-A-MARE, or Castellamare, a city and seaport of Italy, on the Gulf of Naples, 15 miles by rail south-east of the city of that name. It is situated on the lower slopes of Monte Sant' Angelo (the ancient *Mons Gaurus*), and along a sheltered beach, commanding an extensive view of the Bay of Naples from Vesuvius to Misenum. It stands near the site of the ancient *Stabiæ*, which was destroyed by Sulla in the social war, but continued to exist as a small place till 79 A.D., when it was overwhelmed along with Pompeii and Herculaneum by the great eruption of Vesuvius, and became for ever celebrated as the death-scene of the elder Pliny. The castle, from which the city takes its name, was erected by Frederick II., surrounded by walls and towers in the 13th century by Charles I. of Anjou, and strengthened by additional fortifications by Alphonso I. of Aragon. Castel-a-mare is the seat of a bishopric, and has a royal palace, a cathedral, several churches and convents, a military hospital, barracks, a handsome quay, a royal arsenal, and a dockyard, where the large ships of the Neapolitan navy were formerly built. In shipbuilding it still ranks second of the Italian towns; and there are manufactures of linen, silk and cotton goods, and leather. The port is small, and divided by two forts. The hill immediately above the town is covered with villas and casinos. The royal casino of Quisisana, originally built by Charles II. of Anjou, was restored by Ferdinand I. of Naples. It is more remarkable for its fine prospect than for its magnificence as a palace. Population about 26,000.

CASTEL-A-MARE, a seaport town of Sicily, on a bay to which it gives its name, in the province of Trapani, and about 30 miles west of Palermo. It occupies the site of the port of the ancient *Segesta*, which lay about six miles distant, and it still carries on a considerable export trade in wine, fruit, grain, and timber. Population, 11,280.

CASTEL SARRASIN, a town of France, capital of an arrondissement, in the department of Tarn et Garonne, situated on the Songuine or Azine, near its influx into the Garonne, 12 miles west of Montauban. The walls which formerly surrounded the town have been converted into promenades. It has manufactures of serges and other woollen stuffs, hats, and leather, and some trade in corn grown in the vicinity. The town is said by some investigators to receive its name from the erection of its castle by the Saracens, but according to others the present form of the word is only a corruption of Castel sur Azine. The Parliament of Toulouse took refuge within the town in 1595. Population in 1872, 3064.

CASTEL VETRANO, a town of Sicily, near the south-east extremity of the island, 12 miles east of Mazzara, in the province of Trapani. It is well and regularly built, and has a population of about 20,000, many of whom are hereditary tenants of the dukes of Monteleone, who have a palace in the town. Near it are the ruins of the ancient city *Selinus*, which was destroyed by the Carthaginians 409 B.C.

CASTELL, Edmund (*c.* 1606–1685), a learned English Orientalist, was born about 1606, at Hatley, in Cambridgeshire. At the age of fifteen he entered Emmanuel College, Cambridge, but he afterwards changed his residence to St. John's, where he enjoyed the use of a valuable library. His great work was the compiling of his *Lexicon Heptaglotton Hebraicum, Chaldaicum, Syriacum, Samaritanum, Æthiopicum, Arabicum, et Persicum* (London, 1669). Over this book he spent eighteen years, working (if we may accept his own statement) from sixteen to eighteen hours a day; he employed fourteen assistants, and by an expenditure of £12,000 brought himself to poverty, for his lexicon, though full of the most unusual learning, did not find purchasers. His loss was partly compensated by a number of preferments, including a prebend at Canterbury, and the professorship of Arabic at Cambridge. Castell also lent the aid of his erudition to the preparation of Dr. Walton's well-known Polyglott Bible. His MSS. he bequeathed to the University of Cambridge.

CASTELLI, Ignaz Friedrich (1781–1862), an Austrian dramatist, was born on 6th March, 1781, at Vienna. He completed his education at the university in his native town, and entered the profession of law. The leisure left him by his employment in a subordinate Government office he devoted to literary work, in particular to the composition and adaptation of dramatic pieces. Some of his war-songs became exceedingly popular, and so excited the ill-feeling of the French that Castelli had to flee from Vienna and take refuge in Hungary. In 1811 he was made director of the court theatre by Prince Lobkowitz, but he resigned this post in 1814 in order to accompany Count Cavriani to France as secretary. He returned to Vienna with Count Münch-Bellinghausen, and for many years occupied himself entirely with literary work. He died in 1862 at Lilienfeld. From 1840 he had enjoyed a pension from Government. His autobiography appeared in three volumes, 1861–2. His numerous dramas and minor pieces are distinguished only by their light gayety and humor.

CASTELLO, Bernardo (1557–1629), a Genoese portrait and historical painter, born at Albaro near Genoa, was the intimate friend of Tasso, and took upon himself the task of designing the figures of the *Gerusalemme Liberata*, published in 1590; some of these subjects were engraved by Agostino Caracci. Besides painting a number of works in Genoa, mostly in a rapid and superficial style, Castello was employed in Rome, and in the court of the duke of Savoy.

CASTELLO, Giovanni Battista (1500–1569), an eminent Italian historical painter, was born in Bergamo, and is hence ordinarily termed Il Bergamasco. He belongs, however, to the school of Genoa, but does not appear to have had any family relationship with the other two painters named Castello, also noticed here. He was employed to decorate the Nunziata di Portoria in Genoa, the saloon of the Lanzi Palace at Gorlago, and the Pardo Palace in Spain. His best-known works are the Martyrdom of St. Sebastian, and the picture of our Saviour as Judge of the World on one of the vaultings of the Nunziata. He was an architect and sculptor as well as painter. In 1567 he was invited to Madrid by Philip II., and there he died, holding the office of architect of the Royal Palaces.

CASTELLO, Valerio (1625–1659), was the youngest son of Bernardo Castello, noticed above. He surpassed his father, and particularly excelled in painting battle-scenes. He painted the Rape of the Sabines, now in the Palazzo Brignole, Genoa, and decorated the cupola of the Church of the Annunciation in the same city. In these works he is regarded by his admirers as combining the fire of Tintoretto with the general style of Paolo Veronese; his premature death cut short a career of high hopes.

CASTELLON DE LA PLANA, a town of Valencia, in Spain, the capital of a modern province, is situated about 4 miles from the sea, and 40 miles N.N.E. of Valencia, in 39° 57′ N. lat. and 0° 4′ W. long. It derives its name from the extensive plain in which it is situated, and which is watered artificially by an aqueduct brought for the most part through solid rock from the Mijares, a stream about five miles distant. It is walled, and contains two nunneries, three monasteries, and two hospitals, as well as several churches, in which there are paintings by Ribalta, a native artist. There is a brisk local trade maintained in the weaving of sail-cloth and linen. In the time of the Moors the city was situated on a height to the north of the present position, to which it was removed by Jayme I. in 1233. Population, 20,123.

CASTELNAU, Michel de, Sieur de la Mauvissière (*c.* 1520–1592), a French soldier and diplomatist, ambassador to Queen Elizabeth, was born in Touraine about 1520. He was one of a large family of children, and his grandfather, Pierre de Castelnau, was equerry to Louis

XII. Endowed with a clear and penetrating intellect and remarkable strength of memory, he received a careful education, and made rapid progress in his studies. To complete his education he travelled in Italy and made a long stay at Rome. He then spent some time in the Island of Malta, afterwards entered the army, and made his first acquaintance with the art of war in the chequered campaigns of the French in Italy. His abilities and his courage won for him the friendship and protection of the cardinal of Lorraine, who took him into his service. In 1557 a command in the navy was given to him, and the cardinal proposed to get him knighted. This, however, he declined, and then rejoined the French army in Picardy. Various delicate missions requiring tact and discretion were entrusted to him by the constable de Montmorency, and these he discharged so satisfactorily that he was sent by the king, Henry II., to Scotland, with despatches for Mary Stuart, then betrothed to the Dauphin (afterwards Francis II.). From Scotland he passed into England, and treated with Queen Elizabeth respecting her claims on Calais (1559), a settlement of which was effected at the congress of Cambray. Castelnau was next sent, with the title of ambassador, to the princes of Germany, for the purpose of prevailing upon them to withdraw their favor from the Protestants. This embassy was followed by missions to Margaret of Parma, governess of the Netherlands, to Savoy, and then to Rome, to ascertain the views of Pope Paul IV. with regard to France. Paul having died just before his arrival, Castelnau used his influence in favor of the election of Pius IV. Returning to France he once more entered the navy, and served under his former patron. It was his good fortune, at Nantes, to discover the earliest symptoms of the conspiracy of Amboise, which he immediately reported to the Government. After the death of Francis II. (December, 1560), he accompanied the Queen, Mary Stuart, to Scotland, and remained with her a year, during which time he made several journeys into England, and attempted to bring about a reconciliation between Mary and Queen Elizabeth. The wise and moderate counsels which he offered to the former were unheeded. In 1562, in consequence of the civil war in France, he returned there. He was employed against the Protestants in Brittany, was taken prisoner in an engagement with them and sent to Havre, but was soon after exchanged. In the midst of the excited passions of his countrymen, Castelnau, who was a sincere Catholic, maintained a wise self-control and moderation, and by his counsels rendered valuable service to the Government. He served at the siege of Rouen, distinguished himself at the battle of Dreux, took Tancarville, and contributed in 1563 to the recapture of Havre from the English. During the next ten years Castelnau was employed in various important missions;—first to Queen Elizabeth, to negotiate a peace; next to the duke of Alba, the new governor of the Netherlands. On this occasion he discovered the project formed by Condé and Coligny to seize and carry off the royal family at Monceaux (1567). After the battle of St. Denis he was again sent to Germany to solicit aid against the Protestants; and on his return he was rewarded for his services with the post of governor of Saint-Dizier, and a company of ordonnances. At the head of his company he took part in the battles of Jarnac and Moncontour. In 1572 he was sent to England by Charles IX., to allay the excitement created by the massacre of St. Bartholomew; and the same year he was sent to Germany and Switzerland. Two years later he was reappointed by Henry III. ambassador to Queen Elizabeth, and he remained at her court for ten years. During this period he used his influence to promote the marriage of the queen with the duke of Alençon, with a view especially to strengthen and maintain the alliance of the two countries. But Elizabeth made so many promises only to break them that at last he refused to accept them or communicate them to his Government. On his return to France he found that his château of La Mauvissière had been destroyed in the civil war; and as he refused to recognize the authority of the League, the duke of Guise deprived him of the governorship of Saint-Dizier. He was thus brought almost to a state of destitution. But on the accession of Henry IV., the king, who knew his worth, and was confident that although he was a Catholic he might rely on his fidelity, gave him a command in the army, and entrusted him with various confidential missions. Castelnau died at Joinville in 1592. The *Mémoires* left by this great diplomatist rank very high among the original authorities for the period they cover, the eleven years between 1559 and 1570. They were written during his last embassy in England for the benefit of his son; and they possess the merits of clearness, veracity, and impartiality. They were first printed in 1621; again with additions by Le Laboureur, in 2 vols. folio, in 1659; and a third time, still further enlarged by Jean Godefroy, 3 vols. folio, in 1731. Castelnau translated into French the Latin work of Ramus *On the Manners and Customs of the Ancient Gauls*. Various letters of his are preserved in the Cottonian and Harleian collections in the British Museum.

CASTELNAUDARY, the chief town of an arrondissement in the department of Aude, in France, 21 miles north-west of Carcassonne. It is finely situated on an elevation in the midst of a fertile and well-cultivated plain; and its commercial facilities are greatly increased by the Canal du Midi, which widens out, as it passes the town, into an extensive basin or reservoir, surrounded with wharves and warehouses. The principal buildings are the courthouses, the church of St. Michel, the exchange, and the communal college. There are large manufactures of woollen and cotton goods, linen, leather, bricks, tiles, and earthenware; and an extensive trade is maintained in lime, gypsum, grain, fruits, and wine; and the building of canal boats forms an important industry. By some authorities Castelnaudary is supposed to represent the ancient *Sostomagus*, and to receive its present name, which they regard as a corruption of the Latin Castrum Novum Arianorum, from the fact that it was rebuilt by the Visigoths, who were adherents of the Arian party. It is distinctly mentioned in the 12th century, and in 1212 it was remarkable as the scene of a great conflict between the counts of Toulouse and Foix and Simon de Montfort, in which the former were defeated. In 1229 the town was deprived of its ramparts; and in 1355 it was captured and burned by the Black Prince. In 1632 the duke of Montmorency was defeated here by the royal troops under Schomberg. Population in 1872, 7946.

CASTELO BRANCO (*i.e.*, White Castle), a town and bishop's seat of Portugal, in the province of Beira, on a hill near the Liria, 64 miles east by south of Coimbra. It is surrounded by walls flanked by towers, and has a ruined castle on the summit of the hill. Population about 5580.

CASTI, Giovanni Battista (1721–1803), an Italian poet, was born of humble parents at Montefiascone, in the States of the Church, in 1721. He rose to the dignity of canon in the cathedral of his native place, but gave up his chance of church preferment to satisfy his gay and restless spirit by visiting most of the capitals of Europe. In 1782, on the death of Metastasio, he was appointed *Poeta Cesario*, or poet-laureate of Austria, in which capacity he applied himself with great success to the opera bouffe; but, in 1796, he resigned this post, in order that he might not be hampered by political relations; and he spent the close of his life as a private gentleman at Paris, where he died in 1803. Casti is best known as the author of the *Novelle Galanti*, and of *Gli Animali Parlanti*, a poetical allegory, over which he spent eight years (1794–1802), and which, notwithstanding its tedious length, excited so much interest that it was translated into French, German, and Spanish, and (very freely and with additions) into English in W. S. Rose's *Court and Parliament of Beasts* (Lond. 1819). Written during the time of the Revolution in France, it was intended to exhibit the feelings and hopes of the people, and the defects and absurdities of various political systems. The *Novelle Galanti* is a series of poetical tales, in the *ottava rima*,—a metre largely used by Italian poets for that class of compositions. The sole merit of these poems consists in the harmony and purity of the style, and the liveliness and sarcastic power of many passages. They are, however, characterized by the grossest licentiousness; and there is no originality of plot,—that, according to the custom of Italian novelists, being taken from classical mythology or other ancient legends. Among the other works of Casti is the *Poema Tartaro*, a mock-heroic satire on the court of Catherine II., with which he was personally acquainted.

CASTIGLIONE DELLE STIVIERE, a town of Italy, in the province of Brescia, 20 miles north-west of Mantua. It has a castle, a theatre, and two fine churches, and was formerly the capital of a small principality dependent on the duchy of Mantua. In 1796 the Austrians, under Wurmser, were defeated there by Marshal Augereau, who

was afterwards rewarded by Napoleon with the title of duke of Castiglione. Population, 5237. This town must not be confounded with Castiglione Fioretino, a flourishing township, about 11 miles south of Arezzo by rail, which is chiefly engaged in the culture of the silk-worm.

CASTIGLIONE, Baldassare (1478–1529), diplomatist and man of letters, was born at Casatico near Mantua, and was educated at Milan under the famous professors Merula and Chalcondyles. In 1496 he entered the service of Lodovico Sforza, duke of Milan, returning to Mantua in 1500 when Lodovico was carried prisoner into France. In 1504 he was attached to the court of Guidobaldo Malatesta, duke of Urbino, and in 1506 he was sent by that prince on a mission to Henry VII. of England, who had before conferred on Federigo Malatesta, "the Good Duke," the most famous mercenary of his age, the order of the Garter. Guidobaldo dying childless in 1508, the duchy of Urbino was given to Francesco Maria della Rovere, for whom Castiglione, envoy at the court of Leo X. (Medici), obtained the office of generalissimo of the Papal troops. Charged with the arrangement of the dispute between Clement VII. (Medici) and Charles V., Castiglione crossed, in 1524, into Spain, where he was received with highest honors, being afterwards naturalized, and made bishop of Avila. In 1527, however, Rome was seized and sacked by the Imperialists under Bourbon, and in the July of the same year the surrender of the castle of Sant' Angelo placed Clement in their hands. Castiglione had been tricked by the emperor, but there were not wanting accusations of treachery against himself. He had, however, placed fidelity highest among the virtues of his ideal "courtier;" and when he died at Toledo in 1529, it was said that he had died of grief and shame at the imputation. The emperor mourned him as "one of the world's best cavaliers." A portrait of him, now at the Louvre, was painted by Raphael, who disdained neither his opinion nor his advice.

Castiglione wrote little, but that little is of rare merit. His verses, in Latin and Italian, are elegant in the extreme; his letters (Padua, 1769–1771) are full of grace and finesse. But the book by which he is best remembered is the famous treatise, *Il Cortegiano*, written in 1514, published at Venice by Aldus in 1528, and translated into English by a certain Thomas Hoby as early as 1561. This book, called by the Italians *Il Libro d'Oro*, and remarkable for its easy force and undemonstrative elegance of style no less than for the nobility and manliness of its theories, describes the Italian gentleman of the Renaissance, under his brightest and fairest aspect, and gives a charming picture of the court of Guidobaldo da Montefeltre, duke of Urbino, "confessedly the purest and most elevated court in Italy." In the form of a discussion held in the duchess's drawing-room—with Elizabetta Gonzaga, Pietro Bembo, Bernardo Bibbiena, Giuliano de' Medici, Emilia Pia, and Ceretino the Unique among the speakers—the question, What constitutes a perfect courtier? is debated. With but few differences, the type determined on is the ideal gentleman of the present day. See Ginguené, *Histoire Litteraire de l'Italie*, vi., vii.; and J. A. Symonds, *The Renaissance in Italy*, London, 1875.

CASTIGLIONE, Giovanni Benedetto (1616–1670), currently named in Italy Il Grechetto, and in France Le Benédette, a painter of the Genoese School, was born in Genoa, and studied for some time under Vandyck. He painted portraits, historical pieces, and landscapes, but chiefly excelled in fairs, markets, and rural scenes with animals. His paintings are to be found at Rome, Venice, Naples, Florence, and more especially Genoa and Mantua. He also executed a great number of etchings, which are spirited, free, and full of taste; Diogenes searching for a Man is one of the principal of these. The etchings are remarkable for light and shade, and have even earned for Castiglione the name of "a second Rembrandt." The *Presepio* (Nativity of Jesus) in the church of San Luca, Genoa, ranks among his most celebrated paintings; the Louvre also contains eight characteristic examples. In his closing years he lived in Mantua, painting for the court; here he received his name of "Grechetto," from the classic air of his pastorals, and here he died of gout in 1670. His brother Salvatore and his son Francesco excelled in the same subjects; and it is thought that many paintings which are ascribed to Benedetto are only copies after him, or perhaps originals by his son or brother.

CASTIGLIONE, Carlo Ottavia, Count (1784–1849), an Italian philologist of considerable reputation, was born at Milan of an ancient family. His principal work was done in connection with the Arabic and other Oriental languages; but he also performed good service in several other departments. In 1819 he published *Monete Cufiche del Museo di Milano*, and assisted Cardinal Mai in his *Ulphilæ partium ineditarum in Ambrosianis palimpsestis repertarum editio*. A learned *Mémoire geographique et numismatique sur la partie orientale de la Barbarie appelée Afrikia par les Arabes* appeared in 1826, and established his reputation. In 1829 he published by himself the Gothic version of the second epistle of Paul to the Corinthians; and this was followed by the Gothic version of the epistle to the Romans, the first epistle to the Corinthians and the epistle to the Ephesians in 1834; by Galatians, Philippians, and 1 Thessalonians in 1835, and by 2 Thessalonians in 1839. His life was written by Biondelli, and appeared at Milan in 1856.

CASTILE (in Spanish, *Castilla*), an ancient kingdom of Spain occupying the central districts of the peninsula. For its history as a separate kingdom see the article Spain. The name Castile is derived from the existence of numerous forts (*castillos*) erected on the frontiers to afford protection from enemies. The northern part of the old kingdom, which was first rescued from the Moors, is called *Castilla la Vieja*, or Old Castile; the southern, more recently acquired, is called *Castilla la Nueva*, or New Castile. The length of Castile from north to south is about 300 miles; the breadth, about 160 miles; and the total area about 45,000 square miles, or nearly one-fourth that of Spain.

Old Castile is bordered on the N. by the Bay of Biscay, on the E. and N.E. by Biscay, Alava, Navarre, and Aragon, on the S. by New Castile, and on the W. by Leon and Asturias. It is divided into the provinces of Burgos, Logroño, Santander, Soria, Segovia, Avila, Palencia, Valladolid, and has an area of 25,409 square miles, and a population estimated in 1870 at 1,689,864 inhabitants. The country consists of vast plains, which form, between the Cantabrian chain in the north and the chain of Sierras stretching south-west from Aragon to Estremadura, a great table-land, of a height between 2500 and 4000 feet above the sea. The principal rivers are the Douro and the Ebro. The plains are barren and dry, with scarcely a tree, meadow, or spring of water; but the hills bordering the mountain ranges are well clothed with oak-forests. The climate is healthy, but subject to great extremes of cold and heat; frosts in the higher regions may last three months at a time. The soil is productive, but poorly cultivated; the harvests of wheat, however, are abundant. Wine and oil of inferior quality, and madder, are produced in considerable quantity, but fruits are scarce except at Bureba. The export trade is chiefly in wool, cattle, sheep, and wheat. The bad state of the roads (which are often impassable for mules), the insufficiency of railway communication, and the neglected condition of the Port of Santander, are great obstacles to commerce.

New Castile is bounded on the N. by Old Castile, on the E. by Aragon and Valencia, on the S. by La Mancha, on the W. by Estremadura. It forms the southern portion of the great central table-land of Spain, and comprises the provinces of Madrid, Toledo, Guadalajara, and Cuenca. The total area is 20,178 square miles, inhabited by a population estimated in 1870 at 1,277,123. The principal mountain ranges are the Sierra Guadarama in the north, and the Sierra Morena in the south. The chief rivers are the Tagus, Guadiana, Guadalquiver, Segura, and Xucar. The climate is more rigorous than that of Old Castile, and the mean temperature, on account of the elevation of surface, is not more than 59°; but the heat in summer is extreme in the valleys. The rainfall is not more than 10 inches in a year; the winds are dry and violent. The whole country presents the aspect of a barren dusty steppe, with patches of olive-trees here and there, and wheat, pea, and saffron fields. During the rainy season the vegetation is very luxuriant; but agriculture is in a backward state; the soil is fertile, but the rivers are not used for its irrigation. The total quantity of wheat raised is barely sufficient for the wants of the population. Hemp and flax and olive-trees are cultivated. Timber and fire-wood are becoming dearer, as the country is very little wooded. Honey is

gathered in considerable quantities; and sheep, oxen, and mules are reared in great numbers. Iron, salt, and quicksilver are worked; the mineral resources are good, but ill developed. The manufactures are chiefly of woollen goods, plain and figured velvets, silks, satins, calicoes, stockings, earthenware, and cutlery.

The inhabitants of both Old and New Castile are a loyal and manly race, preserving the primitive simplicity and pure Spanish, as well as the pride, of their forefathers. They are uneducated and inclined to bigotry, but naturally shrewd and intelligent. The tillage of the land and the pasturing of sheep are their chief employments.

CASTILLEJO, Christobal de (1494–1556), was born, according to Moratin, in Ciudad-Rodrigo. Attached at an early age to the household of Ferdinand of Austria, afterwards king of Bohemia and Hungary, and eventually emperor, Castillejo rose in the prince's service to the post of secretary, taking orders on the departure of his master from Spain, in which country he remained some time. A letter written during this period (1523) by Martin de Salinas to the treasurer Salamanca, in reply to one asking him to provide the treasurer with a secretary, bears flattering witness to the ability and temper of Castillejo, who is warmly recommended to the vacancy. It is not known whether he obtained this post. Certain it is, however, that he soon afterwards followed Ferdinand, and resumed his secretaryship, with but little profit, if we may judge from many passages in his verse, in which he deplores his poverty and the forlorn position unaided merit held at court. He was several times in Venice, where certain of his opuscules were printed for smuggling into Spain,—Castillejo, like Terres Naharro, whose comedies and satires were also published in Italy, being on the *Index* of the Inquisition, on account of the strong anti-clerical bias of his satirical works. He died in a monastery near Vienna, two years before Ferdinand's recognition as emperor.

Castillejo was a voluminous writer of verse. His poems are worthy of note, not only on account of their intrinsic merit, but also as being the last manifestation of importance of the older Spanish School of poetry against the younger section under the leadership of Garcilaso de la Vega. That fine melodist and brilliant rhetorician, the Ronsard of Spain, seconded by Boscan and Hurtado de Mendoza, had introduced into his own land the rhythms and cadences employed in Italy; through him the sonnet, the canzone, the octaves of the comic epics, and even the *terza rima* of the comedy itself had been transplanted into Spanish soil; and he and his followers had created a vocabulary of picked and exquisite terms which, passing through the hands of the magniloquent Herrera, was to end in the monstrous dialect of Gongora and his disciples. Against this revolution Castillejo set his face, fighting gallantly and unavailingly in defence of the antique metrical forms and structures. The use of these he never abandoned, save on one or two occasions when, for purposes of parody, he produced sonnets and octaves. In the poetry of Castillejo, which is written chiefly in "quantillas" and "coplas de pié quebrado," are all the qualities that make the older verse of Spain such pleasant reading—the graceful simplicity, the artless elegance, the fluency and spontaneity (which sometimes, however, degenerates into garrulity), the keen and homely mother wit, often gross but seldom offensive or cruel. He has, however, other qualities which are peculiar to himself, and which give him a place apart even among the school that may be said to end in him; his society verses are bright with a pleasant gossipy amiability; his satires are quick with a certain cynical sprightliness that makes them still amusing and attractive; while one at least of his poems, the "Dialogue between Himself and his Pen," overflows with a humorous tenderness that is extremely effective. Writing on anything and everything—"On a Green and Yellow Costume," "On the Wood Guaiacum," "On a Friend's Horse called Tristram," —he of course produced a cloud of rhymes that are intolerable and to be avoided. Some of his "Villancicos," "Letras," and "Motes," however, are charming in despite of years; a not infrequent note in them reminding the reader somewhat of the quaint graces of Charles of Orleans, with whom in this fondness for elaborate trifles Castillejo may be said to have a certain affinity, though immeasurably his inferior in delicacy of touch and artistic restraint. His principal satires, "The Sermon against Love" and the "Dialogue of the Conditions of Women," are amusing and witty enough; while his "Galatea," an imitation of Ovid, must be regarded as one of the sweetest pieces of pastoral poetry in the whole range of Spanish letters, and, with the exception of the exquisite little anacreontic to Love, as the best of Castillejo's many poems.

The strong anti-clerical feelings of Castillejo, himself an ecclesiastic, have been already remarked. His satires were treated exceedingly ill on this account by the officers of the Inquisition, who did not scruple to excise large portions of them, and to fill up the gaps thus caused with screeds of a contrary tendency, the work of their own hack-rhymesters, who had at this period a great deal of work to do of the same sort. The poems themselves are divided into three books, the first devoted to "Love," and the second to "Conversation and Pastime;" while the third is composed of moral and religious verses. The best text is that given in the *Biblioteca de Autores Españoles*, vol. xxxii., Madrid, 1832.

CASTING. See Founding.

CASTLE (Saxon *castel*, Latin *castellum*, diminutive from *castrum*, whence the French *château* and *chatel*, as in Neufchatel), an encampment, a fortress or place rendered defensible either by nature or art. The term is also often applied to the principal mansion of a prince or nobleman.

The frequent and protracted wars between neighboring tribes and peoples which took place in early times must soon have rendered evident the expediency of erecting forts. These at first consisted only of earthen ramparts or rows of palisades, situated mostly on commanding eminences. With improved methods of assault and the advance of constructive art came erections of wood and stone, which by and by were flanked with towers and surrounded by a wall and ditch. Increased mechanical and architectural skill, while it made little alteration on the fundamental plan of such buildings, gradually introduced numerous contrivances for repelling assault, and rendering a great castle well-nigh impregnable.

Confining our narrative of the progress of castle-building to Britain, we notice first the hill-forts which are ascribed to the ancient Britons. Typical examples of them are the Herefordshire Beacon on the Malvern Hills, and the Barmekin of Echt in Aberdeenshire. The latter consists of the remains of two circular dry stone walls surrounded by three ditches. The inner wall seems to have been about 12 feet thick, and 300 yards in circumference, and contains five entrances, all in an oblique direction. The outer wall, which is said to be more modern than the inner, is much more entire, and has no entrances through it. The ditches are about 9 feet broad.

Of the castella which the Romans erected in this country during their long occupation of it, Richborough Castle near Sandwich in Kent is almost the only relic. It is, from the evidence of coins found there, supposed to have been built, or at any rate completed, in the time of the Emperor Severus. The ruins at present form nearly three sides—the southern, western, and northern—of a rectangle, and it is commonly supposed that the fourth side, the eastern, facing the River Stour, has been destroyed by the giving way of the terrace on which it stood. The length of the southern wall is 260, of the western 460, and of the northern 440 feet.

The height of the walls varies from 10 to 30 feet; and their thickness, from 11 to 12 feet at the base, diminishes slightly towards the top. In the western and northern walls are two openings which are usually denominated the decuman and postern gates. Round towers are said to have existed at the corners, and square ones at convenient distances along the walls, but no traces of them are now to be found. The walls, which are enormously strong and faced with regular courses of squared stones, consist of rows of boulders alternating with courses of bonding tiles. Nearly in the centre of the castle is the base of a cruciform building resting on a substructure of masonry, which is conjectured to have been the *augurale*, where the auguries were taken, and where was situated the *sacellum* for the reception of the ensigns.

Regarding the castles built by our Saxon forefathers our knowledge is scanty. They were probably not very numerous, and some of them were built principally of wood. Alfred, who did so much for the defence of the country, constructed several strongholds which his successors do not seem to have kept up or improved. At all events they offered little resistance to William the Norman,

who, in order effectually to guard against invasions from without as well as to awe his newly-acquired subjects, immediately began to erect castles all over the kingdom, and likewise to repair and augment the old ones. Besides, as he had parcelled out the lands of the English amongst his followers, they, to protect themselves from the resentment of the despoiled natives, built strongholds and castles on their estates, and these were multiplied so rapidly that towards the latter end of the reign of King Stephen they amounted to 1115.

As the feudal system gathered strength, the lords of castles began to arrogate to themselves a royal power, not only within their castles, but likewise in their environs,—exercising judicature both civil and criminal, coining money, and arbitrarily seizing forage and provisions for the subsistence of their garrisons, which they afterwards demanded as a right. Their insolence and oppression grew to such a pitch that, according to William of Newbury, "there were in England as many kings, or rather tyrants, as lords of castles;" and Matthew Paris emphatically styles them "nests of devils and dens of thieves." The licentious behavior of the garrisons having at length become intolerable, it was agreed in the treaty between Stephen and Henry II., when the latter was duke of Normandy, that all the castles built within a certain period should be demolished; in consequence of which many were actually razed, but not the number stipulated.

The style of castle erected in England after the Conquest seems to have been that of buildings of a similar kind in France, such as the castles of Chamboy, Domfront, Falaise, Nogent-le-Rotrou, Beaugency, Loches, Chauvigny, and many others. Like them, the Norman castle was commonly situated on an eminence, or on the bank of a river. The whole site of the castle, which was frequently of great extent and irregular figure, was surrounded by a deep and broad ditch, called the moat or fosse, which could be easily filled with water or left dry. In some of the later castles, before the principal entrances, was placed an outwork called the barbacan, which was a high wall surmounted by battlements and occasionally turrets to defend the gate and the drawbridge, which communicated therewith. The drawbridge across the moat was constructed of wood, and, by means of chains and weights, could be pulled up against the entrance, thus cutting off all communication with the outside. On the inside of the moat stood the outer bailey wall, about 8 or 10 feet thick, and from 20 to 30 feet high, surmounted by a parapet not less than 1 foot thick, with crenellated embattlements or embrasures. This parapet afforded protection to the defenders of the castle, who stood upon the wall, and through the crenelles discharged arrows, darts, and stones at the besiegers. On the wall, and projecting out from it, were built at proper distances square or round towers, sometimes called bastions, generally one story higher than the wall so as to command it. The lower story of the walls and towers was often built with a batter, or slope outwards, to strengthen, and also to keep the assailants farther from, the walls. Thus the defenders were not compelled to lean far over the parapet, and expose their bodies to the archers of the enemy who were placed at a distance to guard those engaged in undermining the walls. In one of the towers and sometimes in the wall near a tower was the postern gate at a considerable distance from the ground. This gate was used for the egress of messengers during a siege. The principal entrance or main gate of the castle was of great strength, and was usually flanked with strong towers having embattled parapets. It was made of wood, cased with iron, and was rendered doubly secure by an iron portcullis which slid downwards in grooves in the masonry. Within the outer wall was a large open space or court called the outer bailey, bayle, or ballium, in which stood commonly a church or chapel. On the inside of the outer bailey and surrounded by a ditch stood another wall and parapet, with gate and towers similar to those on the outer wall. Round the inside of this inner wall were arranged the offices for the servants and retainers, the granaries, storehouses, and other necessary buildings. These constituted the inner bailey. Within all these was the keep, built sometimes on an artificial mound. It was a large, high, square or rectangular tower more strongly fortified than any of the other parts of the castle, and was the last resort of the garrison when all the outworks were taken. Its walls, from 10 to about 20 feet in thickness at the base, and diminishing towards the top, on which was placed an embattled parapet, often admitted of chambers and staircases being constructed in them. On each side of the keep there was usually a flat Norman buttress, and at the corners were embattled turrets carried one story higher than the parapet, as may be seen in the keeps of Rochester, Newcastle, &c.

Fig. 1.—Rochester Keep.

The entrance was on the first floor, and was reached by an open flight of steps, which could be readily defended, or by a staircase in a turret at one of the angles. The interior was divided by a strong middle partition wall, in which were openings for communication with the different apartments. In this wall was the well of the castle, often of great depth, and with a shaft ascending through all the stories to the top of the keep. The several floors were of stone or wood. The basement floor contained the storerooms and the dungeon for prisoners, and had no lights from the outside. On the first floor were situated the soldiers' apartments, guard-room, &c., lighted only by small loopholes. The second floor was taken up by the baronial hall in which the baron or governor and his retainers dined. The third floor contained, probably, the chapel and apartments of the governor and his family. The two upper floors were lighted by small round-headed Norman windows. Although there were unquestionably great va-

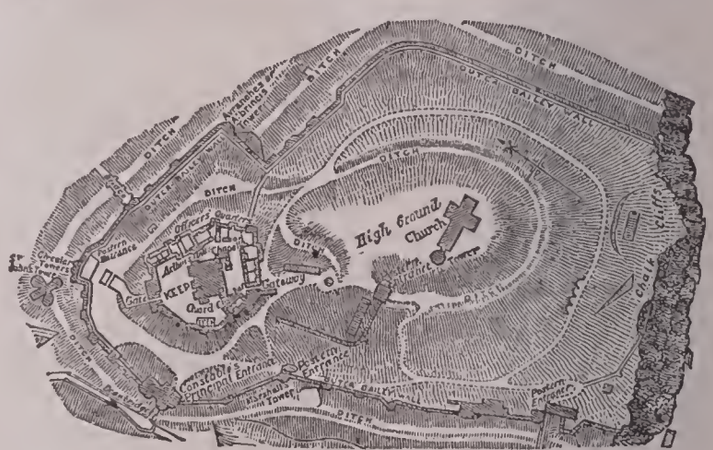


Fig. 2.—Ground-Plan of Dover Castle.

riations in the structure of castles, yet the most perfect of them were built on the plan above described. As an illustration we give a ground-plan of Dover Castle copied by permission from *The Architect*.

The towers along the outer bailey wall (such as Avranches tower, Marshall's tower, and the Constable's tower in Dover Castle) were, in the case of royal castles, each protected by men of approved fidelity and valor, to whom estates were granted on condition of their performing castle-guard. Each had also to keep his particular tower in repair, and supply the requisite number of men to defend it during a siege. In process of time these services were commuted for annual rents, sometimes styled wardpenny and waytfee, but commonly castle-guard rents, payable on fixed days, under prodigious penalties called sursizes. At Rochester, if a man failed in the payment of his rent of castle-guard on the feast of St. Andrew, his debt was doubled every tide while the payment was delayed. These were afterwards restrained by an Act of Parliament made in the reign of Henry VIII., and finally annihilated, with the tenures by knight's service, in the time of Charles II. Such castles as were private property were guarded either by mercenary soldiers, or by the tenants of the lord or owner. Windsor, Warwick, Kenilworth, Conway, Carnarvon, and many others of the later Norman castles differ from the earlier ones chiefly in the structure of the keep, which contained in some instances an open quadrangular court, and had the chapel, the hall, and the state apartments arranged round the sides. The turrets at the corners and on the walls were of various shapes, round, square, and polygonal, and had embrasures and machicolations.

The machicolations were corbelled projections, with apertures between, down which stones could be thrown, or molten lead poured, on the assailants. The principal entrances were defended by large circular towers, with machicolations over the front of the gate, and sometimes more than one portcullis.

The Scotch castles were in general square or rectangular keeps or peels, and depended for their security greatly upon their site. Some of them were situated on precipitous

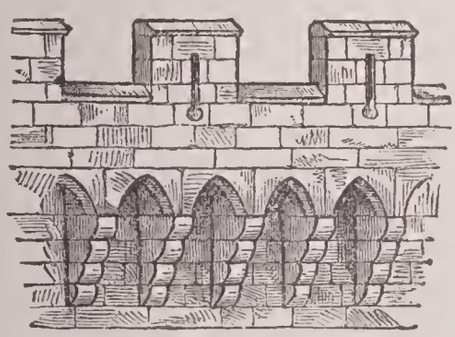


Fig. 3.—Machicolations and Battlemented Parapet.

rocks on the sea-coast, such as Fast, Tantallon, Dunottar; others on islands in a lake or river, such as Lochleven and Threave. Edinburgh and Stirling castles, like many others in England and on the Continent, illustrate well one of the functions often discharged by fortresses, that of forming a nucleus for a village or city.

As civilization advanced and the country enjoyed more peace and security, buildings were erected with a greater regard to comfort and elegance, though still retaining many of the features of a fortress, such as the moat, the drawbridge, and the gatehouse. Examples of these castellated mansions are seen in Caistor, Norfolk, and Herstmonceaux, Sussex, erected in the fifteenth century. But it should not be forgotten that many of the castles of older date were by subsequent repairs, improvements, and adaptations so transformed in course of time as to resemble more modern structures. Castles of recent date are merely imitations of these with some of their features preserved for ornament.

See Grose's *Antiquities*, King's *Munimenta Antiqua*, Britton's *Architectural Antiquities*, Brayley's *Ancient Castles of England and Wales*, Beattie's *Castles and Abbeys of England*, Billings's *Baronial and Ecclesiastical Antiquities of Scotland*, M. Viollet-le-Duc's *Dictionnaire de l'Architecture*, M. de Caumont's *Abécédaire ou Rudiment d'Archeologie*, and many notices in various architectural and archæological periodicals. (R. M'K.)

CASTLEBAR, a town of Ireland, the capital of the county of Mayo, situated on the river of the same name, 159 miles west by north of Dublin. It consists chiefly of a main street upwards of half a mile in length and a square in which are the county courts and public offices. It also possesses a jail, an Episcopal church, a Roman Catholic chapel, a lunatic asylum, a county infirmary, a linen hall, artillery and infantry barracks, and a workhouse. There are some breweries, and a considerable trade in linens and agricultural produce. Two newspapers are published in the town. The castle, which gives its name to the town, was a fortress of the De Burgh family; but the town itself is of more modern origin. In 1641 the castle was held for the Parliament by Sir Henry Bingham, but he was forced to surrender to Lord Mayo, and fell a victim, with all his garrison, to the fury and treachery of the besiegers. The massacre was afterwards avenged, in 1653, by the execution of Sir Theobald Burke (by that time Lord Mayo), who had been in command along with his father at the siege. In 1798 the town was occupied for some weeks by the French under General Humbert, who had defeated the English under Luke J. Hutchison in a conflict which is jocularly styled the "Castlebar Races." Population in 1871, 3508.

CASTLEREAGH, Lord. See Londonderry, Marquis of.

CASTLETOWN (in Manx, Bully Cashtel), the capital of the Isle of Man, and seat of the Manx Government, stands on the western side of Castletown Bay, 11 miles south-west of Douglas, on both banks of the Silverburn. It is neat and regularly built, and has a large square containing some handsome houses. In the centre of the town stands Castle Rushin, which owes its foundation to the Danish chief, Guthred, in 960, and after serving for generations as the residence of the kings of Man, is now partly used as a prison and barracks. In its vicinity is the House of Keys, where the members of the Manx Parliament hold their sessions. The chief educational establishment is King William's College, situated about a mile and a half to the north of the town. It was originally erected about 1830–3; but a complete restoration was rendered necessary by fire in 1844, and it has since been enlarged, in 1862. Castletown also possesses a new town-house, a market-house dating from 1830, and several other public buildings; there are breweries, limekilns, and corn mills in the town and neighborhood; and a small shipping-trade is maintained. Population in 1871, 2320.

CASTOR AND POLLUX, in Greek and Roman mythology, were twin gods, also known under the name of Dioscuri (Διόσκουροι, from Ζεύς, Δίος, Jupiter, and κοῦροι, children), for, according to one myth, they were children of Jupiter and Leda, whose love the god had won under the form of a swan. In some versions Leda is represented as having brought forth two eggs, from one of which were born the mortal babes Castor and Clytæmnestra, from the other the immortal Pollux or Polydeuces and Helen. According to others only the latter two were children of Zeus, and in Homer all are said to be children of Leda and Tyndareus, king of Sparta. We find also that the Dioscuri were specially reverenced among people of Dorian race, and that they were said to have reigned at Sparta. Müller therefore suggests that the myth arose from the apotheosis of certain human Tyndaridæ, round whom gradually collected fables which originally referred to some ancient Peloponnesian deities.

The Dioscuri presided over public games, Castor being the god of equestrian exercise, Pollux the god of boxing; but both are usually represented on fiery steeds with spears and egg-shaped helmets crowned with stars. They were, besides, the patrons of hospitality; their willing and kindly aid was especially sought by travellers; they, θεοὶ σωτῆρες, ever ready to befriend all who paid them due honor. Their most important exploits are their invasion of Attica, to rescue their sister Helen from Theseus; their share in the hunting of the Calydonian boar, and in the Argonautic expedition, during which they married the daughters of Leucippus; and, lastly, their battle with the sons of Aphareus, in which Castor, the mortal, fell by the hand of Idas. Pollux, finding him dead after the battle, implored Jupiter to be allowed to die with him; but the father of the gods (says Homer) gave his brother life, on condition that both should, on alternate days, descend to Hades. According to another fable, the god marked his approval of their love by placing them together among the stars.

Though their worship was perhaps most carefully observed among people of Dorian origin, they were held in no small veneration at Rome. It was the popular belief in that city from an early period that the battle of Lake Regillus had been decided by their interposition. They had fought, it was said, armed and mounted, at the head of the legions of the commonwealth, and had afterwards carried the news of the victory with incredible speed to the city. The well in the Forum at which they alighted was pointed out, and near it rose their ancient temple. A great festival was kept in their honor on the Ides of Quintilis, believed to be the anniversary of the battle, and sumptuous sacrifices were offered to them at the public charge. It was further ordained that a grand muster and inspection of the equestrian body should be part of the ceremonial. All the knights, clad in purple and crowned with olive, were to meet at a temple of Mars in the suburbs. Thence they were to ride in state to the forum, where stood the temple of the twins. This pageant was during several centuries one of the most splendid sights of Rome. In the time of Dionysius the cavalcade consisted of 5000 horsemen, all persons of fair repute and independent fortune.

CASTOR OIL, the fixed oil obtained from the Castor Oil Plant or Palma Christi, *Ricinus communis*, belonging to the Natural Order *Euphorbiaceæ*. The plant is a native of the East Indies, but it has been introduced, and is now cultivated, in most tropical and in the warmer temperate countries. In size it varies from a shrubby plant to a tree of from 30 to 40 feet in height according to the climate in which it grows, being arborescent in tropical latitudes. On account of its very large beautiful palmate-peltate leaves, which measure as much as 2 feet in diameter, it is cultivated as an ornamental plant. In the south of England, with the habit of an annual, it ripens its seeds in favorable seasons; and it has been known to come to maturity as far north as Christiania in Norway. The fruit consists of a tricoccous capsule, covered externally with soft yielding prickles, and each cell develops a single seed. The seeds of the different cultivated varieties, of which there are a great number, differ much in size and in external markings; but average seeds are of an oval laterally compressed form, with their longest diameter about four lines. They have a shining, marble grey and brown, thick, leathery epidermis, within which is a thin dark-colored brittle coat. The cotyledons readily separate, and show a large distinct leafy embryo. The oil is obtained from the seeds by two principal methods—expression and decoction,—the latter process being largely used in India, where the oil, on account of its cheapness and abundance, is extensively employed for illuminating as well as for other domestic and medicinal purposes. The oil exported from Calcutta to Europe, which is said to be "cold drawn and nearly tasteless," is prepared by shelling and crushing the seeds between rollers. The crushed mass is then placed in hempen cloths and pressed in a screw or hydraulic press. The oil which exudes is mixed with water and heated till the water boils, and the mucilaginous matter in the oil separates as a scum. It is next strained, then bleached in the sunlight, and stored for exportation. A considerable quantity of castor oil of an excellent quality is also made in Italy; and in California the manufacture is conducted on an extensive scale. The following is an outline of the process adopted in a Californian factory. The seeds are submitted to a dry heat in a furnace for an hour or thereabout, by which they are softened and prepared to part easily with their oil. They are then pressed in a large powerful screw-press, and the oily matter which flows out is caught, mixed with an equal proportion of water, and boiled to purify it from mucilaginous and albuminous matter. After boiling about an hour, it is allowed to cool, the water is drawn off, and the oil is transferred to zinc tanks or clarifiers capable of holding from 60 to 100 gallons. In these it stands about eight hours, bleaching in the sun, after which it is ready for storing. By this method 100 lb of good seeds yield about 5 gallons of pure oil.

Castor oil is a viscid liquid, almost colorless when pure, possessing only a slight odor, and a mild yet highly nauseous and disagreeable taste. Its specific gravity is ·96, a little less than that of water, and it dissolves freely in alcohol, ether, and glacial acetic acid. It contains palmitic and several other fatty acids, among which there is one—ricinoleic acid—peculiar to itself. In 1864 Tuson isolated from the oil a principle which he denominated an alkaloid under the name of ricinine, and that substance has since been extracted from the leaves, which are used as galactagogues and emmenagogues. Castor oil forms a clean, light-colored soap which dries and hardens well, having no tendency to deliquescence, and is free from smell. It has been recommended for medicinal use.

Castor oil is one of the most extensively useful of purgative medicines known; and the only one which, under certain circumstances, can with safety be administered. Its purgative properties were supposed by Soubeiran to be due to the presence of an acrid oleo-resin and to ricinolein, but the constituents of the oil have not yet been satisfactorily studied in their physiological relations. The seeds themselves, or the oil extracted by alcohol, owing to the larger proportion of the drastic principle they contain, act much more powerfully than the common oil. The nauseous taste of castor oil is the one great impediment to its use, and many methods have been suggested for overcoming its unpleasant flavor. The most common devices are—enclosing it in capsules, floating it in various palatable liquids, or preparing emulsions of the oil with such substances as dissolved gum-arabic and simple syrup.

CASTRÉN, Matthias Alexander (1813–1853), one of the greatest authorities on the ethnology and languages of the Northern Asiatic nations, was born at Tervola, in the parish of Kemi in Finland, on 20th November (2d December), 1813. His father, Christian Castrén, parish minister at Rovaniemi, died in 1825; and Matthias passed under the protection of his uncle, Mathias Castrén, the kindly and learned incumbent of Kemi. At the age of twelve he was sent to school at Uleaborg, and there he helped to maintain himself by teaching the younger children. On his removal to the Alexander's University at Helsingfors in 1830, he first devoted himself to Greek and Hebrew with the intention of entering the church; but his interest was soon excited by the language of his native country, and he even began before his course was completed to lay the foundations of a work on Finnish mythology. The necessity of personal explorations among the still unwritten languages of cognate tribes soon made itself evident; and in 1838 he was glad to join a medical fellow-student, Dr. Ehrström, in a journey through Lapland. In the following year he travelled in Russian Karelia at the expense of the Literary Society of Finland; and in 1841 he undertook, in company with Dr. Elias Lönnrot, the great Finnish philologist, a third journey, which ultimately extended beyond the Ural as far as Obdorsk, and occupied a period of three years. Before starting on this last expedition he had published a translation into Swedish of the Finnish epic of *Kalevala;* and on his return he gave to the world his *Elementa grammatices Syrjaenæ* and *Elementa grammatices Tschcremissæ*, 1844. No sooner had he recovered from the illness which his last journey had occasioned than he set out, under the auspices of the Academy of St. Petersburg and the Helsingfors University, on an exploration of the whole government of Siberia, which resulted in a vast addition to previous knowledge, but seriously affected the health of the adventurous investigator. The first-fruits of his collections were published at St. Petersburg in 1849 in the form of a *Versuch einer Ostjakischen Sprachlehre.* In 1850 he published a treatise *De affixis personalibus linguarum Altaicarum*, and was appointed professor at Helsingfors of the new chair of Finnish language and literature. The following year saw him raised to the rank of chancellor of the university; and he was busily engaged in what he regarded as his principal work, a Samoyedic Grammar, when he died on 7th May, 1853. Five volumes of his collected works appeared from 1852 to 1858, containing respectively—(1.) *Reseminnen fran aren* 1838–1844; (2.) *Reseberättelser och bref aren* 1845–1849; (3.) *Föreläsningar i Finsk mythologi;* (4.) *Ethnologiska föreläsningar öfver Altaiska folken;* and (5.) *Smärre afhandlingar och akademiska dissertationer.* A German translation has been published by Anton Schiefner, who was also intrusted by the St. Petersburg Academy with the editing of his manuscripts which had been left to the Helsingfors University. The Samoyedic Grammar (1854), a Samoyede Vocabulary (1855), a Tungusian Dictionary (1856), and studies on the Buriatic (1857), the Koibalic and Karagassic (1857), and the Yenisei Ostiak and Kottian dialects have been published.

CASTRENSIS, Paulus, a distinguished professor of civil and canon law, who studied under Baldus at Perugia, and was a fellow pupil with Cardinal Zabarella. He was admitted to the degree of doctor of civil law in the university of Avignon. It is uncertain when he first undertook the duties of a professorial chair. A tradition, which has been handed down by Panzirolus, represents him to have taught law during a period of fifty-seven years. He was professor at Vienna in 1390, at Avignon in 1394, and at Padua in 1429; and he filled at different periods a professorial chair at Florence, at Bologna, and at Perugia, but at what precise periods is not known. He was for some time the vicar-general of Cardinal Zabarella at Florence, and his eminence as a teacher of canon law may be inferred from the language of one of his pupils, who styles him "famosissimus juris utriusque monarca." His most complete treatise is his readings on the *Digest*, and it appears from a passage in his readings on the *Digestum Vetus*, that he delivered them at a time when he had been actively engaged for forty-five years as a teacher of civil law. His death is generally assigned to 1436, but it appears from an entry in a MS. of the *Digestum Vetus*, which is extant at Munich, made by the hand of one of his pupils, who styles him "præceptor meus," that he died on the 20th July, 1441.

CASTRES, the chief town of an arrondissement in the department of Tarn, France, 23 miles south-east of Alby, stands in a pleasant and fertile valley, on both sides of the Agout, here crossed by two bridges. The town is ill built, and the streets are narrow and crooked; but it has been much improved during the present century. The principal buildings are the town-hall, formerly the episcopal palace, which was built by Mansart, the churches of St. Benoît (dating from the 17th century) and Nôtre Dame de la Platé, a modern courthouse, two hospitals, barracks, a theatre, and an exchange. It is the seat of tribunals of primary instance and commerce, and of a Protestant consistory. Castres is celebrated for its manufactures, among which are woollen, linen, silk, and cotton stuffs, soap, leather, paper, and iron and copper wares. It has also a considerable trade. Dacier, Rapin, and Sabatier were natives of the town. Castres grew up round a Benedictine abbey, which is believed to have been founded in the 9th century. It was a place of considerable importance as early as the 12th century, and ranked as the second town of the Albigenses. During the Albigensian crusade it surrendered of its own accord to Simon de Montfort; and in 1356 it was raised to a countship by King John. On the confiscation of the possessions of the D'Armagnac family, to which it had passed, it was bestowed by Louis XI. on Boffilo del Giudice, but the appointment led to so much disagreement that the countship was united to the crown by Francis I. in 1519. In the wars of the latter part of the 16th century the inhabitants sided with the Protestant party, fortified the town, and established an independent republic. They were brought to terms, however, by Louis XIII., and forced to dismantle their fortifications; and the town was made the seat of the *chambre de l'édit*, or chamber for the investigation of the affairs of the Protestants, afterwards transferred to Castelnaudary (in 1679). The bishopric of Castres, which had been erected by John XXII. in 1317, was abolished at the Revolution. Population in 1872, 18,177 in the town, and 23,461 in the commune.

CASTRO, a seaport town of Italy, in the province of Otranto, and 10 miles south-west of the city of that name. It is the seat of a bishopric, and has an old castle and a cathedral. Some export trade is carried on in corn, wine, and fish; but the harbor is accessible only to small vessels. The town is supposed to be the same with the *Castrum Minervæ* of the Romans, which possessed an ancient temple of the goddess whose name it bore, and was described by Virgil as the first place in Italy seen by his hero Æneas.

CASTRO DEL RIO EL REAL, a town of Spain in the province of Cordova. It is situated near the River Guadajocillo, about 16 miles south-east from Cordova, and contains several churches, schools, and hospitals, a handsome town-house, and a prison. Its population is about 9000, and the great majority are employed in agricultural pursuits. Its commerce is confined to the exportation of grain and oil, and its industry to coarse manufactures for domestic purposes.

CASTRO GIOVANNI, the ancient *Enna*, a town of Sicily, in the province of Caltanisetta, about a quarter of a mile south of Caltascibetta, which is situated on the railway between Catania and Girgenti. It lies almost in the centre of the island, and occupies a well-nigh impregnable position on the irregular but spacious summit of a hill which rises in precipitous cliffs to a height of 2790 feet. The town is in general in rather a dilapidated condition, but possesses a number of good ecclesiastical buildings. On the highest point of the hill-top stands the castle, built by Frederic II. of Aragon, probably on the site of the ancient temple of Ceres, which formed the boast of early Sicilians. The town is said by Stephanus of Byzantium to have been founded by Syracuse in the 7th century B.C.; but it first appears in history as a Siculian city. It fell into the hands of Dionysius of Syracuse in 403; and it was afterwards subject to Agathocles. In 309 it was one of the first cities to join the Agrigentines in the war of liberation. During the first Punic war it was held for some time by the Carthaginians, and subsequently betrayed to the Romans; and during the second it was delivered to massacre and plunder by the Roman governor Pinarius, who feared a revolt of the citizens. As headquarters of the insurrection of the slaves from 134 to 132 B.C., it defied the consul Rupilius till treachery came to his aid. From the spoliations of Verres it suffered severely, and its importance gradually diminished under the empire. In 837 the Saracens made a vain attempt to take it by storm; but in 859 it was betrayed into the hands of Abbas ibn Fahdl. In 1080 the Normans entered into possession, and the proof of their occupation is still to be found not only in the remains of their buildings but also in the light hair and blue eyes of many of the present inhabitants. Of Roman architecture there are few remains, and the identification of the ancient site assigned to the myth of the Rape of Proserpine rests on very uncertain evidence. The present form of the name Castro Giovanni appears to have arisen simply from an erroneous interpretation of the Sicilian Castro Janni, which is really nothing more than Castrum Ennæ. Population, about 14,000.

CASTRO NUOVO, a town of Sicily, in the province of Palermo, 25 miles north of Girgenti. In the vicinity there are extensive quarries of colored marble, which have been worked since the time of the Romans. Population, 4300.

CASTRO REALE, a city of the province of Messina, in the island of Sicily, situated on a triangular and rocky mountain about 11 miles south of Milazzo. The climate is salubrious; and excellent wine and oil are produced in the district. Population, about 7700.

CASTRO URDIALES, a seaport town of Spain, in the province of Santander, well known to sailors for the shelter which it affords from storms in the Bay of Biscay. It was destroyed by General Foy in 1813, but has been rebuilt, fortified, and greatly improved. The most remarkable buildings are the castle and the hermitage of Santa Ana. Its fisheries are considerable, and iron-ore and calamine are exported. Population, 3391.

CASTRO, Guillen de (1569–1631), a Spanish dramatist of note, was a Valencian by birth, and early enjoyed a reputation as a man of letters. In 1591, with Aguilar and Artieda, he was a member of the *Nocturnos*, a brilliant Spanish imitation of the Italian *Accademia*. At one time a captain of horse, at another the protégé of the munificent Benevente, viceroy of Naples, of whom he received the governorship of a Neapolitan fortress, patronized and splendidly pensioned by the duke of Osuña and the count-duke Olivarez, Guillen de Castro would seem to have made friends with his pen as quickly and as easily as he unmade them by his sour humor and discontented obstinacy. Little is known of the literary part of his life. He lived at Madrid, and wrote for the stage. It is certain, too, that he long enjoyed the friendship of Lope de Vega, who dedicated a play to him in flattering terms, and whom he assisted at the famous festival of the Canonization of San Isidro, where he won a prize in the literary tournament contested by Jauregui, Calderon, Juan de Montalvan, and others. He is said, moreover, to have died in such poverty as to have owed his funeral to charity. Guillen de Castro wrote some forty plays, in all of which he showed himself a follower of Lope de Vega, and a thorough Spaniard in instinct and idea, and in some of which great passions and stirring scenes are treated worthily and well. The best of them are perhaps—(1) *Engañarse Engañando*, (2) *Pagar en propria Moneda*, and (3) *La Justicia en la Piedad*. But the

drama that has made Guillen de Castro's reputation European is *Las Mocedades del Cid*, to the first part of which Corneille was so largely indebted for the materials of his own renowned tragedy. The two parts of this play, like all those of Castro, have the genuine ring of the old songs of the *Romanceros* about them; and, from their intense nationality, no less than for their rough poetry and sweet versification, were, doubtless, among the most popular pieces of their day.

See Schack, *Geschichte der Dramatischen Literatur und Kunst in Spanien*, ii. 428–449; Ticknor, *History of Spanish Literature*, ii. 300–309; *Comedias de Guillen de Castro*, Valencia, 1621; Lord Holland's *Lives of Lope de Vega and Guillen de Castro*, London, 1817; Ribadaneyra, *Biblioteca de Autores Españoles*, vol. xliii.

CASTRO, Inez de (died 1355), called *Collo de Garza*, *i.e.*, "Heron's Neck," was born in Spanish Galicia, in the earlier years of the 14th century. Tradition asserts that her father, Don Pedro Fernandez de Castro, and her mother, Doña Aldonça Soares de Villadares, a noble Portuguese lady, were unmarried, and that Inez and her two brothers were consequently of bastard birth. Educated at the semi-Oriental provincial court of Juan Manuel, duke of Peñafiel, Inez grew up side by side with Costança, the duke's daughter by a scion of the royal house of Aragon, and her own cousin. After refusing several crowned heads in marriage, Costança was at last persuaded to accept the hand of the Infante Dom Pedro, son of Alphonso the Proud, king of Portugal. In 1341 the two girls left Peñafiel; Costança's marriage was celebrated in the same year, and the young Infanta and her cousin went to reside at Lisbon, or at Coimbra, where Dom Pedro conceived that luckless and furious passion for Inez which has immortalized them.

Morganatic marriages among the great were rather the rule than the exception in those times. The only person, therefore, who suffered in the contemplation of the lawless alliance between the Infante and Inez was Costança. In 1345, however, the Infanta died in childbed, and the widower was left in undisturbed possession of his mistress. A wayward, violent man, bold and irresolute, of terrible passions, but subject to strange lapses of will. Dom Pedro, doubtful, perhaps, of the legitimacy of Inez, which debarred her from succession to the throne, took no steps to improve her position in the world's eye till 1354, nine years after Costança's death, when he married her in presence of the bishop of Guarda, and of several of the members of their household. No contract of marriage, however, nor documentary proof of any kind was created for this extraordinary occasion. In 1361 Dom Pedro, then king of Portugal, swore solemnly to Castanhede, that he had been lawfully wedded to Inez; but in 1385 João de Regras had no difficulty whatever, in the absence of written evidence, in setting aside the title of her descendants to the throne.

Alphonso the Proud feared for his grandchild and his kingdom's peace. The Castro family, as much dreaded in Spain as in Portugal, with Inez ready to mount the throne and her brother Pedro Fernandez de Castro rising daily higher in popularity and importance, had many enemies,—among others, three gentlemen, Alvaro Gonçalves, Pedro Coelho, and Diogo Lopes Pacheco. These men, hateful to and fearful of Pedro Fernandez, are said to have used their influence with Alphonso to persuade him to strike down the family through Inez. The old king listened, refused, wavered, and ended by yielding. He went in secret to the palace at Coimbra, where Inez and the Infante resided, accompanied by his three familiars, and by others who agreed with them. The beauty and tears of Inez disarmed his resolution, and he turned to leave her; but the gentlemen about him had gone too far to recede. Inez was stabbed to death, and was buried immediately in the Church of Santa Clara.

The Infante raised at once the flag of revolt against his father, and was only appeased by the concession of a large share in the government. The three murderers of Inez were sent out of the kingdom by Alphonso, who knew his son too well not to be aware that the vengeance would be tremendous as the crime. They took refuge in Castile. In 1357, however, Alphonso died, and the Infante was crowned king of Portugal. Pedro the Cruel, his nephew, reigned over Castile; and the murderers were given up as soon as required. Diogo Lopes escaped through the gratitude of a beggar to whom he had formerly done a kindness; but Coelho and Gonçalves were executed, with horrible tortures, in the very presence of the king.

The story of the exhumation and coronation of the corpse of Inez has often been told. It is said that to the dead body, crowned and robed in royal raiment, and enthroned beside the king, the assembled nobility of Portugal paid homage as to its queen, swearing fealty on the withered hand of the corpse. The gravest doubts, however, exist as to the authenticity of this story; Fernão Lopes, the Portuguese Froissart, who is the great authority for the details of the tragedy of the death of Inez, with some of the actors in which he was personally acquainted, says nothing of the ghastly and fantastic ceremony, though he tells at length the tale of the funeral honors that Pedro the king bestowed upon his wife. Inez was buried at Alcobaça with extraordinary magnificence, in a tomb of white marble, surmounted by her crowned statue; and near her sepulchre Pedro caused his own to be placed. The monument, after repeatedly resisting the violence of curiosity, was broken into in 1810 by the French soldiery; the statue was mutilated, and the yellow hair was cut from the broken skeleton, to be preserved in reliquaries and blown away by the wind. The children of Inez shared her habit of misfortune. From her brother, however, Alvaro Perez de Castro, the house regnant of Portugal directly descends.

See Fernão Lopes, *Chronica del Rey Dom Pedro*, 1735; Camoens, *Os Lusiadas*; Antonio Ferreira's *Ines de Castro*,—the first regular tragedy of the Renaissance after the *Sofonisba* of Trissino; Luis Velez de Guevara, *Reinar despues de morir*, an admirable play; and Ferdinand Denis, *Chroniques Chevaleresques de l'Espagne et du Portugal*.

CASTRO, João de (1500–1548), called by Camoens *Castro Forte*, fourth viceroy of the Portuguese Indies, was the son of Alvaro de Castro, civil governor of Lisbon. A younger son, and destined therefore for the church, he became at an early age a brilliant humanist, discovering also a profound capacity for mathematics. The latter he studied under Pedro Nunez, in company with the Infante Dom Luis, son of Emmanuel the Great, with whom he contracted a life-long friendship. At eighteen he went to Tangiers, where he was dubbed knight by Duarte de Menezes the governor, and where he remained several years. In 1535 he accompanied Dom Luis to the siege of Tunis, where he had the honor of refusing knighthood and reward at the hands of the great emperor Charles V. Returning to Lisbon, he received from the king the small commandership of São Pablo de Salvaterra in 1538. He was exceedingly poor, but his wife, Lenor de Coutinho, a noble Portuguese lady, the exact date of whose marriage with him is not known, admired and appreciated her husband sufficiently to make light of their poverty. Soon after this he left for the Indies in company with his uncle, Garcia de Noronha, and on his arrival at Goa enlisted among the *aventureiros*, "the bravest of the brave," told off for the relief of Diu. In 1540 he served on an expedition under Estabão de Gama, by whom his son, Alvaro de Castro, a child of thirteen, was knighted, out of compliment to him. Returning to Portugal, João de Castro was named commander of a fleet, in 1543, to clear the European seas of pirates; and in 1545 he was sent, with six sail, to the Indies, in the room of Martin de Souza, who had been dismissed the viceroyalty. The next three years were the hardest and most brilliant, as they were the last, of this great man's life,—years of battle and struggle, of glory and sorrow, of suffering and triumph. Valiantly seconded by his sons (one of whom, Fernão, was killed before Diu) and by João Mascarenhas, João de Castro achieved such popularity by the overthrow of Mahmoud, king of Cambodia, by the relief of Diu, and by the defeat of the great army of Adhel Khan, that he could contract a very large loan with the Goa merchants on the simple security of his moustache. These great deeds were followed by the capture of Broach, by the complete subjugation of Malacca, and by the passage of Antonio Moniz into Ceylon; and in 1547 the great captain was appointed viceroy by João III., who had at last accepted him without mistrust. He did not live long to fill this charge, expiring in the arms of his friend, St. Francis Xavier, 6th June of the following year. He was buried at Goa, but his remains were afterwards exhumed and conveyed to Portugal, to be reinterred under a splendid monument in the convent of Bemfica.

See Jacinto Freire de Andrade, *Vida de D. João de Castro*, Lisbon, 1651,—English translation, by Sir Peter Wyche, 1664; João de Barros, *Decada secunda da Asia, bk.* viii.; *Roteiro de Dom Joam de Castro*, Paris, 1833. The last is important as fixing the position of João de Castro among geographers.

CASTROVILLARI, a town of Italy, in the province of Calabria Citra, 7 miles W.N.W. of Cassano. It stands on an eminence surrounded by lofty mountains, and the modern portion contains several handsome streets. The massive castle is supposed to belong to the Norman period. The town carries on a considerable trade in cotton, wine, silk, and fruits, and has about 9400 inhabitants.

CASTRUCCIO CASTRACANI (1283–1328) was by birth a Lucchese, and by descent and training a Ghibelline. He belonged to the family of Antelminelli; and being exiled at an early age with his parents and others of their faction by the Guelfs, then in the ascendant, and orphaned at nineteen, he served as a soldier in England, France, and Lombardy, till he returned to Italy in 1313, and was chosen chief by the Ghibellines, who had again obtained the mastery. To avenge himself on the vanquished faction he called in Uguccione da Faggiuola, lord of Pisa, who treated him ill and perfidiously, putting him in irons and sacking the city of Lucca, in spite of strenuous support received from Castruccio in many arduous enterprises, particularly in that of Montecatini. An insurrection of the Lucchese leading to the expulsion of Uguccione and his party, Castruccio regained his freedom and his position, and the Ghibelline triumph was presently assured. Elected governor of Lucca in 1316, he warred incessantly against the Florentines,—becoming the faithful adviser and staunch supporter of the Emperor Louis V., whom he accompanied to Rome, and who made him duke of Lucca, count of the Lateran palace, and senator of the empire. Castruccio was excommunicated with his master by the Papal Legate, in the interest of the Guelfs, and died soon afterwards, leaving several young children, whose fortunes were wrecked in the Guelfic triumph consequent on their father's death.

Machiavelli's *Life of Castruccio* is a mere biographical romance; it was translated into French, with notes, by Dreux de Radier in 1753. See Nicolas Negrini, *Vita di Castruccio*, Modena, 1496; Sismondi's and Leo's Histories of the Italian Republics; and Wieland, *Dissertatio de Castruccio*, Leipsic, 1779.

CASUISTRY is the application of general moral rules to particular cases, but the word is specially limited to the consideration of cases of possible dubiety, since it is only where difficulty exists that formal treatment is necessary. Any important development of casuistry can only take place under a government by laws expressed in definite precepts; but the development may have its origin in either of two opposite causes, or in a combination of the two—in the desire, namely, to fulfil the laws, or in the desire to evade them, or in a conflict of these desires.

Of these principles a remarkable illustration is given by the Jews. Governed as they were by the written precepts of Moses, they were continually confronted by questions which did not clearly come under any one rule, but of which a solution was required by their extreme reverence for the smallest dicta of their code. This worship of every jot and tittle of the law, which was the most remarkable characteristic of their conscientiousness, determined the nature of their casuistry. It was exact, detailed, unbending, and though often wise and noble, often useless and merely external. Thus it forbade the wearing of a girdle on the Sabbath, decided to a yard how far one might walk on that day, and declared the consequences of an oath by the gift on the altar to be most serious, while an oath by the altar itself was perfectly safe. Its loosest requirements were those which concerned marriage, for it was practically possible to divorce a wife at will. Of these rules some may be found in the Apocrypha, but their great repository is the encyclopædic Talmud, which entered into the minutiæ of conduct with a detail which tended to prevent real obedience to great laws, and which was disastrous to individual freedom. It must, however, be remembered in considering the religious casuistry of the Jews that—as is also remarkably the case with the Mahometans—their religious code was intended to be at the same time their civil law, and that, consequently, part of their casuistry is comprised in our law-books. In fact, the task of our judges is to solve questions of legal casuistry, and the precedents which they make are, so far, comparable to the traditions of the elders.

The early Greeks and the early Romans, in the bright joyousness or the laborious activity of objective life, fully occupied by the pleasures of art or the business of war and politics, with no minutely-detailed code or body of traditions to guide them, troubled themselves little about such problems. When, however, the Greek philosophers and their Roman followers developed moral systems, attention began to be given to this department; at length, such questions as how far suicide is justifiable, or whether duty to the state is more important than duty to a friend, became favorite subjects of debate; and during the first two centuries of the Christian era, elaborate treatises on the subject were produced by the famous Stoic philosophers Epictetus, Seneca, and M. Aurelius.

Christianity brought in a new method of settling casuistical questions—a method directly opposed to that of most of the Jewish scribes, in the midst of whom it had its origin, and consisting in an appeal to the true spirit of great principles. Naturally this method would have left particular cases to the decision of each man's conscience; but the extreme recoil from reckless self-indulgence which gave birth to the monastic ascetic system produced a new kind of casuistical literature. It found its first great representative in Tertullian, a contemporary of M. Aurelius, with whom nearly all sin was mortal, one repentance at most being possible after baptism. The same type of casuistry was taught by others of the fathers, but with the greatest acuteness and power by Augustine, who laid special stress upon the subjective or spiritual side of Christian ethics, insisting upon the principle that the moral worth of action depends upon the disposition of the agent as much as upon the objective nature of the act.

In the Roman Catholic Church, the practice of confession gave rise to a system of casuistry, expressed in the *Libri Pœnitentiales*, which were intended to guide the confessor as to the imposition of penance and the giving of advice. Among the most important of these are the *Summæ* of Raimond of Pennaforti, Angelus, Antonius Augustinus, Pacificus, and Prierias, the work of the last (who was a vigorous opponent of Luther) being an alphabetical compilation from those of his predecessors. Later examples are Amort's *Dictionarium casuum conscientiæ* (1784), and Sobiech's *Compendium theologicæ moralis pro utilitate confessariorum* (1824). Indeed, throughout the Middle Ages, the doctrines of the church being universally accepted as the supreme rules of conduct, the casuistical was the department of moral science which was best developed. In Petrus Lombardus, in Alexander of Hales, and in Aquinas's famous treatise, the *Secunda Secundæ*, we find the uncompromising strictness of the ancient fathers but slightly modified. Abelard, though earlier, took a more indulgent view, but his teaching was condemned by the church, in the synod of Sens (1140).

One of the most favorable conditions for the growth of a system of casuistry is that in which a people, having lost its reverence for the law it once held supreme, and ceased to find obedience tolerable, does not yet dare to deny its authority. Such was the condition in which, during the 16th century, there took place the worst development of casuistry which the world has seen. Men no longer were willing that their liberty should be repressed by the dead rules of a corrupt church, and the Jesuits, animated by the single object of adding to the power of their order, were always ready to make concessions and to soften disagreeable requirements. The most remarkable doctrine which they promulgated—a doctrine which it is hard to believe that any one ever ventured to assert—is that of "Probabilism," according to which any opinion which has been expressed by "a grave doctor" may be looked upon as possessing a fair amount of probability, and may, therefore, be safely followed, even though one's conscience may insist upon the opposite course. With principles so liberal it was hard if one could not find an authority to his mind among Escobar, Suarez, Sanchez, Velasquez, Molina, Bauny, Busenbaum, Toletus, Filiutius, Less, Ponce, and an innumerable host of other "grave" and, as a rule, obliging doctors. Such was the popularity of some of their works that Busenbaum's *Medulla casuum conscientiæ* (1645) ran through fifty-two editions, and Escobar's *Theologia Moralis* (1646) through forty. One of the most amusing of their ruses was that by which they avoided the condemnation of usury. That "money

should breed money" was regarded universally in those days as unnatural; but borrowing was necessary, and no one could be expected to lend without being paid for his risk, and for the use of his capital. The remedy for the Jesuit was easy. There is no sin if you only call the payment not interest but "fair profit;" or if you look upon it as a grateful return by the borrower for the favor done him; or, thirdly, if you prefer it, you can avoid the least appearance of evil by making a "Mohatra" bargain, that is, you sell to the person who wants money a quantity of goods, which he at once sells to you again at a lower rate. For these devices, however, the Jesuits are to be judged the less hardly, since almost all moralists found it necessary to evade the mistaken law. It was mainly by their teaching on the fundamental question of the duty of veracity that they made themselves a by-word and a reproach among men. To settle the limits of this duty is, indeed, one of the most difficult problems in practical ethics; but the Jesuits removed it entirely from the category of obligation. Thus Filiutius and others, from the principle that it is the intention which determines the quality of the action, argue that lying can be avoided by mental reservation, by equivocation, or by introducing words *sotto voce*, and that promises are not binding when the promiser in making them had no intention to bind himself. Equally notorious were their views on murder, which was authorized in revenge for a box on the ear, or to prevent the loss of a trifling sum; and with regard to some other questions, they entered into such prurient details that their bitterest enemies would not quote their words even for the purpose of condemning them. In short, virtue, according to Father Le Moine's *Devotion made Easy*, is not at all the "cross-tempered dame" men represent her as being. The rites and requirements of the church also were modified to suit the taste of the people. For example, if a whole mass be found wearisome, greater expedition can be obtained by having different parts performed simultaneously; and in his *Paradise opened to Philagio in One Hundred Devotions to the Mother of God, easily practised*, Father Bauny shows how easily the heart of the Virgin may be won; a prayer once a day, or even the wearing of an amulet, is enough; nor is it necessary, or, indeed, becoming, that the favored worshipper should give his heart—"that poor little slave"—to his benefactress as a token of his gratitude. It was impossible that absurdities such as these could fail to bring upon their authors the severest punishment. War was declared against them by the great Jansenist, Antoine Arnauld; and in 1656 and 1657 Pascal attacked them with an incisive wit, the edge of which none of their attempts could turn. The order became a jest; the clergy were aroused to examine the ponderous folios which contained its casuistry, and to condemn them in a general assembly. The attack was afterwards followed up by the polished satire of Boileau, and by a second exposure of the *Morale des Jesuites* by Nicole Perrault (1667); and the influence of the *Provincial Letters* was at once spread far and wide by means of their immediate translation into Latin, Italian, German, Spanish, and English. It was in vain that the Pope condemned them (September, 1657); the attempts of Pirot and other Jesuits to justify the base maxims they exposed, only increased the disgrace of the order; and Father Daniel's endeavor to prove them inaccurate was a complete failure. The chief Roman Catholic casuists since that time are St. Ignatio (who produced a complete treatise in 1707, and an *Ethica Amoris* in 1709), Stattler (1782), Lambertini (1766–1794), and Amort and Sobiech, who have been already mentioned.

The casuistry of the Reformers was similar, in origin, to that of the early fathers; and, with the marked exception of the question of celibacy, the two systems greatly resemble one another in their severity. This strictness was most extreme in the Calvinistic Church, as is displayed in the stern rules of its founder, and in the works of the German Danæus (who, in fact, usually follows Augustine), of the English Perkins, and the Dutch Amesius. A more genial spirit prevailed in the Lutheran Church, which produced the *consilia* of Melanchthon, and the treatises of Baldwin of Wittenberg, Olearus, Osiander, and Spener. In the *Pia Desideria* of the last we find the commencement of a more ascetic but specially subjective casuistry, founded upon the pietism of Thomas à Kempis. During the 17th century, several other Protestant works on casuistry appeared in England. Those of Bishops Hall and Barlow are not marked by much power. Perkins's *Cases of Conscience* (1606), starting from a discussion of the authority of Scripture and the nature of the Godhead, of repentance and the sacraments, arrives at conclusions which often display vigorous sense, and always a straightforward and even stern honesty. Thus he declares that a promise, though extorted under compulsion or by means of deceit, is binding so long as the loss to be sustained is merely temporary and private; and he condemns the striving for more riches than is necessary for the health of the body the culture of the mind, and the satisfaction of one's obligations to one's family and to others. His most fanciful argument is that in which he founds the validity of an oath by a creature on the curious ground that "God is seen" (*i.e.*, manifests himself) "in the creature." The still more famous Latin treatise *De Obligatione conscientiæ* (1660)—of which the best known section, the *De Juramenti Obligatione*, appeared separately in 1647—by Sanderson, professor of theology at Oxford, is distinguished by an equal directness of moral aim, and by much learning and vigor. But the most renowned of all, Jeremy Taylor's *Ductor Dubitantium* (1660), has not the merit of similar clearness; as guides of conscience he mixes up the laws of revelation and nature, the laws ecclesiastical and civil of princes and governors, and "the fame or the public reputation of things, expressed by proverbs, &c.," while the place of careful original thought is often taken by profuse quotations.

During the last two centuries, the study of morals has developed itself in a totally different direction. Free discussion being opened up as to the fundamental questions of religion and morality, modern writers on ethics more generally content themselves with the treatment of great principles, without laying down specific rules for their practical application. (T. M. W.)

CASWALL, Henry, D.D. (1810–1870), was born at Yateley, Hampshire, and educated chiefly at the grammar school of Chigwell, Essex. At the age of eighteen he went to the United States, and graduated in arts at Kenyon College, Ohio. After being engaged for several years as a parish minister and a professor of theology in America, he returned to England in 1842, obtained a private Act of Parliament recognizing the validity of his ordination in the United States, was appointed to the vicarage of Figheldean, Wiltshire, and became proctor in Convocation for the diocese of Sarum, and prebendary of Salisbury Cathedral. He received the honorary degree of M.A. from the university of Oxford, and that of D.D. from Trinity College, Hartford, Connecticut. Caswall went back to the United States about two years before his death, which occurred at Franklin, Pennsylvania, December 17, 1870. The main object of his life was to promote the consolidation and to increase the power of the great religious organization connected with the English Reformation. His principal work is *America and the American Church*, 1839; 2d edition, 1851. He also wrote two works on Mormonism; *Scotland and the Scottish Church; The Western World Revisited*, 1854; and *The Martyr of the Pongas*, a memoir of the Rev. H. J. Seacock.

CAT, a name applied in its widest sense to all feline animals, but generally restricted to a few of the smaller species which approximate more or less closely to the domestic form. Of undomesticated species the best known is the wild cat (*Felis catus*), inhabiting the most inaccessible mountain fastnesses, and the deepest recesses of the forests of Central and Northern Europe and Asia. It attains a length of 3 feet including the tail, is of a yellowish grey color above and whitish beneath, with a dark streak extending along the back to the origin of the tail, and with indistinct transverse bands on the sides. Its tail is bushy and of equal thickness throughout, annulated and tipped with black. The wild cat was formerly abundant throughout the wooded districts of Britain, but is now confined to Wales, the mountainous parts of the north-west of England, and the Highlands of Scotland, where, owing to the increased attention now paid to the preservation of game, it is being rapidly exterminated by trap and gun. It forms its nest in rocky crevices, or in the hollows of trees, and has been known to make use, for this purpose, of the nests of the larger birds. It is nocturnal in its habits, prowling by night in search of the

mammals and birds which form its food, and thus doing immense damage in districts well stocked with game. The fierceness of its disposition, its strength, and its agility are well known; and although it does not seek to attack man, yet when disturbed in its lair, or when hemmed in, it will spring with tiger-like ferocity on its opponent, every hair on its body bristling with rage. "I never saw an animal fight so desperately," says Mr. Charles St. John (*Wild Sports of the Highlands*), "or one which was so difficult to kill." In country districts specimens of the domestic cat run wild are by no means uncommon, for, having once tasted wild animal food, hares and rabbits are ever afterwards preferred to rats and mice, and when the house cat thus takes to hunting there are few animals more destructive to poultry and game. In some instances they have been known to hunt regularly in the woods and yet retain sufficient domesticity to carry home their prey before devouring it; and notwithstanding the Latin proverb—

"Catus amat pisces, sed aquas intrare recusat,"

they have been known to overcome their aversion to water in order to gratify their taste for fish. The offspring of such semi-wild forms gradually assume a uniform coloring not unlike that of the wild cat,—a similarity which led to the supposition that the house cat was but a domesticated form of *Felis catus*. The greater size, however, of the latter, the uniform thickness of its tail—a peculiarity which never reappears in any of the domestic varieties, nor in those which have returned to the wild state—along with the fact of the great scarcity of house cats and the high value set upon them throughout Europe during the Middle Ages, when the wild form was everywhere abundant, may be held to prove that the domestic cat is specifically distinct from the wild form of our woods. Its origin, like that of many other domestic animals, is sufficiently obscure to have become a matter of more or less probable conjecture. Reference is made to it in Sanskrit writings 2000 years old, and still more ancient records of it are to be found in the monumental figures and cat mummies of Egypt. The latter, according to De Blainville, belong to three distinct species, two of which are said to be still found, both wild and domesticated, in parts of Egypt. The Gloved Cat of Nubia (*Felis maniculata*), which also occurs as a mummy, approaches most nearly in size, and in the tapering form of the tail, to the domestic cat, but Professor Owen has shown that there are peculiarities in the dentition of this species, sufficient to invalidate its claim to be considered the ancestor of the domestic form. The difficulty of recognizing this ancestor in any single wild species has led many naturalists, including Temminck, Pallas, and Blyth, to the conclusion that *Felis domestica* is the product of many species commingled; and whatever weight may be attached to this view, there is sufficient evidence to show that domestic cats in different parts of the world have been greatly modified by frequent crossings with such wild species as occur in those parts. In the north of Scotland at the present day, the native species is believed occasionally to cross with the house cat, the product living in the houses. Such crosses would, no doubt, be much more frequent in ages when the wild cat was superabundant throughout Europe, and it is evidently owing to this that, as Mr. Blyth states, the affinity of the ordinary British cat to *Felis catus*, as compared with any Indian tame cat, is manifest. The latter, according to the same authority, has crossed with no fewer than four Indian wild species, and a tame specimen lately added to the British Museum agreed, in Dr. Gray's opinion, in almost every character with the Indian wild species *Felis chaus*. Similar instances of the crossing of native species with the domestic form have been noted in Algeria, South Africa, and Paraguay. Although the cat has probably been domesticated quite as long as the dog, the number of distinct breeds inhabiting the same country, to which it has given rise, is strikingly small in comparison with those of the latter,—a fact owing, probably, to the nocturnal habits of the cat and the consequent difficulty in preventing indiscriminate crossing. That it is not owing to any inherent want of variability is proved by the very distinct breeds that have been developed in insular and other isolated situations, such as the tailless cats of the Isle of Man, which differ in size of head and length of limbs, as well as in absence of tail from the ordinary form, and the domestic cats of the Malayan Archipelago, in which the tail is short and truncated. The best known and most distinct varieties are the Tabby, the Tortoise-shell or Spanish, with its pleasing mixture of black, white, and yellow; the Chartreuse, of a bluish-gray color; and the Angora, with long silky hair of a dusky white, a favorite drawing-room pet, and the gentlest of all the varieties. Among less known breeds are the Chinese, with pendulous ears, the red-colored breed of Tobolsk, and the twisted-tailed cats of Madagascar.

The disposition and habits of the domestic cat are familiar to all, and need not be dwelt upon here. It has never evinced that devotion to man which characterizes the dog, though many individual cases of feline attachment might be quoted. It becomes, however, strongly attached to particular localities, and will find its way back from the most distant places although conveyed thither under cover. How it performs such feats has long puzzled naturalists, and no theory that has yet been advanced seems adequately to meet the case. It has been contended recently by Mr. A. R. Wallace that a cat which is being conveyed to a distance blindfold will have its sense of smell in full exercise, and will by this means take note of the successive odors it encounters on the way; that these will leave on its mind "a series of images as distinct as those we should receive by the sense of sight;" and that "the recurrence of these odors in their proper inverse order—every house, ditch, field, and village having its own well-marked individuality—would make it an easy matter for the animal in question to follow the identical route back, however many turnings and cross roads it may have followed" (*Nature*, February 20, 1873).

Among the ancient Egyptians the cat was sacred to Isis or the moon; temples were raised, and sacrifices offered in its honor, and its body was embalmed at death. Nor is this feeling quite extinct among modern Egyptians, for in Cairo at the present time there is an endowment in operation for the lodging and feeding of homeless cats.

In the folk-lore of European nations the cat is regarded with suspicion as the favorite agent of witchcraft, and seems often to have shared in the cruelties inflicted on those who were supposed to practise the "black art." In Germany at the present day black cats are kept away from the cradles of children as omens of evil, while the appearance of a black cat on the bed of a sick person used to be taken as an announcement of approaching death.

CATACOMBS, subterranean excavations for the interment of the dead, or burial-vaults. In this sense the word "Catacomb" has gained universal acceptance, and has found a place in most modern languages. The original term, *catacumbæ*, however, had no connection with sepulture, but was simply the name of a particular locality in the environs of Rome. It was derived from the Greek *κατὰ* and *κύμβη*, "a hollow," and had reference to the natural configuration of the ground. In the district that bore this designation, lying close to the Appian Way, the basilica of St. Sebastian was erected, and the extensive burial-vaults beneath that church—in which, according to tradition, the bodies of the apostles St. Peter and St. Paul rested for a year and seven months previous to their removal to the basilicas which bear their names—were, in very early times, called from it *cœmiterium ad catacumbas*, or *catacumbas* alone. From the celebrity of this cemetery as an object of pilgrimage its name became extensively known, and in entire forgetfulness of the origin of the word, *catacumbæ* came to be regarded as a generic appellation for all burial-places of the same kind. This extension of the term to Christian burial-vaults generally dates from the 9th century, and obtained gradual currency through the Christian world. The original designation of these places of sepulture is *crypta* or *cœmiterium*.

The earliest Christian catacombs known may be assigned to the 2d century. The largest number belong to the 3d and the early part of the 4th. The custom of subterranean interment gradually died out, and entirely ceased with the sack of Rome by Alaric, 410 A.D. "The end of the catacomb graves," writes Mommsen (*Cont. Rev.*, May, 1871), "is intimately connected with the end of the powerful city itself. . . . Poverty took the place of wealth, . . . the traditions of the Christian tomb-architects sank into utter insignificance, and the expanse of the wasted Campagna now offered room enough to bury the few bodies, without having to descend as once far down below the surface of the earth." The earliest account of the Catacombs, that of

St. Jerome narrating his visits to them when a schoolboy at Rome, about 354 A.D., shows that interment in them was even then rare if it had not been altogether discontinued; and the poet Prudentius's description of the tomb of the Christian martyr Hippolitus, and the cemetery in which it stood, leads us to the same conclusion. With the latter part of the 4th century a new epoch in the history of the Catacombs arose,—that of religious reverence. In the time of Pope Damasus, 366–384 A.D., the Catacombs had begun to be regarded with special devotion, and had become the resort of large bands of pilgrims, for whose guidance catalogues of the chief burial-places and the holy men buried in them were drawn up. Some of these lists are still extant.[1] Pope Damasus himself displayed great zeal in adapting the Catacombs to their new purpose, restoring the works of art on the walls, and renewing the epitaphs over the graves of the martyrs. In this latter work he employed an engraver named Furius Philocalus, the exquisite beauty of whose characters enables the smallest fragment of his work to be recognized at a glance. This, in Dean Milman's happy words, "irreverent reverence, which converted the Catacombs from hidden and secret chambers, where piety might steal down to show its respect or affection for the dead, to, as it were, a great religious spectacle, the scene of devout pilgrimage to thousands" (Milman, *Essays*, p. 489), gave rise to extensive alterations in their construction and decoration, which has much lessened their value as authentic memorials of the religious art of the

Fig. 1.—Plan of part of the Cemetery of St. Agnes. From Martigny.

A, Entrance from the Basilica of St. Agnes.
1, 2. Ancient staircases leading to the first story.
3. Corridors from the staircases.
4. Two ruined staircases leading to the lower story.
5. Steps of the rock.
6. Air-shafts, or luminaria.
7. Ruined vault.
8. Blind ways.
9. Passages built up or ruined.
10. Passages obstructed by landslips.
11. Unfinished passage.
12. Passages destitute of tombs.
13. Narrow apertures between adjoining galleries.
14–17. Arcosolia.
18–32. Cubicula.
33. Chapel with vestibule and apse, and two chairs.
34. Double chapel with three chairs.
35. Large chapel in five divisions.

2d and 3d centuries. Subsequent popes manifested equal ardor, with the same damaging results, in the repair and adornment of the Catacombs, and many of the paintings which cover their walls, which have been too unquestioningly assigned to the period of their original construction, are really the work of these later times. The Catacombs shared in the devastation of Rome by the Goths under Vitiges, in the 6th century, and by the Lombards at a later period; and partly through the spoliation of these barbarian invaders, partly through the neglect of those who should have been their guardians, they sank into such a state of decay and pollution that, as the only means of preserving the holy remains they enshrined from further desecration, Pope Paul I., in the latter part of the 8th century, and Pope Paschal, at the commencement of the 9th, commenced the work of the translation of the relics, which was vigorously carried on by successive pontiffs until the crypts were almost entirely despoiled of their dead. The relics having been removed, the visits of pilgrims naturally ceased, and by degrees the very existence of those wonderful subterranean cemeteries was forgotten. Six centuries elapsed before the accidental discovery of a sepulchral chamber, by some laborers digging for *pozzolana* earth (May 31, 1578), revealed to the amazed inhabitants of Rome "the existence," to quote a contemporary record, "of other cities concealed beneath their own suburbs." Baronius, the ecclesiastical historian, was one of the first to visit the new discovery, and his "Annals" in more than one place evidence his just appreciation of its importance. The true "Columbus of

[1] The most important of these lists are the two Itineraries belonging to the first half of the 7th century, in the Salzburg library. One still earlier, but less complete, appears in the *Notitia Urbis Romæ*, under the title *Index Cœmeteriorum*. Another Itinerary, preserved at Einsiedeln, printed by Mabillon, dates from the latter half of the same century. That found in the works of William of Malmesbury (Hardy's ed. vol. ii. p. 539–544) appears to be copied from it, or both may be from the same source. De' Rossi gives a comparative table of these Itineraries and other similar lists

this subterranean world," as he has been aptly designated, was the indefatigable Bosio, who devoted his life to the personal investigation of the Catacombs, the results of which were given to the world in 1632 in a huge folio, entitled *Roma Sotterranea*, profusely illustrated with rude but faithful plans and engravings. This was republished in a Latin translation with considerable alterations and omissions by Aringhi in 1651; and a century after its first appearance, the plates were reproduced by Bottari in 1737, and illustrated with great care and learning. Some additional discoveries were described by Boldetti in his *Osservazioni*, published in 1720; but, writing in the interests of the Roman church with an apologetic not a scientific object, truth was made to bend to polemics, and little addition to our knowledge of the Catacombs is to be gained from his otherwise important work. The French historian of art, Seroux d'Agincourt, 1825, by his copious illustrations, greatly facilitated the study of the architecture of the Catacombs and the works of art contained in them. The works of Raoul Rochette display a comprehensive knowledge of the whole subject, extensive reading, and a thorough acquaintance with early Christian art so far as it could be gathered from books, but he was not an original investigator. The great pioneer in the path of independent research, which, with the intelligent use of documentary and historical evidence, has led in our own day to so vast an increase in our acquaintance with the Roman Catacombs, was the late Padre Marchi of the Society of Jesus. His work, *Monumenti delle arti Christiane Primitive*, so disastrously interrupted by the political vicissitudes of the times, is the first in which the strange misconception, received with unquestioning faith by earlier writers, that the Catacombs were exhausted sand-pits adapted by the Christians to the purpose of interment, was dispelled, and the true history of their formation demonstrated. Marchi's line of investigation was followed by the Commendatore De' Rossi, and his brother Michele, the former of whom was Marchi's fellow-laborer during the latter part of his explorations; and it is to them that we owe the most exhaustive scientific examination of the whole subject, in its geological, architectural, ritual, epigraphic, and artistic aspects, in the two volumes of *Roma Sotterranea*, published in 1864 and 1867, as well as in the articles periodically published in the *Bullettino di Archeologia Christiana*. A very convenient abridgment of De' Rossi's work has been produced in English under the same title by Dr. Northcote, President of Oscott, and the Rev. W. R. Brownlow. The Catacombs of Rome are the most extensive with which we are acquainted, and, as might be expected in the centre of the Christian world, are in many respects the most remarkable. No others have been so thoroughly examined and illustrated. These may, therefore, be most appropriately selected for description as typical examples.

Fig. 4.—Loculi. From De' Rossi.

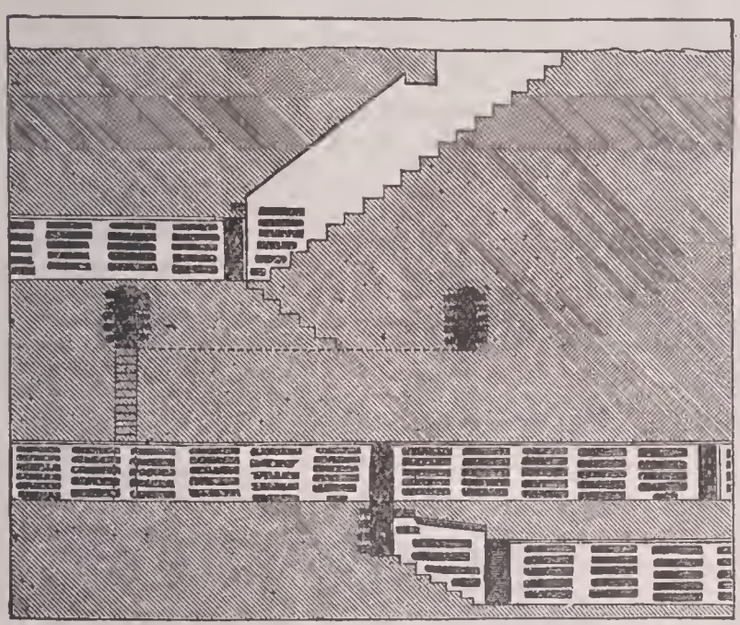


Fig. 2.—Section of Galleries at different levels. From Seroux d'Agincourt.

Fig. 3.—View of a Gallery.

Our description of the Roman Catacombs cannot be more appropriately introduced than by St. Jerome's account of his visits to them in his youth, already referred to, which, after the lapse of above fifteen centuries, presents a most accurate picture of these wonderful subterranean labyrinths. "When I was a boy," he writes, "receiving my education in Rome, I and my schoolfellows used, on Sundays, to make the circuit of the sepulchres of the apostles and martyrs. Many a time did we go down into the Catacombs. These are excavated deep in the earth, and contain, on either hand as you enter, the bodies of the dead buried in the wall. It is all so dark there that the language of the prophet (Ps. lv. 15) seems to be fulfilled, 'Let them go down quick into hell.' Only occasionally is light let in to mitigate the horror of the gloom, and then not so much through a window as through a hole. You take each step with caution, as, surrounded by deep night, you recall the words of Virgil—

'Horror ubique animos, simul ipsa silentia terrent.'"[1]

In complete agreement with Jerome's vivid picture the visitor to the Roman Catacombs finds himself in a vast labyrinth of narrow galleries, usually from 3 to 4 feet in width, interspersed with small chambers, excavated at successive levels, in the strata of volcanic rock subjacent to the city and its environs, constructed originally for the interment of the Christian dead. The galleries are not the way of access to the cemeteries, but are themselves the cemeteries, the dead being buried in long low horizontal recesses, excavated in the vertical walls of the passages, rising tier above tier like the berths in a ship, from a few inches above the floor to the springing of the arched ceiling, to the number of five, six, or even sometimes twelve ranges. These galleries are not arranged on any definite plan, but, as will be seen from the woodcut (fig. 1), they intersect one another at different angles, producing an intricate net-

[1] Hieron., *Comment in Ezech.*, lib. xx. c. 40. The translation is Dean Burgon's.

work which it is almost impossible to reduce to any system. They generally run in straight lines, and as a rule preserve the same level. The different stories of galleries lie one below the other (fig. 2) to the number of four or five (in one part of the cemetery of St. Callistus they reach seven stories), and communicate with one another by stairs cut out of the living rock. Light and air are introduced by

Figs. 5 and 6.—Loculi. From De' Rossi.

means of vertical shafts (*luminaria*) running up to the outer air, and often serving for several stories. The drawing (fig. 3) from Northcote gives a very correct idea of these galleries, with the tiers of graves pierced in the walls. The doorways which are seen interrupting the lines of graves are those of the family sepulchral chambers, or *cubicula*, of which we shall speak more particularly hereafter.

The graves, or *loculi*, as they are commonly designated, were, in the Christian cemeteries, with only a few exceptions (Padre Marchi produces some from the cemetery of St. Cyriaca, *Monum. Primitiv.*, tav. xiv. xliii. xliv.), parallel with the length of the gallery. In the pagan cemeteries, on the other hand, the sepulchral recess as a rule entered the rock like an oven at right angles to the corridor, the body being introduced endways. The plan adopted by the Christians saved labor, economized space, and consulted reverence in the deposition of the corpse. These *loculi* were usually constructed for a single body only. Some, however, were formed to contain two, three, or four, or even more corpses. Such recesses were known respectively as *bisomi*, *trisomi*, *quadrisomi*, &c., terms which often appear in the sepulchral inscriptions. After the introduction of the body the *loculi* were closed with the greatest care, either with slabs of marble the whole length of the aperture, or with huge tiles, three being generally employed, cemented

Fig. 7.—Glass Bottles. From Bosio.

together with great exactness, so as to prevent the escape of the products of decomposition (fig. 4). Where any epitaph was set up—an immense number are destitute of any inscription at all—it is always painted or engraved on these slabs or tiles. In the earlier interments the epitaph is simply daubed on the slab in red or black paint. In later examples it is incised in the marbles, the letters being rendered clearer by being colored with vermilion. The enclosing slab very often bears one or more Christian symbols, such as the dove, the anchor, the olive-branch, or the monogram of Christ (figs. 5, 6). The palm branch, which is also of frequent occurrence, has been solemnly decided by "the Congregation of Relics" to be an indisputable mark of the last resting place of a martyr. But the decision of this infallible authority has been proved fallacious by the stern logic of facts,—the emblem being found in connection with epitaphs of persons dying natural deaths, or those prepared by persons in their lifetime, as well as in those of little children, and even of pagans. Another frequent concomitant of these Catacomb interments, a small glass vessel containing traces of the sediment of a red fluid, embedded in the cement of the *loculus*, pronounced as confidently by the same authority to indicate a martyr's grave (fig. 7), has also shown the unwisdom of pronouncing dogmatically without sufficient evidence. The red matter proves to be the remains of wine, not of blood; and the conclusion of the ablest archæologists of the Church of Rome itself is that the vessels were placed where they are found, after the Eucharistic celebration or *agape* on the day of the funeral or its anniversary, and contained remains of the consecrated elements as a kind of religious charm. Instances of the pious theft, not altogether unknown in modern churches, which combines economy with becoming respect to the dead, appear in the Catacombs. Not a few of the slabs, it is discovered, have done double duty, bearing a pagan inscription on one side, and a Christian one on the other. These are known as *opisthographs*. The bodies were interred wrapt in linen cloths, or swathed in bands, and were frequently pre-

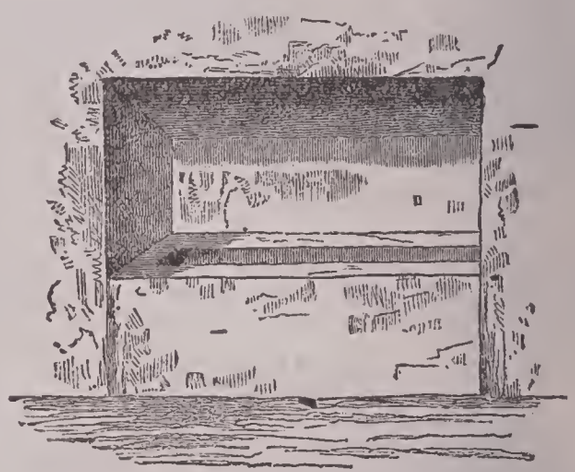


Fig. 8.—Table-Tomb.

served by embalming. In the case of poorer interments the destruction of the body was, on the contrary, often accelerated by the use of quicklime.

Interment in the wall-recess or *loculus*, though infinitely the most common, was not the only mode employed in the Catacombs. Other forms of very frequent recurrence are the *table-tomb* and *arched tomb*, or *arcosolium*. From the annexed woodcuts it will be seen that these only differ in the form of the surmounting recess. In each case the arched tomb was formed by an oblong chest, either hollowed out of the rock, or built of masonry, and closed with a horizontal slab. But in the table-tomb (fig. 8) the recess above, essential for the introduction of the corpse, is square, while in the arcosolium (fig. 9), a form of later date, it is semicircular. Sarcophagi are also found in the Catacombs, but are of rare occurrence. They chiefly occur in the earlier cemeteries, and the costliness of their construction confined their use to the wealthiest classes, —*e.g.*, in the cemetery of St. Domitilla, herself a member of the imperial house. Another unfrequent mode of interment was in graves like those of modern times, dug in the floor of the galleries (Marchi, *u.s.*, tav. xxi. xxvi.). Table-tombs and arcosolia are by no means rare in the corridors of the Catacombs, but they belong more generally to the *cubicula*, or family vaults, of which we now proceed to speak.

These *cubicula* are small apartments, seldom more than 12 feet square, usually rectangular, though sometimes cir-

cular or polygonal, opening out of the main corridors. They are not unfrequently ranged regularly along the sides of the galleries, the doors of entrance, as may be seen in a previous illustration (fig. 3), following one another in as orderly succession as the bedchamber doors in the passage of a modern house. The roof is sometimes flat, but is more usually coved, and sometimes rises into a cupola. Both the roof and the walls are almost universally coated with stucco and covered with fresco paintings,—in the earlier works merely decorative, in the later always symbolical or historical. Each side of the cubiculum, except that of the entrance, usually contains a recessed tomb, either a table-tomb or arcosolium. That facing the entrance was the place of greatest honor, where in many instances the remains of a martyr were deposited, whose tomb, according to primitive usage, served as an altar for the celebration of the Eucharist. This was sometimes, as in the Papal crypt of St. Callistus (fig. 10), protected from irreverence by lattice-work (*transennæ*) of marble. The cubiculum was originally designed for the reception of a very limited number of dead. But the natural desire to be buried near one's relatives caused new tombs to be cut in the walls, above and around and behind the original tombs, the walls being thus completely honey-combed with *loculi*, sometimes as many as seventy, utterly regardless of the paintings originally depicted on the walls. Another motive for multiplying the number of graves operated when the cubiculum contained the remains of any noted saint or martyr. The desire of the old prophet of Bethel that his bones should be laid beside the bones of the man of God that came from Judah, is only the expression of an instinctive though unreasoning feeling, connecting greater personal safety with a resting-place close to the blessed dead, which awoke very early and acted very powerfully in the Christian Church. The Christian antiquary has cause continually to lament the destruction of works of art due to this craving. One of the most perfect examples of early Christian pictorial decoration, the so-called "Dispute with the Doctors," in the Catacomb of Callistus, the "antique style of beauty" of which is noticed by Kugler, has thus suffered irreparable mutilation, the whole of the lower part of the picture having been destroyed by the excavation of a fresh grave-recess (Bottari, vol. ii. tav. 15). The plates of De' Rossi, Perret, and, indeed, all illustrations of the Catacombs, exhibit frequent examples of the same destructive superstition. The woodcuts (figs. 11 and 12), taken from De' Rossi's great work, representing two of the cubicula in the cemetery of St. Callistus, show the general arrangement of the loculi and the character of the frescoes which ornament the walls and roof. These paintings, it will be seen, are simply decorative, of the same style as the wall-paintings of the baths, and those of Pompeii.

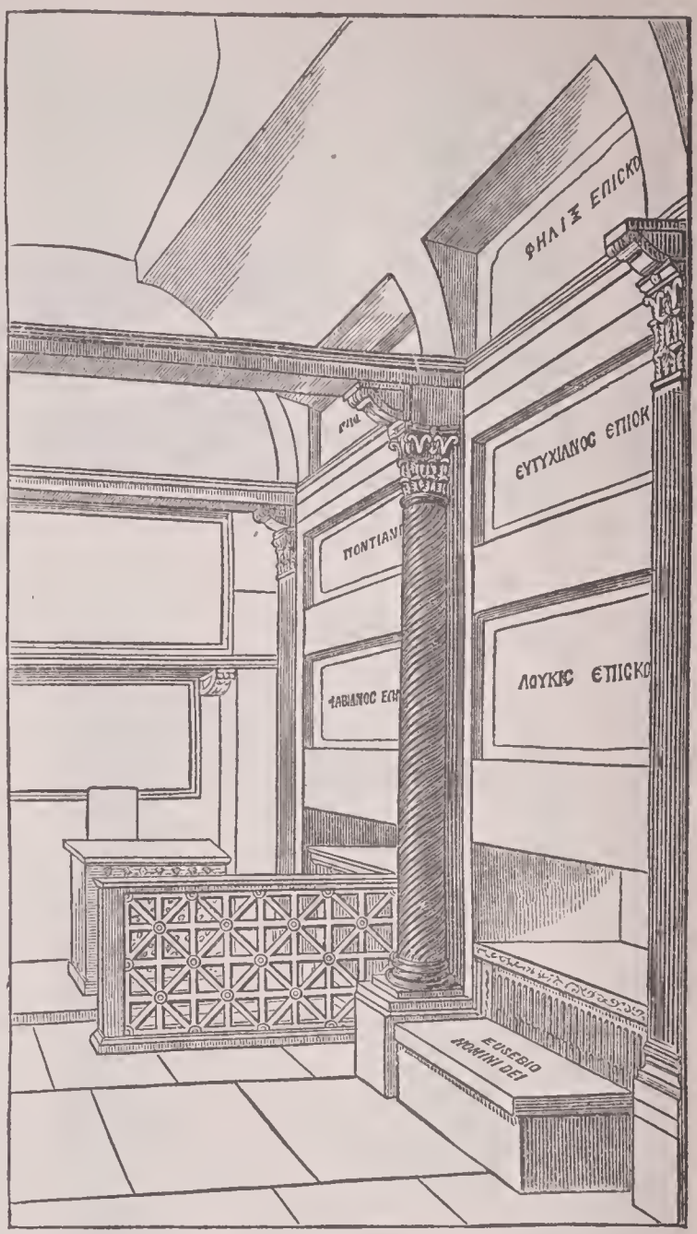


Fig. 10.—Restoration of the Papal Crypt, Cemetery of St. Callistus. From De' Rossi.

Each *cubiculum* was usually the burying-place of some one family, all the members of which were interred in it, just as in the chantry-chapels connected with mediæval churches. In them was celebrated the funeral-feast on the day of burial and on its anniversary, as well as the Eucharist, which was the invariable accompaniment of funerals in the primitive church (Bingham, *Orig. Eccl.*, bk. xxiii. c. iii. 12). The funeral-banquet descended to the Christian Church from pagan times, and was too often profaned by heathen license. St. Augustine, in several passages, inveighs against those who thus by "gluttony and insobriety buried themselves over the buried," and "made themselves drunk in the chapels of the martyrs, placing their excesses to the score of religious reverence for the dead" (August., *De Mor. Eccl. Cathol.*, c. 34; *Contr. Faust.*, lib. xx. c. 21; *Confess.*, lib. vi. c. 2). Some curious frescoes representing these funeral feasts, found in the *cubicula* which were the scene of them, are reproduced by Bosio (pp. 355, 391) and others. A romantic air has been thrown over these burial chapels by the notion that they were the places of worship used by the Christians in times of persecution. This to a certain extent is doubtless true. Mr. J. H. Parker, who has done more by his laborious and self-sacrificing investigations than any one living, not excepting De' Rossi himself, for the elucidation of the true history and archæology of the Catacombs, writes: "That during the time of persecution the bishops performed the divine offices in the Catacombs is not only recorded, but many of the chapels fitted up for that purpose remain, especially one in the chapel of St. Priscilla, where the altar or stone coffin of a martyr remains, with a small platform behind it for the priest or bishop to stand and officiate *over it* according to the practice of the early church" (*Archæology of Rome; The Catacombs*, § 3, p. 25). Mommsen also speaks of them unhesitatingly as "places of devotion for the community,"

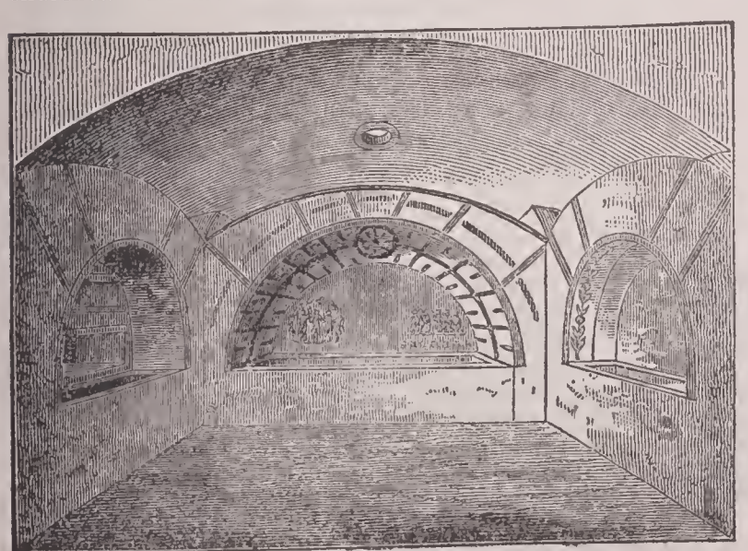


Fig. 9.—Arcosolia. From Bosio.

adding, "this union of devotion with the interment, the development of the grave into the cemetery, of

Fig. 11.—Cubiculum in Cemetery of St. Callistus. From De' Rossi.

the cemetery into the church, is essentially Christian,

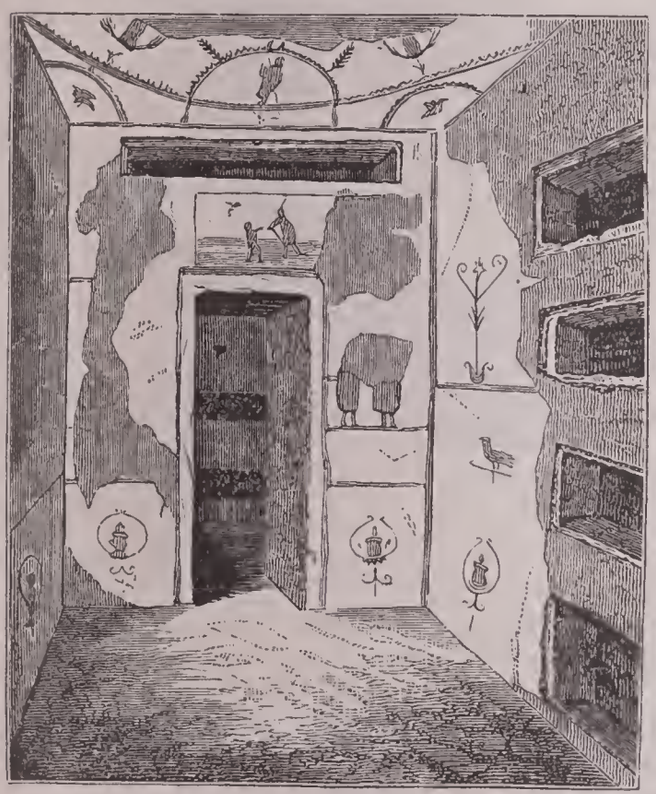


Fig. 12.—Cubiculum in the Cemetery of St. Callistus. From De' Rossi.

one might perhaps say is Christianity" (*u.s.*, p. 166).

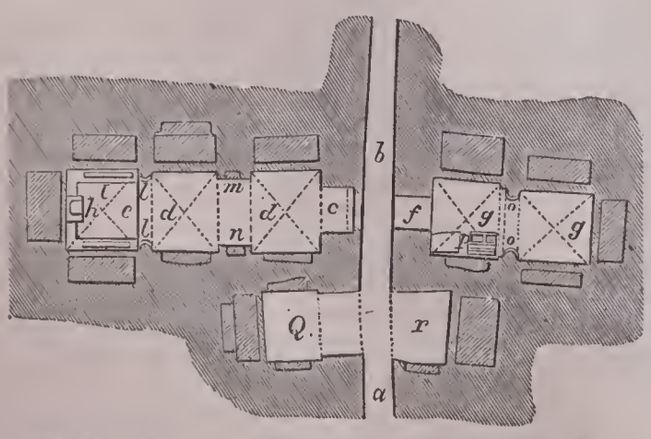


Fig. 13.—Plan of a supposed Church, Catacombs of St. Agnes. From Marchi.

But that they can have been so used to any large extent is rendered impossible by the limited dimensions of these apartments, none of which could hold more than fifty or sixty persons. In some of the Catacombs, however, there are larger halls and connected suites of chapels, which may possibly have been constructed for the purpose of congregational worship during the dark periods when the public exercise of their religion was made penal. The most remarkable of these is in the cemetery of St. Agnes (see annexed plan, fig. 13). It consists of five rectangular compartments, three on one side of the corridor and two on the other, connected by a passage intersecting the gallery at right angles. Two of the five compartments are supposed to have been assigned to male and two to female worshippers, the fifth, at the extremity of the whole, being reserved for the altar and its ministers. In the centre of the end-wall stands a stone chair (fig. 14), considered to have been the Episcopal cathedra, with a bench for the clergy on each side. There is no trace of an altar, which may, Padre Marchi thinks, have been portable. The walls of the compartments are occupied by arched sepulchral recesses, above and below which are tiers of ordinary graves or *loculi*. The arrangements are certainly such as indicate a congregational purpose, but the extreme narrowness of the suite, and still more of the passage which connects the two divisions, must have rendered it difficult for any but a small number to take any intelligent part in the services at the same time. Although the idea of the use of the Catacombs for religious worship may have been pressed too far, there can be no doubt that the sacred rites of the church were celebrated within them. We have already spoken of the Eucharistic celebrations of which the *cubicula* were the scene; and still existing baptisteries prove that the other sacrament was also administered there. The most remarkable of these baptisteries is that in the Catacomb of St. Pontianus (fig. 15). Ten steps lead down to a basin of sufficient depth for immersion, supplied by a spring. The wall at the back exhibits a fresco of a jewelled cross, beneath an arched recess, above which is a fresco of the Baptism of our Lord. Some of the subterraneau chambers contain armed seats and benches cut out of the tufa rock. These are supposed by Marchi and others to indicate school-rooms, where the catechumens were instructed by the bishop or presbyters. But this theory wants verification. It is impossible not to be struck with the remarkable analogy between these rock-hewn chairs and those discovered in the Etruscan tombs (*vide infra*), of the purpose of which no satisfactory explanation has been given.

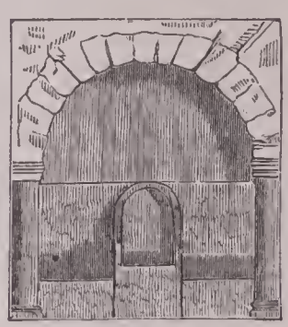


Fig. 14.—Bishop's Chair. Catacomb of St. Agnes.

Very exaggerated statements have been made as to the employment of the Catacombs as dwelling-places by the Christians in times of persecution. We have, however, sufficient evidence that they were used as places of refuge from the fury of the heathen, in which the believers—especially the bishops and clergy, who would naturally be the first objects of attack—might secrete themselves until the storm had blown over. This was a purpose for which they were admirably adapted both by the intricacy of their labyrinthine passages, in which any one not possessing the clue would be inevitably lost, and the numerous small chambers and hiding-places at different levels which might be passed unperceived in the dark by the pursuers. As a rule, also, the catacombs had more than one entrance, and frequently communicated with an *arenaria* or sand-quarry; so that while one entrance was carefully watched, the pursued might escape in a totally different direction by another. But to quote again Mr. J. H. Parker, "the Catacombs were never intended, nor fit, for dwelling-places, and the stories of persons living in them for months are probably fabulous. According to modern physicians it is impossible to live many days in the caves of *pozzolana* in which many of the Catacombs are excavated." Equally exaggerated are the statements as to the linear and lateral extent of the Catacombs, and their intercommuni-

cation with one another. Without resorting to this exaggeration, Mommsen can speak with perfect truth of the "enormous space occupied by the burial vaults of Christian Rome, not surpassed even by the *cloacæ* or sewers of Republican Rome," but the data are too vague to warrant any attempt to define their dimensions. Padre Marchi has estimated the united length of the galleries at from 800 to 900 miles, and the number of interments at between 6,000,000 and 7,000,000; Martigny's estimate is 587 miles; and Northcote's, lower still, at "not less than 350 miles." The idea of general intercommunication is negatived by the fact that the chief cemeteries are separated by low-ground or valleys, where any subterranean galleries would be at once filled with water.

It now remains for us to speak of the history of these subterranean burial places, together with the reasons for, and mode of, their construction. From the period of the rediscovery of the Catacombs, towards the end of the 16th century, almost to our own day, a gigantic fallacy prevailed, repeated by writer after writer, identifying the Christian burial-places with disused sand-pits. It was accepted as an unquestionable fact by every one who undertook to describe the Catacombs, that the Christians of Rome, finding in the labyrinthine mazes of the exhausted *arenariæ*, which abounded in the environs of the city, whence the sand used in building had been extracted, a suitable place for the interment of their martyred brethren, where also the sacred rites accompanying the interment might be celebrated without fear of interruption, took possession of them and used them as cemeteries. It only needed a comparison of the theory with the visible facts to refute it at once. But the search after truth is troublesome, and to controvert received doctrines is always unpopular, and it was found easier to accept the traditional view than to investigate for one's self, and so nearly three centuries elapsed

Fig. 15.—Baptistery of St. Pontianus. From Perret.

before the independence of the *arenariæ* and the Catacombs was established. The discovery of this independence is due to Padre Marchi, whose name has been already so often mentioned. Starting with the firmest belief in the old traditional view, his own researches by degrees opened his eyes to its utter baselessness, and led him to the truth, now universally recognized by men of learning, that the Catacombs were exclusively the work of the Christians, and were constructed for the purpose with which their name is universally connected—the interment of the dead. It is true that a catacomb is often connected with the earlier sand-quarry, and starts from it as a commencement, but the two are excavated in different strata, suitable to their respective purposes, and their plan and construction are so

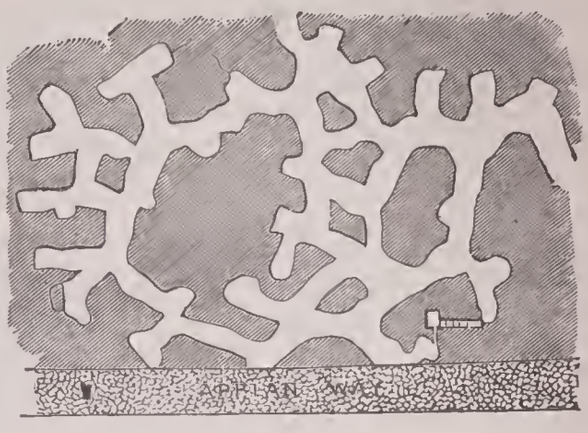


Fig. 16.—Arenaria beneath the Cemetery of Callistus.

completely unlike as to render any confusion between them impossible.

The igneous formation of which the greater part of the Roman Campagna is, in its superior portion, composed, contains three strata known under the common name of *tufa*,—the "stony," "granular," and "sandy" tufa,—the last being commonly known as *pozzolana*.[1] The *pozzolana* is the material required for building purposes, for admixture with mortar; and the sand-pits are naturally excavated in the stratum which supplies it. The stony tufa (*tufa litoide*) is quarried as building-stone. The granular tufa is useless for either purpose, containing too much earth to be employed in making mortar, and being far too soft to be used as stone for building. Yet it is in this stratum, and in this alone, that the Catacombs are constructed; their engineers avoiding with equal care the solid stone of the *tufa litoide* and the friable *pozzolana*, and selecting the strata of medium hardness, which enabled them to form the vertical walls of their galleries, and to excavate the *loculi* and *cubicula* without severe labor and also without fear of their falling in. The annexed woodcut (fig. 16) from Marchi's work, when compared with that of the Catacomb of St. Agnes already given, presents to the eye the contrast between the wide winding irregular passages of the sand-pit, calculated for the admission of a horse and cart, and the narrow rectilinear accurately-defined galleries of the Catacomb. The distinction between the two is also plainly exhibited when for some local or private reasons an ancient *arenaria* has been transformed into a cemetery. The modifications required to strengthen the crumbling walls to support the roof and to facilitate the excavation of *loculi*, involved so much labor that, as a rule, after a few attempts, the idea of utilizing an old quarry for burial purposes was abandoned.

Another equally erroneous idea has only slowly retired before the increased historical research and scientific investigation which have been brought to bear on the construction of the Catacombs. This is, that these vast burial-places of the early Christians remained entirely concealed from the eyes of their pagan neighbors, and were constructed not only without the permission of the municipal authorities but without their cognizance. Nothing can be further from the truth. Such an idea is justly stigmatized by Mommsen as ridiculous, and reflecting a discredit as unfounded as it is unjust on the imperial police of the capital. That such vast excavations should have been made without attracting attention, and that such an immense number of corpses could have been carried to burial in perfect secrecy, is utterly impossible. Nor was there any reason why secrecy should have been desired. The decent burial of the dead was a matter especially provided for by the Roman laws. No particular mode was prescribed. Interment was just as legal as cremation, and

[1] In Rome the three strata are known to geologists as *tufa litoide*, *tufa granolare*, and *pozzolana*.

had, in fact, been universally practised by the Romans until the later days of the republic.[1] The bodies of the Scipios and Nasos were buried in still existing catacombs; and if motives of reverence for that which had been the temple of the Holy Ghost led the Christians to adopt that which Minucius Felix calls "the better, and more ancient custom of inhumation" (*Octavius*, c. 2), there was absolutely nothing, to quote the words of Dr. Northcote (*Roma Sotterran.*, pp. 56, 61), "either in their social or religious position to interfere with their freedom of action. The law left them entire liberty, . . . and the faithful did but use their liberty in the way that suited them best, burying their dead according to a fashion to which many of them had been long accustomed, and which enabled them at the same time to follow in death the example of him who was also their model in life." Interment in rock-hewn tombs, "as the manner of the Jews is to bury," had been practised in Rome by the Jewish settlers for a considerable period anterior to the rise of the Christian Church. A Jewish catacomb, now lost, was discovered and described by Bosio (*Rom. Sott.*, p. 141), and others are still accessible. They are only to be distinguished from Christian catacombs by the character of their decorations, the absence of Christian symbols, and the language of their inscriptions. There would, therefore, be nothing extraordinary or calling for notice in the fact that a community, always identified in the popular heathen mind with the Jewish faith, should adopt the mode of interment belonging to that religion. Nor have we the slightest trace of any official interference with Christian burials, such as would render secrecy necessary or desirable. Their funerals were as much under the protection of the law, which not only invested the tomb itself with a sacred character, but included in its protection the area in which it stood, and the *cella memoriæ* or chapel connected with it, as those of their heathen fellow-citizens, while the same shield would be thrown over the burial-clubs, which, as we learn from Tertullian (*Apolog.*, c. 39), were common among the early Christians, as over those existing among the heathen population of Rome. We may then completely dismiss the notion of there being any studied secrecy in connection with the early Christian cemeteries, and proceed to inquire into the mode of their formation. The investigations of De' Rossi, confirmed by the independent researches of Mr. J. H. Parker, show that, almost without exception, they had their origin in small burial areas, the property of private persons or of families, gradually spreading and ramifying and receiving additions of one subterranean story after another as each was required for interments. The first step would be the acquisition of a plot of ground either by gift or purchase for the formation of a tomb. Christians were not beyond the pale of the law, and their faith presented no hindrance to the property being secured to them in perpetuity. To adapt the ground for its purpose as a cemetery, a gallery was run all round the area in the tufa rock at a convenient depth below the surface, reached by staircases at the corners. In the upright walls of these galleries *loculi* were cut as needed to receive the dead. When these first four galleries were full others were mined on the same level at right angles to them, thus gradually converting the whole area into a network of corridors. If a family vault was required, or a burial chapel for a martyr or person of distinction, a small square room was excavated by the side of the gallery and communicating with it. When the original area had been mined in this way as far as was consistent with stability, a second story of galleries was begun at a lower level, reached by a new staircase. This was succeeded by a third, or a fourth, and sometimes even by a fifth. When adjacent burial areas belonged to members of the same Christian confraternity, or by gift or purchase fell into the same hands, communications were opened between the respective cemeteries, which thus spread laterally, and gradually acquired that enormous extent which, "even when their fabulous dimensions are reduced to their right measure, form an immense work."[2] This could only be executed by a large and powerful Christian community unimpeded by legal enactments or police regulations, "a living witness of its immense development corresponding to the import-

Fig. 17.—Fresco Ceiling. From Bosio.

The subjects, beginning at the top and going to the right, are—(1.) The paralytic carrying his bed; (2.) The seven baskets full of fragments; (3.) Raising of Lazarus; (4.) Daniel in the lions' den; (5.) Jonah swallowed by the fish; (6.) Jonah vomited forth; (7.) Moses striking the rock; (8.) Noah and the dove. In the centre, the Good Shepherd.

Fig. 18.—Fresco Ceiling. From Bosio.

The subjects, beginning at the bottom and going to the right, are—(1.) Moses striking the rock; (2.) Noah and the dove; (3.) The three children in the furnace; (4.) Abraham's sacrifice; (5.) The miracle of the loaves.

ance of the capital." But although, as we have said, in ordi-

[1] Cicero is our authority for the burial of Marius, and for Sulla's being the first member of the Gens Cornelia whose dead body was burnt.—*De. Legg*, ii. 22.

[2] Mommsen's chosen example of an ancient burial-chamber, extending itself into a catacomb, or gathering subterranean additions round it till a catacomb was established, is that of the cemetery of St. Domitilla, traditionally identified with a grand-daughter of Vespasian, and the catacomb of S.S. Nereus and Achilleus on the Appian and Ardeatine way.

nary times there was no necessity for secrecy, yet when the peace of the church was broken by the fierce and often protracted persecutions of the heathen emperors, it became essential to adopt precautions to conceal the entrance to the cemeteries, which became the temporary hiding-places of the Christian fugitives, and to baffle the search of their pursuers. To these stormy periods we may safely assign the alterations which may be traced in the staircases, which are sometimes abruptly cut off, leaving a gap requiring a ladder, and the formation of secret passages communicating with the *arenariæ*, and through them with the open country.

When the storms of persecution ceased and Christianity had become the imperial faith, the evil fruits of prosperity were not slow to appear. Cemetery interment became a regular trade in the hands of the *fossores*, or grave-diggers, who appear to have established a kind of property in the Catacombs, and whose greed of gain led to that destruction of the religious paintings with which the walls were decorated, for the quarrying of fresh *loculi*, to which we have already alluded. Monumental epitaphs record the purchase of a grave from the fossores, in many cases during the life time of the individual, not unfrequently stating the price. A very curious fresco, found in the cemetery of Callistus, preserved by the engravings of the earlier investigators (Bottari, tom. ii. p. 126, tav. 99), represents a "fossor" with his lamp in his hand and his pick over his shoulder, and his tools lying about him. Above is the inscription, "Diogenes Fossor in Pace depositus."

Our space forbids us to enter on any detailed description of the frescoes which cover the walls and ceilings of the burial-chapels in the richest abundance. It must suffice to say that the earliest examples are only to be distinguished from the mural decorations employed by their pagan contemporaries (as seen at Pompeii and elsewhere) by the absence of all that was immoral or idolatrous, and that it was only very slowly and timidly that any distinctly religious representations were introduced. These were at first purely symbolical, meaningless to any but a Christian eye, such as the Vine, the Good Shepherd, the Sheep, the Fisherman, the Fish, &c. Even the personages of ancient mythology were pressed into the service of early Christian art, and Orpheus, taming the wild beasts with his lyre, symbolized the peaceful sway of Christ; and Ulysses, deaf to the Siren's song, represented the Believer triumphing over the allurements of sensual pleasure. The person of Christ appeared but rarely, and then commonly simply as the chief personage in an historical picture. The events depicted from our Lord's life are but few, and always conform rigidly to the same traditional type. The most frequent are the miracle at Cana, the multiplication of the loaves and fishes, the paralytic carrying his bed, the healing of the woman with the issue of blood, the raising of Lazarus, Zacchæus, and the triumphal entry into Jerusalem. The Crucifixion, and subjects from the Passion, are never represented. The cycle of Old Testament subjects is equally limited. The most common are the history of Jonah as a type of the Resurrection, the Fall, Noah receiving the dove with the olive branch, Abraham's sacrifice of Isaac, Moses taking off his shoes, David with the sling, Daniel in the lions' den, and the Three Children in the fiery furnace. The mode of representation is always conventional, the treatment of the subject no less than its choice being dictated by an authority to which the artist was compelled to bow. Whatever be the date of the original pictures, a point on which considerable doubt exists, it is tolerably certain that the existing frescoes are restorations of the 8th or even a later century, from which the character of the earlier work can only very imperfectly be discovered. All the more valuable of these paintings have been reproduced in Mr. Parker's magnificent series of photographs taken in the Catacombs by the magnesium light. The contrast between these rude inartistic performances and the finished drawings, which profess to be accurate copies, in Perret's costly work, fully warrants the late Dean Milman's severe strictures on that "beautiful book,"—"so beautiful as to be utterly worthless to the archæologist and historian, which wants only two things—truth and fidelity." Not the frescoes alone, but also every point of interest in the plan, structure, and decoration of the Catacombs has been illustrated by Mr. Parker in the same series of photographs, an examination of which is almost as instructive as a personal visit to the Catacombs themselves.[1]

Beyond Rome and its suburbs the most remarkable Christian Catacombs are those in the vicinity of Naples, described by Pelliccia (*De Christ. Eccl. Polit.*, vol. iv. Dissert. 5), and in a separate treatise by Bellerman. Plans of them are also given by Agincourt in his great work on Christian Art. These catacombs differ materially from those of Rome. They were certainly originally stone-quarries, and the hardness of the rock has made the construction practicable of wide, lofty corridors, and spacious halls, very unlike the narrow galleries and contracted chambers in the Roman cemeteries. The mode of interment, however, is the same as that practised in Rome, and the *loculi* and *arcosolia* differ but little in the two. The walls and ceilings are covered with fresco paintings of

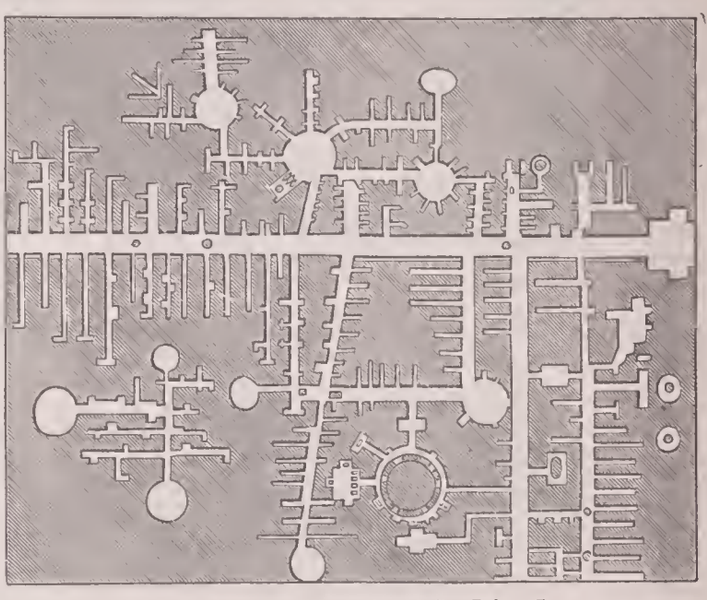


Fig. 19.—Plan of the Catacombs of St. John, Syracuse.

different dates, in some cases lying one over the other. This catacomb contains an unquestionable example of a church, divided into a nave and chancel, with a rude stone altar and bishop's seat behind it. At Syracuse also there are very extensive catacombs known as "the Grottoes of St. John." They are also figured by Agincourt, and described by Denon (*Voyage en Sicile et Malte*). Denon considers them of pagan origin, and to have passed to the Christians. He speaks of an entire underground city with several stories of larger and smaller streets, squares, and cross-ways, cut out of the rock; at the intersection of the cross-ways, are immense circular halls of a bottle shape, like a glass-house furnace, lighted by air-shafts. The galleries are generally very narrow, furnished on each side with arched tombs, and communicating with family sepulchral-chambers closed originally by locked doors, the marks of the hinges and staples being still visible. The walls are in many places coated with stucco adorned with frescoes, including palms, doves, labara, and other Christian symbols.

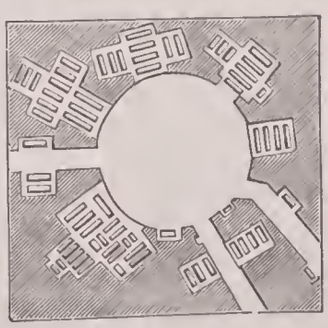


Fig. 20.—Plan of Circular Hall, Catacombs of St. John, Syracuse. From Agincourt.

A more complete examination of this interesting cemetery is much needed. The ground-plans (figs. 19, 20), from Agincourt, of the catacomb and of one of the circular halls, show how widely it differs in arrangement from the Roman Catacombs. The frequency of blind passages and of circular chambers will be noticed, as well as the very large number of bodies in the cruciform recesses, apparently amounting in one instance to nineteen. Agincourt remarks that this cemetery "gives an idea of a work executed with

[1] Mr. Parker's invaluable series of Roman photographs may be seen at the library of the South Kensington Museum, and at Mr. Stanford's, Charing Cross, as well as in the Ashmolean Museum, and the Bodleian Library, Oxford.

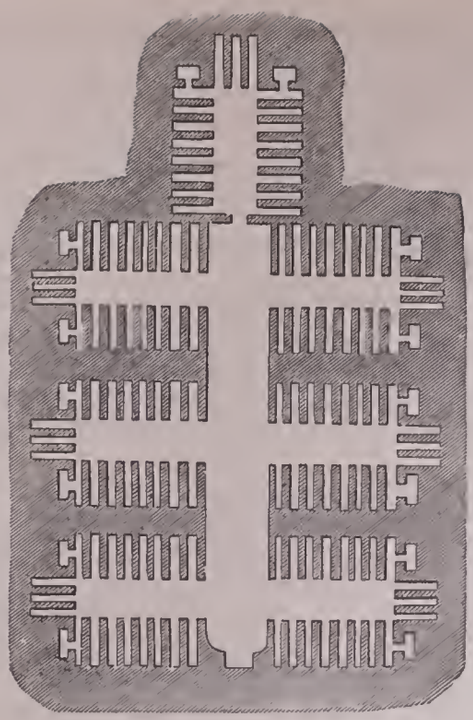


Fig. 21.—Plan of Catacomb at Alexandria. From Agincourt.

design and leisure, and with means very different from those at command in producing the Catacombs of Rome."

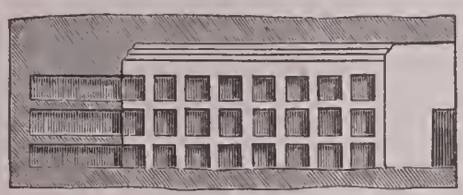


Fig. 22.—Section of a Gallery in Catacomb at Alexandria. From Agincourt.

Denon also describes catacombs at Malta near the ancient capital of the island. The passages were all cut in a close-grained stone, and are very narrow, with arched ceilings, running very irregularly, and ramifying in all directions. The greater part of the tombs stand on either side of the galleries in square recesses (like the table-tombs of the Roman Catacombs), and are rudely fashioned to imitate sarcophagi. The interments are not nearly so numerous as in other catacombs, nor are there any vestiges of painting, sculpture, or inscriptions. At Taormina in Sicily is a Saracenic catacomb, also figured by Agincourt. The main corridor is 12 feet wide, having three or more ranges of *loculi* on either side, running longitudinally into the rock, each originally closed by a stone, bearing an inscription.

Passing to Egypt, a small Christian catacomb has been recently discovered at Alexandria, and described and figured by De' Rossi.[1] The *loculi* here also are set end-ways to the passage. The walls are abundantly decorated with paintings, one of a liturgical character. But the most extensive catacombs at Alexandria are those of Ægypto-Greek origin, from the largest of which, according to Strabo (lib. xvii. p. 795), the quarter where it is placed had the name of the Necropolis. The plan, it will be seen, is remarkable for its regularity (figs. 21, 22). Here, too, the graves run end-ways into the rock. Other catacombs in the vicinity of the same city are described by Pocock and other travellers, and are figured by Agincourt.

Subterranean cemeteries of the general character of those described are very frequent in all Southern and Eastern countries. A vast necropolis in the environs of Saida, the ancient Sidon, is described in Renan's *Mission en Phenicie*, and figured in Thobois's plates. It consists of a series of apartments approached by staircases, the sides pierced with sepulchral recesses running lengthwise into the rock.

The rock-hewn tombs of Etruria scarcely come under the category of catacombs, in the usual sense, being rather independent family burial-places, grouped together in a necropolis. They are, however, far too remarkable to be altogether passed over. These sepulchres are usually hollowed out of the face of low cliffs on the side of a hill.

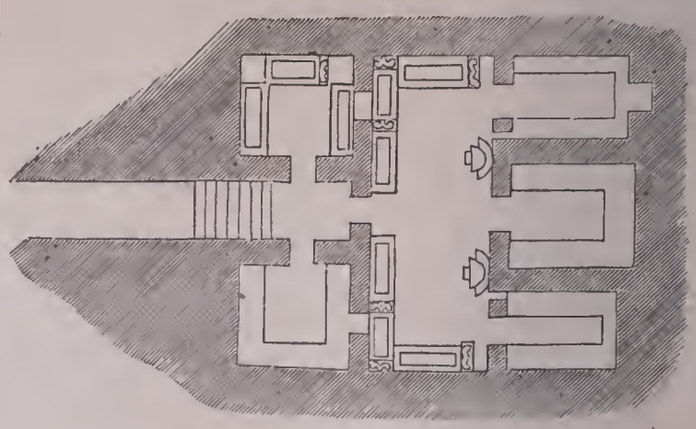


Fig. 23.—Plan of a Tomb at Cervetri. From Dennis.

They sometimes rise tier above tier, and are sometimes all on the same level "facing each other as in streets, and branching off laterally into smaller lanes or alleys;" and

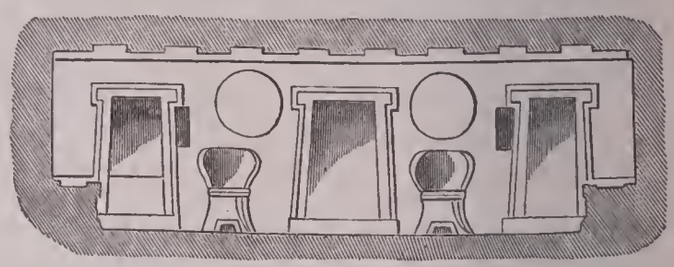


Fig. 24—Section of the Tomb of the Seats and Shields, Cervetri. From Dennis.

occasionally forming "a spacious square or piazza surrounded by tombs instead of houses." (Dennis, *Cities and Cemeteries of Etruria*, vol. ii. p. 31.) The construction of

Fig. 25.—Plan of a portion of the principal story in the Poggio Gajella. From Dennis.

the tombs commonly keeps up the same analogy between the cities of the living and those of the dead. Their plan is for the most part that of a house, with a door of entrance and passage leading into a central chamber or *atrium*, with

[1] *Bulletino di Archeologia Christiana*, November, 1864, August, 1865.

others of smaller size opening from it, each having a stone-hewn bench or *triclinium* on three of its sides, on which the dead, frequently a pair of corpses side by side, were laid as if at a banquet. These benches are often hewn in the form of couches with pillows at one end, and the legs carved in relief. The ceilings have the representation of beams and rafters cut in the rock. In some instances arm-chairs, carved out of the living rock, stand between the doors of the chambers, and the walls above are decorated with the semblance of suspended shields. The walls are often covered with paintings in a very simple archaic style, in red and black. As a typical example of the Etruscan tombs we give the plan and section (figs. 23, 24) of the *Grotta della Sedia* at Cervetri from Dennis (pp. 32, 35). The tombs in some instances form subterranean groups more analogous to the general idea of a catacomb. Of this nature is the very remarkable cemetery at Poggio Gajella, near Chiusi, the ancient Clusium, of a portion of the principal story of which the woodcut (fig. 25) is a plan. The most remarkable of these sepulchral chambers is a large circular hall about 25 feet in diameter, supported by a huge cylindrical pillar hewn from the rock. Opening out of this and the other chambers, and connecting them together, are a series of low winding passages or *cuniculi*, just large enough for a man to creep through on all fours. No plausible suggestion has been offered as to the purpose of these mysterious burrows, which cannot fail to remind us of the labyrinth which, according to Varro's description as quoted by Pliny (*Hist. Nat.*, lib. xxxvi. c. 19, § 4), was the distinguishing mark of Porsena's tomb, and which have led some adventurous archæologists to identify this sepulchre with that of the great king of Etruria (Dennis, *u.s.*, p. 393, *ff.*).

Authorities.—Aringhi, *Roma Sotterranea;* Boldetti, *Osservazioni;* Bosio, *Roma Sotterranea;* Bottari, *Sculture et pitture sagre;* Garrucci, *Cimetero degli Antichi Ebrei; Arte Cristiana;* Le Blant, *Inscriptions Chrétiennes;* Fabretti, *Inscriptionum Antiquarum Explicatio;* Lupi, *Dissertatio;* Mabillon, *Iter Italicum; De Cultu ignotorum sanctorum;* Wharton Marriott, *Testimony of the Catacombs;* Martigny, *Dictionnaire des Antiquités Chrétiennes;* Mommsen, "The Roman Catacombs," *Contemp. Review*, May, 1871; Marchi, *Monumenti delle arti cristiane primitive;* Northcote and Brownlow, *Roma Sotterranea;* Panvinius, *De ritu sepeliendi mortuos;* J. H. Parker, C.B., *The Archæology of Rome, The Catacombs;* Perret, *Les Catacombes de Rome;* Raoul Rochette, *Tableau des Catacombes;* Richemont (Comte Desbossaynes de), *Nouvelles études sur les catacombes Romaines;* De' Rossi, *Inscriptiones Christianæ; Roma Sotterranea;* Seroux d'Agincourt, *Histoire de l'art par les monuments;* Smith and Cheetham, *Dictionary of Christian Antiquities.* (E. V.)

CATALEPSY (from *κατάληψις*, a seizure) is a term applied to a nervous affection characterized by the sudden suspension of sensation and volition, accompanied with a peculiar rigidity of the whole or of certain muscles of the body. The subjects of catalepsy are in most instances females of highly nervous temperament. The exciting cause of an attack is usually mental emotion operating either suddenly, as in the case of a fright, or more gradually in the way of prolonged depression. The symptoms presented vary in different cases, and even in the same individual in different attacks. Sometimes the typical features of the disease are exhibited in a state of complete insensibility, together with a statue-like appearance of the body, which will retain any attitude it may be made to assume during the continuance of the attack. In this condition the whole organic and vital functions appear to be reduced to the lowest possible limit consistent with life, and to such a degree as to simulate actual death. At other times considerable mental excitement will accompany the cataleptic symptoms, and the patient will sing or utter passionate exclamations during the fit, being all the while quite unconscious. The attack may be of short duration, passing off within a few minutes. It may, however, last for many hours, and in some rare instances persist for several days; and it is conceivable that in such cases the appearances presented might be mistaken for real death, as is alleged to have occasionally happened. Catalepsy belongs to the class of functional nervous disorders, of which the pathology is but little understood, owing to the manner in which morbid physical and psychical conditions are mixed up. Although it is said to occur in persons in perfect health, careful inquiry will usually reveal some departure from the normal state, as is shown by the greater number of the recorded cases. More particularly is this true of females, in whom some form of menstrual derangement will generally be found to have preceded the cataleptic affection. Catalepsy is sometimes associated with epilepsy and with grave forms of mental disease. In ordinary cases, however, the mental phenomena bear close resemblance to those witnessed in hysteria, with which disease catalepsy, though not identical, has very close alliance. In many of the subjects of catalepsy there appears to be a remarkable weakness of the will, whereby the tendency to lapse into the cataleptic state is not resisted but rather in some measure encouraged, and attacks may thus be induced by the most trivial circumstances. From what has been stated it follows that the successful treatment of such a disease as catalepsy must depend upon the due recognition of both its corporeal and mental relations. While the state of health will demand the attention of the physician, his skill and judgment will be no less urgently called for in dealing with the mental and moral characteristics manifested in each particular case. Dr. Chambers has shown that efforts directed to obtain command of the patient's will so as to compel her to resist to the utmost the inclination to fall into the cataleptic state, may succeed in curing even aggravated examples of this disease. See Ecstasy, Hysteria, Somnambulism.

CATALONIA (in Spanish, *Cataluña*), an old province of Spain and principality of the crown of Aragon, triangular in shape, and forming the north-east corner of the peninsula, lies between 40° 30′ and 42° 51′ N. lat., and 0° 15′ and 3° 21′ E. long., and is bounded on the N. by the Pyrenees, W. by Aragon, S. by Valencia, E. by the Mediterranean. The greatest breadth is 130 miles, the greatest length 185 miles, area 12,483 square miles. The coast, which is partly sandy, partly rocky, extends about 240 miles; the harbors are mostly unprotected from the wind. The surface is much broken by spurs of the Pyrenees, the direction of which is generally south. Running south-west to north-east, and united on the north with one of the offsets of the Pyrenees, is the range of the Sierra Llena, which bisects the province, and forms its central watershed. The principal rivers are the Ter, the Llobregat, and the Ebro, which all run into the Mediterranean. None of them is navigable. The climate, in spite of frequent mists and rains, sudden changes of temperature, and occasional great mid-day heat, is healthy and favorable to vegetation. The soil is light and loamy. Amongst the rocks of the province may be mentioned granite, chiastolite schists, porphyry and lava. Near Olot, towards the north-east, is a district containing extinct volcanoes. Oolitic limestone is found in the neighborhood of Figueras; and in other localities, nummulitic and Miocene deposits are represented. Mining is not much prosecuted; but copper, zinc, manganese, marble, sulphur, and coal are worked, and rock salt in abundance is procured from Cardona. The vegetation of Catalonia varies according to the altitude and nature of different regions. The dwarf-palm, orange, lime, and olive grow in the warmer tracts; and on the higher grounds the thorn-apple, pomegranate, myrtle, esparto, and heaths flourish. There is much woodland; but meadows and pastures are rare. Maize, millet, rye, flax, liquorice, and fruits of all sorts—especially nuts, almonds, oranges, figs, walnuts, and chestnuts—are produced. Wheat sufficient for one-fourth of the population is grown, and the vine is extensively cultivated. Few cattle, but numbers of sheep, goats, and swine are reared. Game is plentiful, and the fisheries on the coast are excellent. The exports are chiefly fruits, cork, and wines. The wines are for the most part rough and strong, though some are very good, especially when matured. They are much used to adulterate those of Oporto, or, after undergoing the operation termed *compage*, are passed off as Bordeaux wines in France. The best of them, "*priorato*," is chiefly known in England under the disguise of second or third-rate port; it was much used in the military hospitals of America during the Civil War. The imports are chiefly textiles, coal, coke, machinery of all kinds, and salt fish. The value of imports in 1870 was £5,996,143; of the exports, £2,884,306; the loss of the balance of £3,111,837 against Catalonia being partly borne by the other provinces of Spain, and to a great extent paid in wines, fruits, and corks. The value of exports to the Spanish American colonies in 1873 exceeded £2,220,000. The manufactures of Catalonia are cotton, silk, woollen goods, brandy, paper, cordage, and firearms. The Catalonians are a frugal, sharp-

witted, and industrious people, having much national pride, and a strong revolutionary spirit. They are distinct in origin from the other inhabitants of Spain, from whom they differ both in their dialect and costume and in their great energy and their love of enterprise. Irrigation, careful husbandry, and railroad communication have much developed the resources of their country, in themselves excellent; and there are many manufacturing towns and industrial establishments. Catalonia is divided into the provinces Gerona, Barcelona, Tarragona, and Lerida. Its chief towns are the ports of Rosas, Mataro, Tarragona, and the capital Barcelona; and Tortosa, Gerona, Figueras, Lerida, and Manresa. The population, in 1867, was 1,744,520.

Catalonia was one of the first of the Roman possessions in Spain, and formed the north-eastern portion of *Hispania Tarraconensis*. About 470 it was occupied by the Alans and Goths, and thus came to be called *Gothalania*, whence the modern name of the province. It was taken possession of by the Berbers in 712, who were in turn dispossessed by the Spaniards and the troops of Charlemagne in 788, and was after that ruled by French counts, who soon, however, made themselves independent of France. By the marriage of Count Raymond Berenger of Barcelona with Petronilla of Aragon, in 1137, Catalonia became annexed to the latter province; but this union was frequently severed. In 1640, when Philip IV. attempted to deprive Catalonia of its rights and privileges, it gave itself up to Louis XIII. of France. It was restored to Spain in 1659, but was once more occupied by the French from 1694 to 1697. Under Philip V. Catalonia, in 1714, was deprived of its Cortes and liberties. From 1808 to 1813 it was held by France. It was the scene of civil war in 1823, and of important revolutionary operations in the Carlist war.

CATAMARCA, or, in its full form, San Fernando de Catamarca, the capital of the province of the same name in the Argentine Republic, is situated in 28° 20′ S. lat. and 66° 25′ W. long. It is pretty regularly built, has a large square, with an obelisk in memory of the achievement of national independence, and numbers among its public buildings a small townhouse, a fort, a Franciscan monastery, and a Santa Teresa convent. The old establishment of the Mercedarios, for some time possessed by the Jesuits, now serves as a high school. The import trade, even of European goods, is considerable, as the town is a centre of distribution for an extensive and flourishing district. Dried figs, wine, brandy, and cotton are the principal articles of export; the copper, for which the province is so well known, is from another district. The present town of Catamarca only dates from 1685, when it replaced the old town of Chacra, the ruins of which are still to be seen a short distance to the north, at a spot which was found both unhealthy and exposed to inundation. Chacra had shortly before, in 1679, been appointed capital instead of San Juan de Londres, which had been founded in 1558. Population about 6000.

CATANIA, the ancient *Catana*, a city and seaport of Sicily and the chief town of a province, is situated on the east coast of the island, at the foot of the southern projections of Mount Etna, about 60 miles by rail from Messina, in 37° 28′ 20″ N. lat. and 15° 5′ 15″ E. long. It is one of the most important and attractive cities in the island, and has a fine appearance from the sea. Its streets are wide, regular, and finely paved with blocks of lava; and not only its public buildings but a large number of its private mansions are spacious and handsome structures of lava and limestone ornamented with marble. Among its churches, which number upwards of a hundred, the first place is held by the cathedral, originally founded by Roger I. in 1091, but for the most part rebuilt since the earthquake of 1693; and, at the head of its monastic institutions stands the great Benedictine abbey of San Nicolo, which occupies an area of about 21 acres, and has hardly more than two or three buildings of the same kind in Europe to be compared with it. Its first foundation dates from 1518, when the Benedictines removed from the town of Nicolosi further up the slope of Mount Etna, where they had been settled since 1359; but the present buildings were erected in the beginning of the 18th century by Contini of Rome. The church is principally remarkable for a grand organ, with seventy-two stops and 2916 pipes, built by Donato del Piano in 1760. The chief educational institution is the university founded in 1445 by Alphonso of Aragon; it has five faculties and thirty-eight professors, and was attended in 1873 by 233 students. The library is of considerable extent; but its collections of antiquities are surpassed by those in the Biscari Museum, founded by Prince Ignazio Biscari in the end of the 18th century. The senate house, the theatre, and the hospitals are the most important of the other buildings; and among the associations may be mentioned an academy of sciences and a college of the fine arts. Remains of the Roman period are numerous and extensive; they include a theatre, an amphitheatre, an odeum, several baths known as the Bagni Achillei, a number of tombs to the north-west of the town, and a few fragments of a so-called temple of Ceres. The theatre is for the most part buried under the *débris* of volcanic disturbances; and it has at different times served as a quarry for more modern buildings. Catania is the seat of a bishop, a prefect, and a court of appeal, as well as the residence of the grand prior of the Order of Malta. It is a place of great wealth, and is remarkable for the display of its festivals, of which the most important is held in August in honor of Santa Agata, the patroness of the city. Its industry and commerce are of considerable importance; silk and linen are largely manufactured, and there is a regular export of sulphur, grain, fruits, macaroni, olives, and articles in amber and lava. In 1873 the sulphur shipped amounted to 57,383 tons. In 1871 there entered the port 2297 sailing and 434 steam ships, with a respective tonnage of 97,442 and 162,387 tons. The value of the exports to Great Britain in 1874 was £160,000. The harbor is small, and accessible only to comparatively small craft, but another is in course of construction, which will be capable of receiving vessels of the largest size. Population in 1871, 84,379.

The ancient Catana was founded (730 B.C.) by a colony from the neighboring city of Naxos, which was itself founded by the Chalcidians of Eubœa. It maintained its independence till 476 B.C., when it was taken by Hiero I., who removed its inhabitants to Leontini, and repeopled the city with a new colony of 5000 Syracusans and an equal number of Peloponnesians, at the same time changing its name to Ætna. Soon after the death of Hiero the former inhabitants obtained possession of the town, when it again took the name of Catana. In 403 B.C. it was taken by Dionysius of Syracuse, who, after plundering the city and selling the inhabitants for slaves, established there a body of Campanian mercenaries. In the first Punic war it was one of the earliest among the cities of Sicily to submit to the Romans, and it appears to have afterwards continued on friendly terms with them. In the time of Cicero it was a flourishing and wealthy city; but it suffered so severely from the ravages of Sextus Pompeius, that Augustus afterwards sent a colony of veterans thither. In its more modern history the principal events are its occupation by the Goths, its deliverance by Belisarius, its sack by the Saracens, its conquest by the Normans, its destruction by earthquake in 1169, and its devastation by Henry VI., the erection of its fortress of Rocca Orsina by Frederick II., and several sieges in the course of the 14th century, the partial ruin of its harbor in 1669 by the eruption of Mount Ætna, and its almost total overthrow by the earthquake of 1693.

CATANZARO, a city of Italy, capital of the province of Calabria Ulteriore II., stands on the slope of a lofty and rocky hill near the Gulf of Squillace, 30 miles S.S.E. of Cosenza. It is the seat of a bishopric, and has a cathedral, several churches and convents, a castle, built by Robert Guiscard, a royal academy of sciences, a diocesan school, a college, a theatre, a foundling and two other hospitals, and other charitable institutions. It has manufactures of silk, velvet, and woollen goods, and a considerable trade in corn and wine and walnut oil. The most important fact in its history is the successful defence it made in the 16th century against the French general Lautrec. In 1783 many of its principal buildings were destroyed by an earthquake. Population, 24,900.

CATAPULTA, a military engine, employed by the ancient Greeks and Romans. It was constructed of wood and ropes in such a way that a sudden and forcible recoil could be produced, sufficient to project arrows and spears to a considerable distance. It is usually mentioned in conjunction with the *ballista*, which was employed for projecting heavy stones; and, after the time of Julius Cæsar, these two species of *tormenta* were often confounded.

CATARRH (from *καταῤῥέω*, to flow down) is a term employed to describe a state of irritation of the mucous membrane of the air passages, or what is called in popular language a cold. This complaint, so prevalent in damp and cold weather, usually begins as a nasal catarrh or coryza, with a feeling of weight about the forehead and some degree of difficulty in breathing through the nose, increased

on lying down. Fits of sneezing accompanied with a profuse watery discharge from the nostrils and eyes soon follow, while the sense of smell and to some extent that of taste become considerably impaired. There is usually present some amount of sore throat and of bronchial irritation, causing hoarseness and cough. Sometimes the vocal apparatus becomes so much inflamed (laryngeal catarrh) that temporary loss of voice results. There is always more or less feverishness and discomfort, and frequently an extreme sensitiveness to cold. After two or three days the symptoms begin to abate, the discharge from the nostrils and chest becoming thicker and of purulent character, and producing when dislodged considerable relief to the breathing. On the other hand the catarrh may assume a more severe aspect and pass into some form of pulmonary inflammation (see BRONCHITIS).

A peculiar catarrhal affection occasionally occurs, in an epidemic form, to which the name influenza is applied (see INFLUENZA).

Many remedies have been proposed with the view of cutting short a catarrh, but none of them are infallible, even where they can be safely employed. In some cases an opiate taken at the outset proves effectual for this end, but as often it will be found to fail. Entire abstinence from liquids of every kind for a period of forty-eight hours has been recommended as sufficient to cure any catarrh, but few will be found willing to submit to such a regimen. Many persons appear to think that they will get rid of a cold most quickly by continuing to go about, and, happily, in the majority of such cases, no harm results. Nevertheless it is more than probable that by a brief confinement to a warm room and the employment of means to promote perspiration (such as Dover's powder, along with a warm or vapor bath) speedier relief will be obtained; and at all events the evil consequences attendant upon a "neglected cold," which are so familiar to the experience of every physician, will be obviated. Local applications, in the form of inhalation of the vapor of iodine, turpentine, or ammonia, sometimes relieve the uncomfortable feelings in the head. Lately the use of a snuff composed of the trisnitrate of bismuth has been strongly recommended as affording marked relief in nasal catarrh. Where attacks of catarrh are of frequent occurrence no more useful prophylactic will be found than the habitual employment of the cold bath.

The term catarrh is now used in medical nomenclature in a still wider sense than that above mentioned, being employed to describe a state of irritation of any mucous surface in the body which is accompanied with an abnormal discharge of its natural secretion, hence the terms gastric catarrh, intestinal catarrh, &c.

CATAWBAS, an American Indian tribe in North and South Carolina, which has now become almost extinct, but was still able at the time of the War of Independence to furnish a valuable contingent to the South Carolina troops. They then occupied a number of small towns on the river which still preserves their name; but they afterwards leased their land and removed to the territory of the Cherokees, with whom they had been formerly at war. There, however, they did not long remain, but returned to a reservation in their original district. Their affinities have not been very clearly made out, but by Gallatin they are grouped with the Cherokees, Choctaws, Muskogees, and Natchez. Their language is closely allied to that of the Waccoes and the Carolina tribes, and affords no support to the opinion that they came originally from Canada. A vocabulary of sixty of their words was published by Hale in volume ii. of the *Transactions of the American Ethnological Society* in 1848; and a much fuller list—about 300—collected by Oscar M. Lieber, the geologist, in 1856, made its appearance in volume ii. of *Collections of the South Carolina Historical Society*, 1858. Peter Harris, the revolutionary soldier, was said to be the last survival of the full-blooded Catawbas, and the present representatives of the tribe are all half-castes. The pleasant sound of the Indian name is far more familiar in its application to the white American wine, whose praises have been sung so heartily by Longfellow. The grape from which the wine is obtained was first discovered about 1801, near the banks of the Catawba River, but it is now cultivated extensively in Illinois, Ohio, and New York, and especially on the shores of Lake Erie.

CATEAU CAMBRÉSIS, or LE CATEAU, a town of France, in the department of Nord, on the Selle, 15 miles E.S.E. of Cambray. It is well built, and was formerly fortified. Its importance has been greatly increased by the opening of coal-fields in the neighborhood; and it manufactures shawls, merinoes, calicoes, lace, leather, starch, sugar, and tobacco. Formed originally by the union of the two villages of Peronne and Vendelgies, under the protection of a castle built by the bishop of Cambray, Cateau became the seat of an abbey in the 11th century. In the 15th it was frequently taken and retaken; and in 1554 it was burned by the French, who in 1559 signed a celebrated treaty with Spain in the town. It was finally ceded to France by the peace of Nimeguen in 1678. In 1793 it was occupied for some time by the Austrians. Population in 1872, 9332.

CATECHISM, a word which originally signified instruction by word of mouth, being derived from the Greek *κατηχέω*. But, as it was necessarily by oral instruction that, in the early church, catechumens (or converts in preparation for baptism) were instructed in the essential doctrines of Christianity, and as the catechist usually sought to produce clear comprehension by means of questioning, several distinct uses of the word have sprung from its original employment, and it has come to signify—(1) instruction by means of question and answer; (2) elementary instruction, whether oral or written, in any branch of knowledge; and (3), in common language, a book of elementary instruction by means of question and answer,—either secular, as, *e.g.*, the science catechisms of the Middle Ages, or, as usually, religious.

Catechetical instruction was doubtless common among the ancient Jews, and the modern Jews possess several catechisms. The earliest with which we are acquainted are the *Thirteen Articles of Belief* of the famous Maimonides, which belongs to the 12th century, and Rabbi Levi's *Book of Education*, which belongs to the 13th. Among those used at the present day in England may be mentioned Leser's and Pixiotto's.

The most important and authoritative of the Catechisms of the Roman Catholic Church is that of the Council of Trent, which was published in 1566. It was prepared under the superintendence of the archbishop of Milan, by Leonardo Marini, Francisco Fureiro, Ægidius Foscorari, and Mugio Calini; and the style was polished by Pogianus. It is not a catechism in the ordinary sense, for it is not in the interrogative form, and it can scarcely be called elementary. It is, in fact, a very careful and complete system of Roman Catholic doctrine, extending over 500 8vo pages of closely-printed Latin. By command of the council, it was translated into French, German, Spanish, and Italian, and there is also an English version. The earliest of the catechisms of this church appear to be that of Kero, a monk of St. Gall, who lived in the 8th century, and that which is ascribed to Otfried, a monk of Weissenburg of the 9th century. Others worthy of mention are the *Summa Doctrinarum* of Peter Canisius, which was authorized in 1566; that of Bellarmine (1603), and that of Bossuet (1687). In 1870, the Œcumenical Council recommended the general use of the *Schema de Parvo*, a small catechism, which is little more than an abstract of Bellarmine's.

Catechisms were also very common among the Christian sects which, during the Middle Ages, opposed themselves to the dominant church, as the Albigenses and the Wickliffites.

The Greek Church has two principal catechisms, the earlier of which is that of Peter Mogilas, patriarch of Kieff, which was published in 1542, and sanctioned by the church in 1572. The other is that of Plato, patriarch of Moscow, of which an abstract has been made for purposes of education. This work is divided into two parts, of which the first treats of natural religion, the second of revealed.

Of the larger Protestant sects, each has a separate catechism. The Lutherans are represented by the two smaller catechisms of their founder, published in 1520 and 1529, and by his larger catechism, published in the latter year. In Switzerland, France, the Low Countries, Hungary, and Scotland, the *Geneva Catechism* of Calvin (1536) was for some time the standard of the Reformed Church. The *Heidelberg Catechism*, which appeared in 1563, compiled by Caspar Olevian and Zacharias Ursinus, and revised by the Synod of Dort, became the standard of the Swiss Church; and upon it was founded the *Zurich Catechism* (1639). A Socinian catechism appeared at Rakov in 1574.

In the reign of Edward VI. (1549), the newly-established English Church published, along with the Forty-two Articles, what now forms the first part of its catechism. It consists of no more than two or three pages, and contains only the Ten Commandments, the Creed, the Lord's Prayer, and an expression of the doctrine of baptism held by the English Church. In the reign of James I. an explanation of the Anglican doctrine of the sacraments was added by Bishop Overall.

The first catechism produced by the Scottish Presbyterians was that known as Craig's, which was laid before the General Assembly in 1592. It embodied, in twelve chapters, the Calvinistic doctrine of the church with regard to original sin, redemption, the sacraments, and ecclesiastical discipline; and after each chapter was a number of questions and answers. This catechism, together with some of those used on the Continent, served the British Presbyterians till 1647. In that year the Westminster Assembly of Divines appointed committees to draw up the famous *Larger* and *Shorter Catechisms*.

Besides these catechisms, which profess to be the symbols of various churches, a large number of private catechisms have been published. In the English Church the most important are Cranmer's and Noel's (1570). Among the English Protestant dissenters, who, of course, do not possess an authoritative catechism, there have been several, of which the most famous are those of Dr. Watts. A considerable number have also been produced by German theologians; but many of the works which they have published under the name have no claim to it whatever.

CATECHU, or CUTCH, is an extract obtained from several plants, its chief sources being the wood of two species of *Acacia* (*A. Catechu* and *A. Suma*), both natives of India. The extract obtained from these plants is also known as black catechu, Pegu cutch, and *Terra japonica*. A similar extract, known in pharmacy as pale catechu (*Catechu pallidum*), and in general commerce as Gambir, is produced from the leaves of *Uncaria Gambir* and *U. acida*, Rubiaceous plants growing in the East Indian Archipelago. A third product to which the name catechu is also applied, is obtained from the fruits of the areca or betel palm, *Areca Catechu;* but this substance is not chemically the same as the other two, neither does it appear to enter to any extent into European commerce.

Ordinary black catechu is usually imported in three different forms. The first and best quality, known as Pegu catechu, is obtained in blocks externally covered with the large leaves of a species of *Dipterocarpus;* the second and less pure variety is in masses, which have been moulded in sand; and the third consists of large cubes packed in coarse bags. The wood of the two species of *Acacia* yielding catechu is taken for the manufacture when the trees have attained a diameter of about 1 foot. The bark is stripped off and used for tanning, and the trunk is split up into small fragments, which are packed into earthenware jars, covered with water, and boiled in the open air. As the liquor becomes thick it is passed into separate vessels in which the evaporation is continued till the proper degree of inspissation is reached. It is then cast into the forms in which it is found in commerce, and further hardened by exposure to the sun. Catechu so prepared is a dark brown, or, in mass, almost black substance, brittle, and having generally a shining lustre. It has a powerfully astringent taste, with a sweetish after-effect. In cold water it disintegrates, and in boiling water, alcohol, acetic acid, and strong caustic alkali it is completely dissolved. Chemically it consists of a mixture of a peculiar variety of tannin termed catechu-tannic acid with catechin or catechuic acid, and a brown extractiform substance due to the alteration of both these principles. Catechu-tannic acid is an amorphous body soluble in cold water, while catechin occurs in minute, white, silky, needle-shaped crystals, which do not dissolve in cold water. A very minute proportion of quercetin, a principle yielded by quercitron bark, has been obtained from catechu.

Gambir, which is similar in chemical composition to ordinary catechu, occurs in commerce in the form of cubes of about an inch in size, with a pale brown or yellow color and an even earthy fracture. For the preparation of this extract the plants above mentioned are stripped of their leaves and young twigs, and these are boiled down in shallow pans. The juice is strained off, evaporated by boiling, and when sufficiently concentrated poured into vessels for cooling in which it is stirred in a peculiar manner as it cools and thickens. The mass, when it has attained a syrupy consistence, is cast into shallow boxes, where, as it hardens and dries, it is cut into small cubes.

Gambir and catechu are extensively employed in dyeing and tanning, and to some extent as astringents in medicine. For dyeing they have been in use in India from the most remote period, but it is only during the present century that they have been placed on the list of European dyeing substances. Catechu is fixed by oxidation of the coloring principle, catechin, on the cloth after dyeing or printing; and treated thus it yields a great variety of most durable tints of drabs, browns, and olives with different mordants. In tanning, catechu is used only for a low class of leather, which, when made into boots, communicates to the stockings a yellow stain. The principal consumption of catechu occurs in the preparation of fibrous substances exposed to water, such as fishing-lines and nets, and for coloring stout canvas used for covering boxes and portmanteaus under the name of tanned canvas. The average annual imports into Great Britain amount to about 5000 tons of catechu, which comes chiefly from Bengal, and 20,000 tons of gambir, coming from the Straits Settlements.

CATECHUMEN. The catechumeni in the earliest ages of the church were those who were desirous of and candidates for baptism. The literal signification of the term, according to its etymology (Greek), is one who is caused to hear something. In ecclesiastical language,—and the word is no otherwise used,—a catechumen is one who is being instructed in the doctrines of Christianity in preparation for baptism.

Catechumens were usually divided into four classes. The first class appears to have been those who were still in the condition of inquirers,—those who had been sufficiently impressed by what they had heard of Christianity to wish for more complete instruction. It would seem that this first instruction was, from motives of prudence, given privately and not in the churches. The second class consisted of those who, having been thus instructed, were found worthy of being admitted to the churches, not, however, to take any part in the holy mysteries, or even, as it would seem, in the prayers of the faithful, but for the hearing of sermons and exhortations, and the reading of the Gospel. These were accordingly called *audientes*,—hearers. They left the church when the reading of the sacred Scriptures and the sermon had been concluded. The third class consisted of those who had formally demanded baptism, and placed their names in the list of catechumens. These were called *prostrati* or *genuflectentes*,—those who shared in the prayers of the congregation. The fourth class was the *electi* or *competentes*, or those who had completed the period of their probation, and were deemed ready to receive baptism, and only waited to do so on the first occasion, that is to say, at the following Easter or Pentecost. The most important body of catechumens was obviously those of the third class, the *genuflectentes;* and it is of these that most of what we read in the early writers of the catechumens generally must be understood.

Of course the number of those who were in a state of preparation for baptism increased in proportion to the spread of the church. But it must not be supposed that there were no more catechumens when the totality of the population had become Christian, or that the catechumenate, as it was called, denoted solely the period of conversion from heathendom to Christianity. The children of Christian parents, who were not old enough, or not yet sufficiently instructed, to be admitted to the mystery of the Eucharist were catechumens, and subjected to the instruction of the church by a catechist appointed for the purpose. But throughout all the long period, during which proselytism from either Roman or barbarian heathenism was going on, the numbers of the catechumens were largely increased by a practice very curiously illustrative of the special superstition of the time. Large numbers of persons, who had become persuaded of the truth of Christianity, and who were fully minded to be baptized, put off the receiving of that sacrament, for a longer or shorter period, often until they found themselves in the presence of death. The object of this was to avoid responsibility before God for that greater heinousness of guilt, which would have resulted from sin committed after baptism. They argued that since baptism washed out all previous sin, and could be had only once, it was clearly expedient

that it should be received as late in life as possible. And thus many remained as catechumens during the greater part of their lives. And this practice prevailed not only among those who were quitting paganism for Christianity; it was also common among those born of Christian parents. Tenderness of conscience, too, seems often to have produced the same result in prolonging the catechumenate as the superstitious notion mentioned above. St. Ambrose, St. Gregory Nazianzen, and St. Augustine all remained catechumens till far on in life. The emperors Theodoric, Valentinian, and Constantine the Great did the same. And the abuse became so great that towards the end of the 4th century (see Baronius, *ad an.* 877) the church tried to provide a remedy for it, and among other fathers of the church, Saints Ambrose and Gregory exerted themselves to prevent others from following (though probably from very different motives) their own example.

The idea of the probable numbers of the members of a congregation likely to be in the condition of catechumens, which may be obtained from a consideration of the above circumstances, may serve to explain in some degree the architectural arrangements still to be seen in some churches of the early centuries. The complete plan of a church of that time seems to have comprised a court in front of the principal western entrance, surrounded with colonnades, as may still be seen in the cases of the church of St. Ambrose at Milan, and that of St. Clement at Rome, and some others. Now, when the catechumens were dismissed previously to the commencement of that portion of the service which we should call the "Communion Service," it was not understood that they should depart entirely, but they remained in these courts. It would seem, however, that those thus dismissed must have been the catechumens of the second class only — the *audientes*. And in the churches that have been mentioned, especially in that of St. Clement at Rome, the body of the building is divided by permanent stone constructions into the presbytery or chancel for the clergy at the eastern end, an intermediate portion for the lay members of the congregation of the male sex (the females being in the galleries), and a much larger part of the nave at the western extremity of the church, destined for the catechumens.

In the more important churches, persons called catechists were especially appointed for the instruction of the catechumens. In the epistle attributed to St. Clement, catechists are spoken of as distinguished from either bishops, priests, or deacons. But there is not sufficient evidence that they were ever considered a separate order in the hierarchy. In the church of Alexandria there was a celebrated school of catechumens, under the superintendence of some of the foremost men of their time, among whom St. Clement of Alexandria and Origen may be mentioned. See Origen, *Cont. Cel.*, lib. iii. It would seem that Origen was thus employed at eighteen years of age, when he was still a layman. There was also a celebrated school of catechumens in the church of Carthage. It is somewhat remarkable, however, that no traces are found of any such catechists having existed at Rome. There can be no doubt, however, that the catechumens were there as elsewhere required to pass through a period of instruction and novitiate, the task of preparing them being doubtless entrusted to the priests and deacons—more probably the latter—of each church.

Catechumens of the third category might be present, in the more distant and inferior part of the church assigned to them, during all that part of the service of the mass which precedes the offertory. It was then that the "*Ite, Catechumeni; missa est!*" was pronounced; and that portion of the service was called a "Catechumens' mass." It was not permitted to them so much as to see the eucharist. But in order that there might be the bond of some kind of special communion between them and the body of the faithful, bread was blessed and given to them, and this bread was called *Panis Catechumenorum*.

On the demand of any person to become a catechumen, a strict and searching examination was made into the previous conduct of the aspirant, and the general tenor of his life. Great caution was used also in ascertaining the nature and earnestness of his desire to become a Christian. If these inquiries and examinations were satisfactory, the person's name was formally entered on the roll of catechumens. From a very ancient extant ritual, entitled *Ordo ad faciendum Christianum*, it appears that the catechumens were, by anticipation, as Moroni says, called Christians, while the title of "the Faithful" was reserved for those who had received baptism. The duration of the catechumenate was originally fixed at three months (see the third epistle of St. Clement), but was subsequently shortened to forty days. The ceremonial with which the catechumen was at the termination of his novitiate admitted to baptism varied in some unimportant respects in different churches. But the following brief statement of the practice of the Roman church will suffice to indicate the nature of the function. In the first place a searching scrutiny into the mind and heart of the candidate for baptism was made on seven different occasions during Lent or in the weeks preceding Pentecost. Previously to beginning the first scrutiny, which took place on the Wednesday of the third week in Lent, the priest blessed ashes, which he sprinkled on the head of the catechumen. He also touched his ears and his nostrils with saliva, saying, "Ephphatha, which is, he opened to the odor of sanctity. But thou, devil, flee hence, for the judgment of God is approaching." The days appointed for the other six scrutinies were the Saturday of the third week, the Wednesday and Saturday of the fourth week, the Wednesday of the fifth week, and the Wednesday and Saturday of the last week. The first scrutiny was closed by asking of the neophyte if he renounced the devil and believed all the doctrines of the faith. Then the priest blew on his face, saying, "Go out from him, thou unclean spirit, and give place to the Holy Spirit of the Paraclete;" and concluded by making the sign of the cross on his forehead, accompanying the action by the words, "In nomine Patris, et Filii, et Spiritus Sancti." At the third scrutiny the Creed and the Lord's Prayer were given to the catechumen that he might learn them by heart, for the discipline of the "Arcanum" expressly forbade that he should be allowed any cognizance of these at an earlier period of his novitiate. This consigning of the Creed was not done without certain formalities. The catechumens were assembled in the church, the bells were rung, and the church doors closed. Then the bishop preached a sermon, and then recited the Creed twice, once in Latin, once in Greek, prefacing his reading by the words "Signate vos; et audite Symbolum!" He then explained it passage by passage, and then gave to each Catechumen a written copy of it. Then a day was fixed for the ceremony of baptism, and the catechumens were dismissed by the archdeacon with the words "*Catechumeni recedant; omnes Catechumeni exeant foris!*"—"Let the catechumens retire! Let all the catechumens go out from the church!" And the deacon added "*Filii carissimi, revertimini in loca vestra, expectantes horam qua possit circa vos Dei gratia Baptismum operari,*"—"Well-beloved sons, return to your own home, and there await the hour when, by the grace of God, baptism may be performed on you." And so ended the catechumens' novitiate.

The number of writers who have specially treated of the institution of catechumens, and of the practice of the Church, and in some respects of the different churches, in regard to them, is far too large for it to be possible to give a list of them here. But such a list may be found in the treatise of Cancellieri on the Holy Week.

CATEGORY (Gr. *κατηγορία*), a term first introduced into the philosophical vocabulary by Aristotle, means etymologically an accusation. Even in the writings of Aristotle the word occurs once or twice in this its primary acceptation, but generally it has there a definite and technical signification. So also in Aristotle the verb *κατηγορεῖν*, to accuse, takes the specific logical sense, to predicate; *τὸ κατηγορούμενον* becomes the predicate; and *κατηγορικὴ πρότασις* may be translated as affirmative proposition. But though the word thus received a new signification from Aristotle, it is not on that account certain that the thing it was taken to signify was equally a novelty in philosophy. We do find in the records of Oriental and early Greek thought something corresponding to the Aristotelian classification.

Our knowledge of Hindu philosophy, and of the relations in which it may have stood to Greek speculation, is not yet adequate to give decisive answers to various questions that naturally arise on observation of their many resemblances; and it might therefore appear irrelevant to introduce into an historical notice of a peculiarly Western doctrine any reference to its Eastern counterpart. Yet the similarity between the two is so striking that, if not historically connected, they must at least be regarded as expressions of similar philosophic wants. The Hindu classification to which we specially refer is that of Kanada, who lays down six categories, or classes of existence, a seventh being generally added by the commentators. The term employed is Padârtha, meaning "signification of a word." This is in entire harmony with the Aristotelian doctrine, the categories of which may with truth be described as significations of simple terms, *τὰ κατὰ μηδεμίαν συμπλοκὴν λεγόμενα*. The six categories of Kanada are Substance, Quality, Action, Genus, Individuality, and Concretion or Co-inherence. To these is added Non-Existence, Privation, or Negation. *Substance* is the permanent sub-strate in which *Qualities* exist. *Action*, belonging to or inhering in substances, is

that which produces change. *Genus* belongs to substance, qualities, and actions; there are higher and lower genera. *Individuality*, found only in substance, is that by which a thing is self-existent and marked off from others. *Concretion* or Co-inherence denotes inseparable or necessary connection, such as that between substance and quality. Under these six classes, γένη τοῦ ὄντος, Kanada then proceeds to range the facts of the universe.[1]

Within Greek philosophy itself there were foreshadowings of the Aristotelian doctrine, but nothing so important as to warrant the conclusion that Aristotle was directly influenced by it. Doubtless the One and Many, Being and Non-Being, of the Eleatic dialectic, with their subordinate oppositions, may be called categories, but they are not so in the Aristotelian sense, and have little or nothing in common with the later system. Their starting-point and results are wholly diverse. Nor does it appear necessary to do more than mention the Pythagorean table of principles, the number of which is supposed to have given rise to the decuple arrangement adopted by Aristotle. The two classifications have nothing in common; no term in the one list appears in the other; and there is absolutely nothing in the Pythagorean principles which could have led to the theory of the categories.[2]

One naturally turns to Plato when endeavoring to discover the genesis of any Aristotelian doctrine, and undoubtedly there are in the Platonic writings many detached discussions in which the matter of the categories is touched upon. Special terms also are anticipated at various times, *e.g.*, ποιότης in the *Theætetus*, ποιεῖν and πάσχειν in the *Gorgias*, and πρός τι in the *Sophist*.[3] But there does not seem to be anything in Plato which one could say gave occasion directly and of itself to the Aristotelian doctrine; and even when we take a more comprehensive view of the Platonic system and inquire what in it corresponds to the widest definition of categories, say as ultimate elements of thought and existence, we receive no very definite answer. The Platonic dialectic never worked out into system, and only in two dialogues do we get anything like a list of ultimate or root-notions. In the *Sophist*, Being, Rest, and Motion (τὸ ὂν ἀυτὸ καὶ στάσις καὶ κίνησις) are laid down as μέγιστα τῶν γενῶν.[4] To these are presently added the Same and the Other (ταὐτὸν καὶ θάτερον), and out of the consideration of all five some light is cast upon the obscure notion of Non-Being (τὸ μὴ ὄν). In the same dialogue (262, *sq.*) is found the important distinction of ὄνομα and ῥῆμα, noun and verb. The *Philebus* presents us with a totally distinct classification into four elements—the Infinite, the Finite, the Mixture or Unity of both, and the Cause of this unity (τὸ ἄπειρον, τὸ πέρας, ἡ σύμμιξις, ἡ αἰτια). It is at once apparent that, however these classifications are related to one another and to the Platonic system, they lie in a different field from that occupied by the Aristotelian categories, and can hardly be said to have anything in common with them.

The Aristotelian doctrine is most distinctly formulated in the short treatise Κατηγορίαι, which generally occupies the first place among the books of the *Organon*. The authenticity of the treatise was doubted in early times by some of the commentators, and the doubts have been revived by such scholars as Spengel and Prantl. On the other hand Brandis, Bonitz, and Zeller are of opinion that the tract is substantially Aristotle's. The matter is hardly one that can be decided either *pro* or *con* with anything like certainty; but this is of little moment, for the doctrine of the categories, even of the *ten* categories, does not stand or fall with only one portion of Aristotle's works.

It is surprising that there should yet be so much uncertainty as to the real significance of the categories, and that we should be in nearly complete ignorance as to the process of thought by which Aristotle was led to the doctrine. On both points it is difficult to extract from the matter before us anything approaching a satisfactory solution. The terms employed to denote the categories have been scrutinized with the utmost care, but they give little help. The most important—κ. τοῦ ὄντος or τῆς οὐσίας, γένη τοῦ ὄντος or τῶν ὄντων, γένη simply, τὰ πρῶτα or τὰ κοινὰ πρῶτα, αἱ πτώσεις, or αἱ διαιρέσεις—only indicate that the categories are general classes into which Being as such may be divided, that they are *summa genera*. The expressions γένη τῶν κατηγορίων and σχήματα τῶν κ., which are used frequently, seem to lead to another and somewhat different view. Κατηγορία being taken to mean that which is predicated, γένη τῶν κ. would signify the most general classes of predicates, the framework into the divisions of which all predicates must come. To this interpretation there are objections. The categories must be carefully distinguished from predicables; in the scholastic phraseology the former refer to *first intentions*, the latter to *second intentions*, *i.e.*, the one denote real, the other logical connection. Further, the categories cannot without careful explanation be defined as predicates; they are this and something more. The most important category, οὐσία, in one of its aspects cannot be predicate at all.

In the Κατηγορίαι Aristotle prefixes to his enumeration a grammatico-logical disquisition on homonyms and synonyms, and on the elements of the proposition, *i.e.*, subject and predicate. He draws attention to the fact that things are spoken of either in the connection known as the proposition, *e.g.*, "a man runs," or apart from such connection, *e.g.*, "man" and "runs." He then proceeds, "Of things spoken of apart from their connection in a proposition (τῶν κατὰ μηδεμίαν συμπλοκὴν λεγομένων), each signifies either Substance (οὐσία), or Quantity (ποσόν), or Quality (ποιόν), or Relation (πρός τι), or Where (*i.e.* Place, ποῦ), or When (*i.e.* Time, ποτέ), or Position (κεῖσθαι), or Possession (ἔχειν), or Action (ποιεῖν), or Passion (πάσχειν). Οὐσία, the first category, is subdivided into πρώτη οὐσία or primary substance, which is defined to be τόδε τι, the singular thing in which properties inhere, and to which predicates are attached, and δεύτεραι οὐσίαι, genera or species which can be predicated of primary substances, and are therefore οὐσία only in a secondary sense. Nevertheless, they too, after a certain fashion, signify the singular thing, τόδε τι" (*K.*, p. 3b, 12, 13). It is this doctrine of πρώτη οὐσία that has raised doubts with regard to the authenticity of the Κατηγορίαι. But the tenfold classification, which has also been captiously objected to, is given in an acknowledged writing of Aristotle's (see *Topica*, i. 9, p. 103b, 20).[5] At the same time it is at least remarkable that in two places where the enumeration seems intended to be complete (*Met.*, p. 1017a, 25; *An. Pos.*, i. 22, p. 83a, 21), only eight are mentioned, ἔχειν and κεῖσθαι being omitted. In other passages[6] six, five, four, and three are given, frequently with some addition, such as καὶ αἱ ἄλλαι κ. It is also to be observed that, despite of this wavering, distinct intimations are given by Aristotle that he regarded his list as complete, and he uses phrases which would seem to indicate that the division had been exhaustively carried out. He admits certainly that some predicates which come under one category might be referred to another, but he declines to deduce all from one highest class, or to recognize any relation of subordination among the several classes.

The full import of the categories will never be adequately reached from the point of view taken up in the Κατηγορίαι, which bears all the marks of an early and preliminary study. For true understanding we must turn to the *Metaphysics*, where the doctrine is handled at large. The discussion of Being in that work starts with a distinction that at once gives us a clue. Τὸ ὄν is spoken of in many ways; of these four are classified—τὸ ὂν κατὰ συμβεβηκός, τὸ ὂν ὡς ἀληθές, τὸ ὂν δυνάμει καὶ ἐνεργείᾳ, and τὸ ὂν κατὰ τὰ σχηματὰ τῶν κατηγορίων. It is evident from this that the categories can be regarded neither as purely logical nor as purely metaphysical elements. They indicate the general forms or ways in which Being can be predicated; they are determinations of Being regarded as an object of thought, and consequently as matter of speech. It becomes apparent also why the analysis of the categories starts from the singular thing, for it is the primary form under which all that is becomes object of knowledge, and the other categories modify or qualify this real individual. Πάντα δὲ τὰ γιγνόμενα ὑπό τέ τινος γίγνεται καὶ ἐκ τινος καὶ τι. Τὸ δὲ τί λέγω καθ' ἑκάστην κατηγορίαν· ἢ γὰρ τόδε ἢ ποσὸν ἢ ποιὸν ἢ ποῦ (*Met.*, p. 1032a, 13–15). . . . The categories, therefore, are not logical forms but real predicates; they are the general modes

[1] For details of this and other Hindu systems see Colebrooke, *Essays*; H. H. Wilson, *Essays*; Williams, *Indian Wisdom*; Gough's *Vaiseshika-Sutras*; M. Müller, *Sanskrit Literature*, and particularly his Appendix to Thomson's *Laws of Thought*.

[2] The supposed origin of that theory in the treatise περὶ τοῦ παντός, ascribed to ARCHYTAS (*q.v.*), has been proven to be an error. The treatise itself dates in all probability from the Neo-Pythagorean schools of the 2d century A.D.

[3] Prantl, *Ges. d. Logik*, i. 74–5; Trendelenburg, *Kategorienlehre*, 209, *n.*

[4] *Soph.*, 254, D.

[5] Against this passage even the cross-grained Prantl can raise no objection of any moment; see *Ges. der Logik*, i. 206, *n.*

[6] See Bonitz, *Index Aristotelicus*, *s.v.*, and Prantl, *Ges. d. Log.*, i. 207.

in which Being may be expressed. The definite thing, that which comes forward in the process from potentiality to full actuality, can only appear and be spoken of under forms of individuality, quality, quantity, and so on. The nine later categories all denote entity in a certain imperfect fashion.

The categories then are not to be regarded as heads of predicates, the framework into which predicates can be thrown. They are real determinations of Being—*allgemeine Bestimmtheiten*, as Hegel calls them. They are not *summa genera* of existences, still less are they to be explained as a classification of namable things in general. The objections Mill has taken to the list are entirely irrelevant, and would only have significance if the categories were really—what they are not—an exhaustive division of concrete existences. Grote's view (*Aristotle*, i. 108) that Aristotle drew up his list by examining various popular propositions, and throwing the different predicates into genera, "according as they stood in different logical relation to the subject," has no foundation. The relation of the predicate category to the subject is not entirely a logical one; it is a relation of real existence, and wants the essential marks of the propositional form. The logical relations of τὸ ὄν are provided for otherwise than by the categories.

Aristotle has given no intimation of the course of thought by which he was led to his tenfold arrangement, and it seems hopeless to discover it. Trendelenburg in various essays has worked out the idea that the root of the matter is to be found in grammatical considerations, that the categories originated from investigations into grammatical functions, and that a correspondence will be found to obtain between categories and parts of speech. Thus, Substance corresponds to noun substantive, Quantity and Quality to the adjective, Relation partly to the comparative degree and perhaps to the preposition, When and Where to the adverbs of time and place, Action to the active, Passion to the passive of the verb, Position (κεῖσθαι) to the intransitive verb, ἔχειν to the peculiar Greek perfect. That there should be a very close correspondence between the categories and grammatical elements is by no means surprising; that the one were deduced from the other is both philosophically and historically improbable. Reference to the detailed criticisms of Trendelenburg by Ritter, Bonitz, and Zeller will be sufficient.

Aristotle has also left us in doubt on another point. Why should there be only *ten* categories? and why should these be the ten? Kant and Hegel, it is well known, signalize as the great defect in the Aristotelian categories the want of a principle, and yet some of Aristotle's expressions would warrant the inference that he *had* a principle, and that he thought his arrangement exhaustive. The leading idea of all later attempts at reduction to unity of principle, the division into substance and accident, was undoubtedly not overlooked by Aristotle, and Brentano[1] has collected with great diligence passages which indicate how the complete list might have been deduced from this primary distinction. His tabular arrangements (pp. 175, 177) are particularly deserving of attention. The results, however, are hardly beyond the reach of doubt.

There was no fundamental change in the doctrine of the categories from the time of Aristotle to that of Kant, and only two proposed re-classifications are of such importance as to require notice. The Stoics adopted a fivefold arrangement of highest classes, γενικώτατα. Τὸ ὄν or τί, Being, or somewhat in general, was subdivided into ὑποκείμενα or subjects, ποία or qualities in general, which give definiteness to the blank subject, πῶς ἔχοντα, modes which further determine the subject, and πρὸς τι πῶς ἔχοντα, definite relative modes. These categories are so related that each involves the existence of one higher than itself, thus there cannot be a πρός τι πῶς ἔχον which does not rest upon or imply a πῶς ἔχον, but πῶς ἔχον is impossible without ποιόν, which only exists in ὑποκείμενον, a form or phase of τὸ ὄν.[2]

Plotinus, after a lengthy critique of Aristotle's categories, sets out a twofold list. Τὸ ἓν, κίνησις, στάσις, ταυτότης, ἑτερότης are the primitive categories (πρῶτα γένη) of the intelligible sphere. Οὐσια, πρός τι, ποιά, ποσόν, κίνησις are the categories of the sensible world. The return to the Platonic classification will not escape notice.

[1] Brentano, *Bedeutung des Seienden nach A.*, pp. 148–178.

[2] For detailed examination of the Stoic categories, see Prantl, *Ges. d. Logik*, i. 428, *sqq.*; Zeller, *Ph. d. Gri.*, iii. 1, 82, *sqq.*; Trendelenburg, *Kateg.*, p. 217.

Modern philosophy, neglecting altogether the dry and tasteless treatment of the Aristotelian doctrine by scholastic writers, gave a new, a wider, and deeper meaning to the categories. They now appear as ultimate or root notions, the metaphysical or thought elements, which give coherence and consistency to the material of knowledge, the necessary and universal relations which obtain among the particulars of experience. There was thus to some extent a return to Platonism, but in reality, as might easily be shown, the new interpretation was, with due allowance for difference in point of view, in strict harmony with the true doctrine of Aristotle. The modern theory dates in particular from the time of Kant, who may be said to have re-introduced the term into philosophy. Naturally there are some anticipations in earlier thinkers. The Substance, Attribute, and Mode of Cartesianism can hardly be classed among the categories; nor does Leibnitz's chance suggestion of a fivefold arrangement into Substance, Quantity, Quality, Action and Passion, and Relations, demand any particular notice. Locke, too, has a classification into Substances, Modes, and Relations, but in it he has manifestly no intention of drawing up a table of categories. What in his system corresponds most nearly to the modern view of these elements is the division of kinds of real predication. In all judgments of knowledge we predicate either (1) Identity or Diversity, (2) Relation, (3) Co-existence, or necessary connection, or (4) Real existence. From this the transition was easy to Hume's important classification of *philosophical relations* into those of Resemblance, Identity, Time and Place, Quantity or Number, Quality, Contrariety, Cause and Effect.

These attempts at an exhaustive distribution of the necessary relations of all objects of knowledge indicate the direction taken by modern thought, before it received its complete expression from Kant.

The doctrine of the categories is the very kernel of the Kantian system, and, through it, of later German philosophy. To explain it fully would be to write the history of that philosophy. The categories are called by Kant Root-notions of the Understanding (*Stammbegriffe des Verstandes*), and are briefly the specific forms of the *a priori* or formal element in rational cognition. It is this distinction of matter and form in knowledge that marks off the Kantian from the Aristotelian doctrine. To Kant knowledge was only possible as the synthesis of the material or *a posteriori* with the formal or *a priori*. The material to which *a priori* forms of the understanding were applied was the sensuous content of the pure intuitions, Time and Space. This content could not be *known* by sense, but only by intellectual function. But the understanding in the process of knowledge makes use of the universal form of synthesis, the judgment; intellectual function is essentially of the nature of judgment or the reduction of a manifold to unity through a conception. The specific or type forms of such function will, therefore, be expressed in judgments; and a complete classification of the forms of judgments is the key by which one may hope to discover the system of categories. Such a list of judgments Kant thought he found in ordinary logic, and from it he drew up his well-known scheme of the twelve categories. These forms are the determinations of all objects of experience, for it is only through them that the manifold of sense can be reduced to the unity of consciousness, and thereby constituted experience. They are *a priori* conditions, subjective in one sense, but objective as being universal, necessary, and constitutive of experience.

The table of logical judgments with corresponding categories is as follows:—

Judgments.		Categories.
Universal.....	I. Of Quantity	Unity.
Particular		Plurality.
Singular.....		Totality.
Affirmative.....	II. Of Quality	Reality.
Negative.....		Negation.
Infinite.....		Limitation.
Categorical.....	III. Of Relation	Inherence and Subsistence (Substance and Accident).
Hypothetical...		Causality and Dependence (Cause and Effect).
Disjunctive.....		Community (Reciprocity).
Problematical..	IV. Of Modality	Possibility and Impossibility.
Assertoric.....		Existence and Non-Existence.
Apodictic.....		Necessity and Contingency.

Kant, it is well known, criticises Aristotle severely for

having drawn up his categories without a principle, and claims to have disclosed the only possible method by which an exhaustive classification might be obtained. What he criticised in Aristotle is brought against his own procedure by the later German thinkers, particularly Fichte and Hegel. And in point of fact it cannot be denied that Kant has allowed too much completeness to the ordinary logical distribution of propositions; he has given no proof that in these forms are contained all species of synthesis, and in consequence he has failed to show that in the categories, or pure conceptions, are contained all the modes of *a priori* synthesis. Further, his principle has so far the unity he claimed for it, the unity of a single function, but the specific forms in which such unity manifests itself are not themselves accounted for by this principle. Kant himself hints more than once at the possibility of a completely rational system of the categories, at an evolution from one single movement of thought, and in his *Remarks on the Table of the Categories* gave a pregnant hint as to the method to be employed. From any complete realization of this suggestion Kant, however, was precluded by one portion of his theory. The categories, although the necessary conditions under which alone an object of experience can be thrown, are merely forms of the mind's own activity; they apply only to sensuous and consequently subjective material. Outside of and beyond them lies the thing-in-itself, the blankest and emptiest of abstractions, which yet to Kant represented the ultimately real. This subjectivism was a distinct hiatus in the Kantian system, and against it principally Fichte and Hegel directed criticism. It was manifest that at the root of the whole system of categories there lay the synthetizing unity of self-consciousness, and it was upon this unity that Fichte fixed as giving the possibility of a more complete and rigorous deduction of the pure notions of the understanding. Without the act of the Ego, whereby it is self-conscious, there could be no knowledge, and this primitive act or function must be, he saw, the *position* or affirmation of itself by the Ego. The first principle then must be that the Ego posits itself as the Ego, that the Ego = Ego, a principle which is unconditioned both in form and matter, and therefore capable of standing absolutely first, of being the *prius* in a system. Metaphysically regarded this act of self-position yields the categories of Reality. But, so far as matter is concerned, there cannot be affirmation without negation, *omnis determinatio est negatio*. The determination of the Ego presupposes or involves the Non-Ego. The form of the proposition in which this second act takes to itself expression, the Ego is not = Not-Ego, is unconditioned, not derivable from the first. It is the absolute antithesis to the primitive thesis. The category of Negation is the result of this second act. From these two propositions, involving absolutely opposed and mutually destructive elements, there results a third which reconciles both in a higher synthesis. The notion in this third is determination or limitation; the Ego and Non-Ego limit, and are opposed to one another. From these three positions Fichte proceeds to evolve the categories by a series of thesis, antithesis, and synthesis.

In thus seizing upon the unity of self-consciousness as the origin for systematic development, Fichte has clearly taken a step in advance of, and yet in strict harmony with, the Kantian doctrine. For, after all that can be said as to the demonstrated character of formal logic, Kant's procedure was empirical, and only after the list of categories had been drawn out, did he bring forward into prominence what gave them coherence and reality. The peculiar method of Fichte, also, was nothing but a consistent application of Kant's own Remark on the Table of the Categories. Fichte's doctrine, however, is open to some of the objections advanced against Kant. His method is too abstract and external, and wants the unity of a single principle. The first two of his fundamental propositions stand isolated from one another, not to be resolved into a primitive unity. With him, too, the whole stands yet on the plane of subjectivity. He speaks, indeed, of the universal Ego as distinct from the empirical self-consciousness; but the universal does not rise with him to concrete spirit. Nevertheless the *Wissenschaftslehre* contains the only real advance in the treatment of the categories from the time of Kant to that of Hegel.[1] This, of course, does not imply that there were not certain elements in Schelling, particularly in the *Transcendental Idealism*, that are of value in the transition to the later system; but on the whole it is only in Hegel that the whole matter of the Kantian categories has been assimilated and carried to a higher stage. The Hegelian philosophy, in brief, is a system of the categories; and as it is not intended here to expound that philosophy, it is impossible to give more than a few general and quite external observations as to the Hegelian mode of viewing these elements of thought. With Kant, as has been seen, the categories were still subjective, not as being forms of the individual subject, but as having over against them the world of *noumena* to which they were inapplicable. Self-consciousness, which was, even with Kant, the *nodus* or kernel whence the categories sprang, was nothing but a logical centre,—the reality was concealed. There was thus a dualism, to overcome which is the first step in the Hegelian system. The principle, if there is to be one, must be universally applicable, all-comprehensive. Self-consciousness is precisely the principle wanted; it is a unity, an identity, containing in itself a multiplicity. The universal in absolute self-consciousness is just pure thinking, which in systematic evolution is the categories; the particular is the natural or multiform, the external as such; the concrete of both is spirit, or self-consciousness come to itself. The same law that obtains among the categories is found adequate to an explanation of the external thing which had so sadly troubled Kant. The categories themselves are moments of the universal of thought, type forms, or definite aspects which thought assumes; determinations, *Bestimmungen*, as Hegel most frequently calls them. They evolve by the same law that was found to be the essence of ultimate reality—*i.e.*, of self-consciousness. The complete system is pure thought, the Universal *par excellence*.

After the Hegelian there can hardly be said to have been a philosophical treatment of the Categories in Germany, which is not more or less a criticism of that system. It does not seem necessary to mention the unimportant modifications introduced by Kuno Fischer, Erdmann, or others belonging to the school. In the strongly-opposed philosophy of Herbart, the categories can hardly be said to hold a prominent place. They are, with him, the most general notions which are psychologically formed, and he classifies them as follows:—(1) Thing, either as product of thought, or as given in experience; (2) Property, either qualitative or quantitative; (3) Relation; (4) The Negated. Along with these, he posits as categories of inner process—(1) Sensation, (2) Cognition, (3) Will, (4) Action. George,[2] who in the main follows Schleiermacher, draws out a table of categories which shows, in some points, traces of Herbartian influence. His arrangement by enneads, or series of nine, is fanciful, and wanting in inner principle.

The most imposing recent attempt at a reconstruction of the categories is that of Trendelenburg. To him the first principle, or primitive reality, is Motion, which is both real as external movement, and ideal as inner construction. The necessary conditions of Motion are Time and Space, which are both subjective and objective. From this point onwards are developed the mathematical (point, line, &c.) and real (causality, substance, quantity, quality, &c.) categories which appear as involved in the notion of motion. Matter cannot be regarded as a product of motion; it is the condition of motion, we must think something moved. All these categories, "under the presupposition of motion as the first energy of thought, are ideal and subjective relations; as also, under the presupposition of motion as the first energy of Being, real and objective relations."[3] A serious difficulty presents itself in the next category, that of End (*Zweck*), which can easily be thought for inner activity, but can hardly be reconciled with real motion. Trendelenburg solves the difficulty only empirically, by pointing to the insufficiency of the merely mechanical to account for the organic. The consideration of Modality effects the transition to the forms of logical thought. On

[1] It does not seem necessary to do more than refer to the slight alterations made on Kant's Table of Categories by Herder (in the *Metakritik*), by Maimon (in the *Propadeutik zu einer neuen Theorie des Denkens*), by Fries (in the *Neue Kritik der Vernunft*), or by Schopenhauer, who desired to reduce all the categories to one—that of Causality. We should require a new philosophical vocabulary even to translate the extraordinary compounds in which Krause expounds his theory of the categories. Notices of the changes introduced by Rosmini, and of Gioberti's remarkable theory, will be found in Ragnisco's work referred to below.

[2] *Lehrbuch der Metaphysik*, 1844.

[3] *Logische Untersuchungen*, i. 376-7.

the whole, Trendelenburg's unique fact of motion seems rather a blunder. There is much more involved than he is willing to allow, and motion *per se* is by no means adequate to self-consciousness. His theory has found little favor.

Ulrici works out a system of the categories from a psychological or logical point of view. To him the fundamental fact of philosophy is the distinguishing activity (*unterscheidende Thätigkeit*) of thought. Thought is only possible by distinction, difference. The fixed points in the relations of objects upon which this activity turns are the categories, which may be called the forms or laws of thought. They are the aspects of things, notions under which things must be brought, in order to become objects of thought. They are thus the most general predicates or heads of predicates. The categories cannot be completely gathered from experience, nor can they be evolved *a priori*; but, by attending to the general relations of thought and its purely indefinite matter, and examining what we must predicate in order to know Being, we may attain to a satisfactory list. Such list is given in great detail in the *System der Logik* (1852), and in briefer, preciser form in the *Compendium der Logik* (2d ed., 1872); it is in many points well deserving of attention.

The definition of the categories by the able French logician Renouvier, in some respects resembles that of Ulrici. To him the primitive fact is Relation, of which all the categories are but forms. "The categories," he says, "are the primary and irreducible laws of knowledge, the fundamental relations which determine its form and regulate its movements." His table and his criticism of the Kantian theory are both of interest.[1]

The criticism of Kant's categories by Cousin and his own attempted classification are of no importance. Of more interest to us, though not of much more value, is the elaborate table drawn out by Sir W. Hamilton.[2] The generalized category of the *Conditioned* has but little meaning, and the subordinate categories evolve themselves by no principle, but are arranged after a formal and quite arbitrary manner. They are never brought into connection with thought itself, nor could they be shown to spring from its nature and relations.

J. S. Mill has presented, "as a substitute for the abortive classification of Existences, termed the categories of Aristotle," the following as an enumeration of all namable things:—(1) Feelings, or states of consciousness; (2) The minds which experience these feelings; (3) Bodies, or external objects which excite certain of those feelings; (4) Successions and co-existences, likenesses and unlikenesses, between feelings or states of consciousness.[3] This classification proceeds on a quite peculiar view of the categories, and is only presented here for the sake of completeness.

Trendelenburg, *Geschichte der Kategorienlehre*, 1846; Ragnisco, *Storia critica delle Categorie*, 2 vols. 1871. For Aristotle's doctrine the most important, in addition to Brandis, Zeller, and the above, are Bonitz, *Sitzungsber. d. kön. Akad. d. Wissen.*, Wien, 1853, pp. 591–645; Prantl, *Ges. d. Logik*, i.; and Brentano, *Bedeutung des Seienden nach Aristoteles*, 1862. See also Schuppe, *Die Kategorien des Aristoteles*, 1866; Grote's *Aristotle*, i.; and the translations of the *Categoriæ* by Maimon, 1794, and Heydenreich, 1835. (R. AD.)

CATERPILLAR. See BUTTERFLIES, vol. iv. p. 528.

CATGUT is the name applied to cord of great toughness and tenacity prepared from the intestines of sheep. It is used for the strings of harps and violins, as well as other stringed musical instruments, for hanging the weights of clocks, for bow-strings, and many other purposes where toughness, flexibility, and durability are required. To prepare catgut the intestines are cleaned, freed from fat, and steeped for some time in water, after which their external membrane is scraped off with the back of a knife or other blunt tool. They are then steeped for some time in an alkaline lye, smoothed and equalized by drawing out, bleached with sulphuric fumes, if necessary dyed, sorted into sizes, and twisted together into cords of various numbers of strands according to their uses. The best strings for musical instruments are imported from Naples; and it is found that lean and ill-fed animals yield the toughest gut.

CATHAY. See CHINA.

CATHCART, SIR GEORGE (1794–1854), British general, was born in London, May 12, 1794. He was the third son of the first Earl Cathcart, a distinguished general and diplomatist, commander-in-chief of the expedition to Copenhagen in 1807, and afterwards ambassador to Stockholm and St. Petersburg. He received his early education at Eton College, and passed thence to the university of Edinburgh. In 1810 he entered the army, and two years later accompanied his father as aide-de-camp to Russia. With him he joined the Russian headquarters in March, 1813; and he was present at all the great battles of the campaigns of that year in Germany and of the following year in France, and also at the taking of Paris. The fruits of his careful observation and critical study of these operations appeared in the *Commentaries* which he published in 1850, a volume of plain soldier-like history, prepared from notes made during the campaigns. After the peace of 1814 he accompanied his father to the Congress of Vienna; and while in that city he was appointed (March, 1815) extra aide-de-camp to the duke of Wellington. He was present at Quatre-Bras and at Waterloo, was named full aide-de-camp to the duke, and remained in his staff till the army of occupation quitted France. Reappointed almost immediately, he accompanied the duke to the Congresses of Aix-la-Chapelle and Verona, and in 1826 to Prussia. Promoted lieutenant-colonel in 1828, he served in Nova Scotia, Bermuda, and Jamaica,—retiring on half-pay in 1834. After three years he was recalled to active service, and was sent as commander of the King's Dragoon Guards to Canada, where he played an important part in suppressing the rebellion and pacifying the country. In 1844 he returned to England and again retired. Two years later he was appointed deputy-lieutenant of the Tower, and this post he held till 1852. In that year he was offered the governorship and command at the Cape. This he accepted, and had the merit of bringing to a close the Kaffre War. In December, 1853, he was appointed adjutant general of the army. In 1854 he was sent to take part as lieutenant-general in the Crimean War, and the highest hopes were fixed on him as a scientific and practically experienced soldier. But these hopes were not to be fulfilled; for he fell at the battle of Inkermann, November 5, 1854. His remains, with those of other officers, were buried on Cathcart's Hill, Lord Raglan, the commander-in-chief, attending the ceremony. Sir George Cathcart married in 1824 Lady Georgiana Greville, who survived him, and by whom he had a family of one son and seven daughters. At the time of his death he was a Knight Commander of the Bath.

CATHEDRAL, more properly CATHEDRAL CHURCH (*Ecclesia Cathedralis*), the chief church of a diocese, in which the bishop has his official seat or throne, *cathedra*. The earliest example given of the use of the term *Ecclesia Cathedralis* is in the Acts of the Council of Tarragona, in 516. Another primitive designation was "Ecclesia mater" or "matrix," indicating the cathedral as the mother-church of the diocese. As being the chief house of God, *Domus Dei*, of the district, it acquired in Germany the name of *Domkirche*, and in Italy of *Duomo*. The word "Ecclesia" was gradually dropt, and by the 10th century the adjective "cathedralis" took rank as a substantive, which it has successfully maintained in most of the modern languages of Europe. The essential distinction between a cathedral and all other churches, viz., that it is the church of the bishop, containing his throne of office, or *bishop's stool*, as our Saxon forefathers termed it, is thus well expressed by Hooker (*Eccl. Polit.*, vii. 8, 3), "To note a difference of that one church where the bishop hath his seat, and the rest which depend upon it, that one hath been usually termed *cathedral*, according to the same sense wherein Ignatius, speaking of the Church of Antioch, termeth it his throne; and Cyprian, making mention of Evaristus, who had been bishop and was now deposed, termeth him *cathedræ extorrem*, one that was thrust beside his chair. The church where the bishop is set with his college of presbyters about him we call a *see*; the local compass of his authority we term a *diocese*." A bishop's *see* is, strictly speaking, a bishop's *seat* (*sedes, siège*), or *cathedra*, and is only in a secondary sense applied to the church in which that seat is placed, and the city in which that church stands. From this it follows that a church may lose its cathedral rank by the transferenee of the bishop's see to another church, which by that transference at once assumes the dignity lost by the other. Thus the

[1] *Essais de Critique Generale*, 2d ed.; *La Logique*, i., pp. 184, 190, 207–225.
[2] *Discussions*, p. 577.
[3] *Logic*, i. 83; *cf.* Bain, *Ded. Log.*, *App.* C.

Oxfordshire Dorchester was the cathedral of the vast East Mercian diocese, until in 1072 Remigius removed the *cathedra* to Lincoln, while the West Mercian prelates at one time had their see at Chester before it was finally fixed in its earlier habitation at Lichfield. Thus also in 1088 the abbey church of Bath became the cathedral of Somersetshire, which for nearly two centuries had been at Wells, where after a brief sojourn at Glastonbury the bishop's throne was again permanently set up in 1206. Towards the close of the 12th century the cathedral of Canterbury was in some danger of losing its rank, the contumacy of the monks having caused Archbishop Baldwin to conceive the idea of transferring his official seat to the church of Hackington, which would in that event have become the cathedral of the Kentish diocese, and the metropolitan church of England. Such a plan was actually carried out when, early in the 13th century (1220), Bishop Poore deserted the cathedral of Old Sarum, and founded the existing cathedral of Salisbury. The period of the Reformation saw the abbey churches of Bristol, Chester, Gloucester, Oxford, and Peterborough, and for a short space Westminster, elevated to cathedral rank by being made the seat of a bishop, a change which has been witnessed in the present century by the establishment of the sees of Ripon and Manchester. While we are writing, the church of Cumbrae has become the cathedral of the Scottish diocese of Argyll and the Isles, and the abbey church of St. Albans is only waiting for the completion of preliminary necessary arrangements to be constituted the cathedral for the counties of Hertfordshire and Essex.

By very early canons it was decreed that cathedrals should only be established in chief cities. The Council of Laodicea (361), following the legislation of the Council of Sardica (347), prohibited the appointment of bishops in villages or country places. Throughout the Roman empire, where the ecclesiastical coincided with the civil divisions, the seats of religious authority were fixed in the same spots as the seats of temporal authority, the bishop placing his *cathedra* in the city where the temporal governor had planted his curule chair. In Britain, however, where, in the early days when the church first developed her power, cities were but few and insignificant, the case was different. The bishop was rather the bishop of a district or of a tribe than of a city. The position of his cathedral was dictated by motives of convenience and security rather than by the dignity and populousness of the site. Not unfrequently the *cathedra* was migratory. This state of things drew to an end with the conclusion of the 10th century, when the country became more settled, and the Roman system was finally ratified by the Council of London (1075), which ordered that episcopal sees should be removed from unwalled villages to walled cities. In obedience to this decree the cathedrals of Salisbury, Chichester, and Chester (the last only temporarily) were created,—succeeding to the episcopal dignity of those of Sherborne, Selsey, and Lichfield (Freeman, *Hist. of Norman Conquest*, vol. iv. pp. 414–420). Other transferences of only slightly later date were those already mentioned from Dorchester to Lincoln, and from Wells to Bath, as well as that of the East Anglian see from Elmham to Thetford and thence to Norwich.

Wherever established, the cathedral church was regarded as being, what it usually was in fact, the mother-church of the district dependent upon it. This district was for the first three centuries designated the *parochia* (παροικία) of the bishop. Gradually the term *diocese* (διοίκησις), originally signifying a civil province of the lesser sort, came to be transferred to ecclesiastical divisions, to the exclusion of the earlier name, which in its forms, *parish*, *paroisse*, *parrocchia*, &c., was restricted to the smaller ecclesiastical districts, each containing a single church. Cathedrals in their original idea possessed much of a missionary character. The district of which they were the ecclesiastical centre in general received the light of religious truth from them. They were the headquarters of the bishop and his clergy, from which they went forth for the evangelization of the heathen inhabitants—*pagani*, *i. e.*, dwellers in the *pagi*, or surrounding country villages. To this also they returned as their home for rest and refreshment, as well as for necessary conference. In the words of Dean Milman,—"Christianity was first established in the towns and cities, and from each centre diffused itself with more or less success into the adjacent country. . . . The churches adjacent to the towns or cities either originally were or became the diocese of the city bishop" (*Hist. of Christianity*, bk. iv. c. 1, § 2). Thus, as Hooker says, "Towns and villages abroad receiving the faith of Christ from cities whereunto they were adjacent, did, as spiritual and heavenly colonies, by their subjection honor those ancient mother-churches out of which they grew" (*Eccl. Polit.*, bk. vii. c. 8, § 2). In some cases, however, especially in Britain, the history of the cathedral was different. The missionary element was the same; but instead of starting with a bishop as the centre of organized action, establishments of missionary priests were formed, with a church as the focus of their religious life and a monastery as their home, which only tardily attained cathedral rank by the appointment of a bishop to preside over them. The cathedral of Worcester is instanced by Professor Stubbs in this relation, as an example, "like Canterbury itself, of a successful missionary establishment, thus attaining its due development." ("Cathedral of Worcester in the 8th century," *Archæol. Jour.*, vol. xix. p. 244.) The history of the missionary work of the Church of England during the early part of the present century reproduced this same system. The missionary clergy preceded the bishop, and cathedral dignity was imposed on a church not originally erected with any such object. The last twenty years have seen a return to the other more primitive plan of operations. In newly-constituted dioceses in Africa and elsewhere, the bishop takes the lead among his clergy in date of constitution as he does in official rank, and the cathedral church is one of the first requirements to be provided for. The true character and object of a cathedral church and establishment are thus well set forth by Bishop Stillingfleet:—"Every cathedral in its first institution was as a temple to the whole diocese, where the worship was to be performed in the most decent and constant manner; for which end it was necessary to have such a number of ecclesiastical persons there attending as might still be ready to do all the offices which did belong to the Christian church,—such as constant prayer and hymns and preaching and celebration of sacraments,—which were to be kept up in such a church, as the daily sacrifice was in the Temple." Though it was the church of the bishop, it was essential for its completeness that he should be surrounded by his college of presbyters, as the members of the body of which he was the head. The purpose of this collective body was threefold:—(1.) Consultative,—as the *concilium episcopi*, by whose advice he might be strengthened in all important matters concerning the diocese; (2.) Ministerial,—for the maintenance and celebration of public worship in its most reverent and dignified form, *cum cantu et jubilatione;* and (3.) Diocesan,—as the bishop's officials in the administration of his diocese, prepared also to go forth at his bidding to act as missionaries or evangelists in any part to which he might see fit to send them. In this way there sprang up the body known as the "chapter" of the cathedral,—a body originally in the closest connection with the bishop, and having no corporate existence apart from him. This collective body sometimes consisted of "seculars," *i.e.*, of clergy not bound by monastic vows, living in the world with separate homes of their own; sometimes of "regulars," *i.e.*, of clergy living according to a monastic rule, residing in one religious community, and sharing in common buildings. Of both bodies the bishop was the head. When the cathedral was the church of a monastery and was served by regulars, the bishop was regarded as the abbot; and when the chapter consisted of a college of secular clergy, it owed allegiance to no one but the bishop himself. The "dean," the present head of all English cathedral chapters, was a comparatively late addition, not appearing till the 10th or 11th century. He had been preceded by the *præpositus*, a "provost," who occurs in the 8th and 9th centuries. Earlier still we find the "archpresbyter," who was gradually supplanted by the "archdeacon," exercising chief authority among the cathedral clergy, but always in strict subordination to the bishop. Another chief officer of the church—one, with the two last, of the "tria culmina ecclesiæ"—was the "custos" or "primicerius," a title he derived from his name being that first entered on the waxen tablet or list. The strange contradiction by which the bishop has less authority in the church of which he is the titular head, and which takes its distinctive appellation from his throne, than in any other church in his diocese, only gradually came into existence. It

was partly a result of the increase of his diocesan duties, partly of his transformation into a great political officer of the state, and partly of the organization of the chapter as an independent corporation. When travelling over his wide-spread diocese, or attending upon the king as chancellor, or other high officer, the bishop had no leisure to attend to the internal administration of his cathedral, and the authority naturally tended to attach itself to the permanent chief of the chapter, while he gradually sank into a mere external visitor called in when needed to correct abuses, or as an arbiter to settle disputes. Under the bishop as its nominal head the chapter of a fully organized cathedral, when it was formed of secular priests, consisted of the *quatuor personæ*, or four chief "dignitaries" of the church, and a body of "canons" or "prebendaries." The four high officers were—(1) the "dean," as the general head of the whole capitular body, charged with the internal discipline of the corporation; (2) the "præcentor," or "chanter," who was charged with the management of the choir, and the musical arrangements of the service; (3) the "chancellor," the literary-man of the chapter, who, as theological professor, superintended the education of its younger members, delivered lectures himself, and procured the delivery of sermons by others, had the care of the library, and wrote the letters of the body; and (4) the "treasurer," not in the modern fiscal sense of the word, but the officer to whose care were entrusted the treasures of the church, its sacred vessels and altar furniture, reliquaries, and other ornaments. With these were usually united the "archdeacons," varying in number with the size of the diocese, who were, however, more diocesan than cathedral officers. Next after these dignitaries the main body of a cathedral chapter consisted of "canons" or "prebendaries." The former name they received originally from being enrolled on the "canon" or list of ecclesiastical officers, though subsequently it was supposed to have reference to their being bound by canons, *i.e.*, rules. The additional title of prebendary was given to those canons who enjoyed a separate estate (*præbenda*), in virtue of their position, besides their share of the corporate funds. These names were, generally speaking, two different designations for the same individual. A canon was usually, though not always, a prebendary; but a prebendary, as a member of the capitular body, was always a canon. The life of the canons was separate, not cœnobitic. Each had his own house and private establishment. The attempt of Chrodegang, archbishop of Metz (who died in 766), to force a semi-monastic rule on canons, with a common refectory and common dormitory, though eagerly adopted by the Emperor Charlemagne, was short-lived. By the middle of the 9th century the rule was indeed established in almost all the cathedrals of France, Germany, and Italy, and had also been adopted in England. But its strictness proved unpalatable to the canons. It was gradually relaxed everywhere, and found no acceptance in England. The distinction between "residentiary" and "non-residentiary" canons had its origin in the attempt to combat the evils consequent on pluralities. The canons having other preferments were, by the end of the 12th century, generally non-resident. Their cathedral duties were performed by "vicars" receiving a small stipend. To attract them into residence the divisible part of the corporate revenue was ordered to be shared among those canons who had resided for a certain term. This created a degree of confusion, as there was no certainty how many canons would reside during a given year. To obviate this irregularity the duty of residence was laid on a fixed number of canons only, who were to discharge the ordinary duties of the cathedral on behalf of the whole body (Freeman, *Cathedral Essays*, pp. 148–149). The establishment of "vicars," or, as they are now more usually but unstatutably called, "minor canons," as a regular and permanent part of the cathedral body, originally due to non-residence, was sanctioned through the inability of some of the canons to take their part in the choral service of the church. In most cathedrals each officer had his deputy. Thus we find the "sub-dean," the "sub-chanter," or "succentor," the "vice-chancellor," as recognized members of the cathedral staff. Another officer is the "prælector," or lecturer in theology, who in some cathedrals executes the duties elsewhere performed by the chancellor.

We have been speaking hitherto of the cathedrals of secular canons. The monastic cathedrals differed little from ordinary monasteries, save in being governed, in the almost constant absence of their titular abbot, the bishop, by a prior as the real head of their society. Cathedrals of this class are peculiar to England and Germany, which received its religion mainly from England. The monks or regular clergy who served them were, in England, everywhere of the Benedictine order, except at Carlisle, where they were Austin canons.

The distinction between monastic and secular cathedrals in England was perpetuated at the Reformation under the new titles of "Cathedrals of the Old Foundation" and "Cathedrals of the New." In the cathedrals of the former class the foundation remained substantially unchanged. But the monasteries attached to cathedrals having been suppressed by Henry VIII., together with the other religious houses, these cathedrals were founded afresh as chapters of secular canons presided over by a dean. These new chapters were eight in number, viz., Canterbury, Durham, Winchester, Carlisle, Ely, Norwich, Rochester, and Worcester. The members of the chapter were designated, not canons, but prebendaries, an improper appellation, as none had any separate estate or "præbenda" assigned to them. The highest number of these new prebendaries was twelve, at Canterbury, Durham, and Winchester; the lowest was four, at Carlisle. With these monastic cathedrals may be classed the new sees formed by Henry VIII. from existing monasteries, viz., Bristol, Chester, Gloucester, Oxford, and Peterborough. The constitution of these cathedrals was similar to those of the other monastic cathedrals, and the codes of statutes almost identical. In all the cathedrals of the New Foundation the præcentor, instead of being a chief dignitary second only to the dean, is one of the minor canons.

The cathedrals of the Old Foundation, whose constitution has not been materially changed since the 13th century, and which are in some instances still governed by pre-Reformation statutes, are those of York, London, Chichester, Exeter, Hereford, Lichfield, Lincoln, Salisbury, and Wells, together with those of the four Welsh bishoprics—Bangor, Llandaff, St. Asaph's, and St. David's. Monastic cathedrals being nearly peculiar to England and Germany, these Old Foundation cathedrals "are those whose history and constitution has most in common with the churches of Scotland, Ireland, and Western Christendom generally" (Freeman, *u.s.*, p. 139).

To these must be added the two recently-erected cathedrals of Manchester and Ripon. In each of these cases advantage was taken of an existing collegiate establishment on which to graft a cathedral. No provision is made in the Act for the founding of the see of St. Alban's for the creation of a capitular body.

The legislation of 3 and 4 Victoria reduced all the cathedrals of England and Wales to a uniform constitution. The normal type is that of a dean and four canons. Canterbury, Durham, and Ely, however, have six canons apiece, and Winchester and Exeter five. To remove still further the distinction between cathedrals of the Old and New Foundation, a body of honorary canons was called into being in the latter to correspond to the prebendaries of the former foundations. The prebendal estates having been alienated, the honor in each case is equally a barren one.

In not a few of the English cathedrals the due performance of the choral service is provided for by a corporation of "lay vicars," forming in some cases an independent body endowed with estates of their own. The chorister boys also in some cases are supported and educated from the proceeds of separate estates. The "priest vicars," or "minor canons," in several instances, also have their own estates and form a corporation by themselves.

It does not fall within the scope of the present article to enter upon the ritual and architectural history of cathedrals. In neither of these respects do they differ essentially from other important and dignified churches.

Essays on Cathedrals, edited by Dean Howson; Freeman, *Cathedral Church of Wells;* Walcott, *Cathedralia;* Robertson, *History of the Christian Church;* Milman, *History of Christianity.* (E. V.)

CATHERINE, Saint. The Roman hagiology contains the record of no less than six saints of this name, viz.:—1. St. Catherine, virgin and martyr, whose day of com

memoration recurs on the 25th of November; 2. St. Catherine of Sweden, who died abbess of Watzen, on the 24th March, 1381, and is commemorated on the 21st of that month; 3. St. Catherine of Siena, born in 1347, whose festal day is observed on the 30th of April; 4. St. Catherine of Bologna, whose family name was Vigri, and who died abbess of the Convent of St. Clairs in that city on the 9th March, 1463; 5. St. Catherine of Genoa, who belonged to the noble family of Fieschi, was born about 1448, spent her life and her means in succoring and attending on the sick, especially in the time of the plague which ravaged Genoa in 1497 and 1501, died in that city in 1510, was canonized by Clement XII. in 1737, and had her name placed in the calendar on the 22d of July by Benedict XIV.; and 6. St. Catherine de' Ricci, of Florence, born of that noble family in 1522, who became a nun in the convent of the Dominicans at Prato, died in 1589, and was canonized by Benedict XIV. in 1746, who fixed her festal day on the 13th February.

All these women are recorded by the chroniclers of the Roman church to have worked miracles. Indeed, without this essential qualification they could not have been canonized. The lives of all, save that of Catherine of Genoa, whose career was a more active one, having been spent mainly in the hospitals of her native city, were passed in the practice of the ordinary monastic virtues. St. Catherine de' Ricci was subject to long trances and visions. And of St. Catherine of Genoa it is recorded, that that miracle of levitation (or being raised from the ground), which is asserted with such curious frequency to have happened to various saints, frequently happened to her, when she was in the act of receiving the Holy Communion.

Of all these saints, however, it will only be necessary here to say a few words of the earliest of the name, who is the person intended when the Roman church speaks of St. Catherine without any additional designation, and then to give a somewhat more detailed account of the far most celebrated and historically important of them all, St. Catherine of Siena.

St. Catherine, Virgin and Martyr.

History has exceedingly little to tell of this saint; history, more properly so called, indeed, has nothing at all. She is said to have been of royal parentage, and her life is referred to the early part of the 4th century. She was martyred at Alexandria. She was especially celebrated for her learning and philosophical culture, and has always been considered the especial patron of philosophical schools. But in proportion to the scantiness of authenticated fact, legendary fable has been abundant in furnishing forth lives of the saint. And it is to one of these legends that the well-known presentiment of the saint, which alone is likely to cause modern readers to feel any interest in her name, is due. It is said that in revenge for the discomfiture of a company of heathen philosophers, with whom she had been compelled to dispute, the holy and learned lady was bound to a wheel armed with spikes, in such sort that every turn of the machine would cause the spikes to pierce her body. But the cords were miraculously broken, and the malice of her enemies foiled. Hence St. Catherine, virgin and martyr, is always represented with a wheel, and the extreme popularity of this saint, and consequent commonness of the pictures of her, is indicated by the fact that a wheel of a certain construction and appearance is to the present day called a Catherine wheel. The lover of mediæval painting may be warned against mistaking the pictures, which he so constantly meets with, of St. Catherine with her wheel, for representations of St. Catherine of Siena, or of any of the other saints Catherine, who all of them lived a thousand years or more later than the first and original saint of the name.

St. Catherine of Siena.

St. Catherine of Siena, born in that city in the year 1347, was a daughter of Giacomo Benincasa, said by the hagiographers to have been a descendant of the noble family of Borghese, also of Sienese origin,—a connection, however, which has been repudiated by the nobles of that subsequently Papal family. It seems certain, however, that the two families were sprung from the same stock. The researches of Signor Grottanelli, the present librarian of the municipal library at Siena, have enabled him to construct a pedigree of the saint, which may be considered as perfectly authentic, from which it appears that she was one of thirteen children; and that her father Giacomo, who died when she was one-and-twenty, in 1368, had been one of ten. Her mother Lapa, who was the grand-daughter of a "poeta volgare,"—that is to say, a poet who wrote in the then nascent Italian tongue,—lived to be eighty-nine. To her and to one of her brothers, and to two of her nieces, sundry of the saint's letters are addressed.

As is usual in the Roman hagiography, the first and contemporary biographer of St. Catherine, her confessor, the Dominican friar Raimondo (he was great-grandson of the celebrated Pietro delle Vigne, the chancellor of the Emperor Frederick II., and became the 24th general of the Dominican order), insists largely on the tendency towards sanctity which marked Catherine in her earliest years. The austerities and self-inflictions by which she prepared herself for her career, and gave proof of her vocation to those around her, began at an incredibly early age, and went on increasing in intensity till they pass from the probable to the highly improbable, and thence to the manifestly miraculous. At five years old it was her practice in going up stairs to kneel at each step to the Virgin. She habitually flogged herself and induced other children to do the same, at six years of age. At seven she deprived herself of a great portion of her food, secretly giving it to her brother, or throwing it to the cats. At the same age she would watch from the window to see when a Dominican monk passed, and as soon as he had moved on, would run down and kiss the spot of the pavement on which he had placed his feet. At twelve years old her mother begged her to comb her hair and wash her face oftener. But this she steadily refused to do, till her mother requested a married sister to use her influence with Catherine, to which for a time she yielded to a certain degree. This yielding, however, she often in after-life, as her confessor testified, bewailed with bitter tears of penitence, always mentioning it, when she made, as she was in the habit of doing frequently, a general confession of her sins.

About the same period of Catherine's life, her twelfth year, she wholly abandoned the use of animal food. At fifteen she left off wine. At twenty she gave up bread, living only on uncooked vegetables. She used to sleep but one quarter of an hour in the four and twenty. She always flogged herself till the blood streamed from her three times a day. She lived three years without speaking. She wore a chain of iron round her body, which gradually ate its way into her flesh. And, finally, she remained wholly without food for many years. Catherine began, we are told, to have visions at six years old. Returning home one day, about that time, through the streets of Siena, she saw in the sky, immediately over the Dominican Church, a throne with Christ sitting on it, dressed in Papal robes, accompanied by St. Paul, St. Peter, and St. John.

But these practices of her infancy, and these early visions, were but preparatory to the wonders of a later period. Christ appeared to her daily as soon as she retired to her cell, as she informed Father Raimondo, for the purpose of teaching her the doctrines of religion, which, as she said to her confessor, "no man or woman ever taught me, but only Our Lord Jesus Christ himself, sometimes by means of inspiration, and sometimes by means of a clear bodily appearance, manifest to the bodily senses, and talking with me, as I now talk with you." A detailed account of these manifestations will be found in the pages of Father Raimondo.

It is necessary to give some account of one miraculous occurrence, which was deemed the great and culminating glory of the saint, and has occupied the most prominent position in her estimation by the church, and in the imaginations of her admirers. This is the supernatural impression on her hands and feet of the scars of wounds corresponding with those made in the hands and feet of the Saviour by the nails which fixed Him to the cross. This is stated to have occurred at Pisa, and is asserted by Father Raimondo to have happened in his presence. Catherine had received the sacrament, and fell, as usual with her at such times, into a trance. Her confessor and some others were awaiting her recovery from it, when they saw her suddenly rise with a start to a kneeling posture, with her arms stretched out horizontally, and in a minute or two more fall prostrate. Soon afterwards she came out of her trance, and immediately calling aside her confessor said, "Be it known to you, my father, that I

now bear on my body the marks of the crucifixion of our Lord Jesus Christ." "And I," continues Father Raimondo, "having told her that I had observed as much from the movements of her body, while she was in her trance, asked her in what manner the Lord had performed that miracle? And she said, 'I saw the crucified Lord descending towards me with a great light, which caused me, from the impetus of my soul to meet its Creator, to raise up my body. Then I saw five bloody rays descending from the scars of his most holy wounds, and directing themselves to the hands and feet and heart of my body. Upon which, knowing what the mystery was, I exclaimed, O Lord, my God, let not, I pray you, the scars appear externally on my body, it is enough for me to have them internally. Then, while I was yet speaking, the rays, before they reached me, turned from blood-color to a pure and splendid light, and touched the five parts of my body—that is my hands, my feet, and my heart.' I asked her further, Do you now feel in those spots any sensible pain? To which, with a deep sigh, she replied, 'So great is the pain I feel in all those five places, but especially in my heart, that it appears impossible to me to live many days, unless the Lord perform some further miracle.'"

In order to appreciate the importance and bearing of this celebrated miracle, the fierce and bitter rivalry which existed between the Dominicans and Franciscans must be borne in mind. St. Francis had, some half century previously, received these five wounds in the same way. The marks are familiarly known among hagiographers and their readers as the *Stigmata;* and the having received them was considered the crowning glory of St. Francis, and was the exclusive boast of his Franciscans. But now the Dominicans were even with them. The Sienese Pope, who canonized his townswoman Catherine, Pius II., gave his approbation to a service, in which this reception of the *stigmata* was prominently asserted. And so severely was the blow felt by the indignant Franciscans that they obtained from the next Pope but one, Sixtus IV., himself a Franciscan, a decree to the effect that St. Francis had an exclusive right to and monopoly of that especial miracle, and that it was accordingly forbidden to represent St. Catherine receiving the *stigmata* under pain of ecclesiastical censures. The tendency observable in many of the austerities and miracles said to have been suffered and done by St. Catherine, to outdo the austerities and miracles of other saints, especially St. Francis, is particularly remarkable in this of the *stigmata.* The degree in which it served the purpose of the Dominicans is the measure of the suspicion attaching to it. But there is nothing incredible in the supposition that Catherine may have imagined in her trance all that she had related; and still less is it unlikely that such diseased dreamings may have been the natural product of a waking fancy, filled with, and dwelling on, this much envied manifestation. Perhaps the condition, so providently introduced, as it would seem, that the scars were not to be visible, may be suggestive of a fraudulent intention. But on the other hand, it may be observed that if such a fraud had been planned, it would have been easy for one, who habitually subjected her body to so much suffering, to submit to the required wounds beforehand. It will, however, probably be felt by most readers of the above quoted narrative of Father Raimondo that it bears on the face of it many of the marks of untruthfulness. The monk's statement that he had known what was taking place from the movements of her body would seem to be very suggestive of a foregone purpose and plan. On the other hand it may be argued that this is so obvious, that the monk would never have committed himself to such a statement had not it been the simple truth.

The celebrated and learned Tomasseo, whose literary reputation probably stands higher with his countrymen than that of any other living writer, and who is the latest writer on St. Catherine, accepting her works and character in the spirit of an enthusiastic devotee, writes in the essay on St. Catherine, which he has prefixed to the latest edition of her works (4 vols., Florence, 1860), as follows: "If by the mere play of the imagination a person, who has had a limb cut off, feels, nevertheless, pain in the part which has been removed; if the force of thought often creates bodily ills and cures them, it would be in contradiction to all philosophy and all the laws of criticism to deny that a woman rendered by love profoundly apprehensive of the sufferings of another, may feel pain in her own person, in that same spot of the body where the loved person feels or felt it. It would be to deny to Catherine that privilege of sympathizing piety and tender humanity, which we grant to the French mother, who exclaims, *J'ai mal à la poitrine de ma fille!* And for Catherine Jesus was alive, was present in her heart, in her eyes. All her being, as all the world, was full of him." The recognized phenomenon, however, to which the eloquent philologist refers is a purely physiological one; and it is for physiologists to determine what amount of analogy may be discoverable between that known fact and the sensation of bodily pain from which Catherine declared herself to be suffering, when she had recovered from her trance;—or rather that respecting which Catherine is said to have made such a declaration by the Dominican, her confessor and biographer. For in weighing the extremely curious question of the amount of conscious imposture which may probably be supposed to have been mingled with other elements in the extraordinary narrative, it is very necessary to remember that we have the testimony and statements of Catherine only through the medium of the general of the order, to the fame and glory of which Catherine's saintly fame and glory was so all-important.

It is important to observe in this connection that various statements of her confessor will leave little doubt on the minds of those who have made that form of malady called catalepsy their study, or even of those who have witnessed the phenomena attending it, that Catherine was subject to constantly-recurring attacks of catalepsy. And physicians will probably deem the hint above thrown out, to the effect that the saint was in the habit of throwing herself into this state "as much as she could," not unimportant. It is unnecessary in this place to do more than call attention by a passing word to the very remarkable similarity between some of the phenomena described by Father Raimondo and those attending many very well-known cases of animal magnetism.

But if doubts and difficulties crowd thickly about the whole of that portion of St. Catherine's story which has obtained for her the pre-eminence of saintship, it may be said that the public events of her life, which make part of the undoubted history of her time, are hardly less extraordinary and surprising. In the year 1376, the 29th of Catherine's life, Gregory XI. was living and holding the Papal court at Avignon. He was the last of seven French Popes in succession who had done so, and had perpetuated for seventy-three years what ecclesiastical writers are fond of terming "the Babylonian captivity of the church." To put an end to this absenteeism, and to bring back the Papacy to Italy, was the cherished and anxious wish of all good Italians, and especially of all Italian churchmen. Petrarch had urgently pressed Urban V., Gregory's immediate predecessor, to accomplish the desired change; and Dante had at an earlier date labored to bring about the same object. But both had failed in front of the great difficulties which attended the step. The French cardinals, who surrounded the Pope, were anxious, of course, to detain him in France. The king of France threw all his influence into the same scale. The French Pope's own prejudices and wishes were, of course, enlisted on the same side. Rome itself and the dominions of the church, which the violences and usurpations of the Roman barons kept in a chronic state of rebellion, made the Eternal City anything but an inviting residence. There was also considerable truth in the representations insisted on by several of the French Popes, that the rising importance of the northern churches had in a great degree changed the central point of the ecclesiastical world, and that the church could more advantageously be governed from a French than from an Italian city. Thus all the influences which Italy had for many years past striven to bring to bear upon the popes, to induce them to return to their own city, had failed. And it was under these circumstances that Catherine, the illiterate daughter of an obscure Sienese dyer, determined to try her powers of persuasion and argument for the accomplishment of that which the princes of the church and the greatest men of Italy had in vain attempted. For this purpose Catherine proceeded to Avignon in the summer of 1376. And in the September of that year the Pope set out on his return to Rome. It is true that he did this, intending after a sojourn in the Eternal City to return to France, and he would almost certainly have done so, had he not been prevented by death. But the dyer's

daughter did, as things fell out, succeed in her enterprise, and moved the centre of Europe back again once more to its old place in Rome! Of course it may be said that to attribute the Pope's return to Rome to Catherine's intervention is a notable instance of a *post hoc ergo propter hoc* inference. But many proofs might be given from various writers to show that it was unquestionably believed in her own day that Catherine had been the real moving cause of the restoration of the Papacy to Rome. (See especially Ammirato, *Istorie Fiorentine*, vol. v. p. 130, ed. Flor., 1824.) After many other journeyings she arrived in Rome on the 28th of November, 1378, in obedience to the commands of the Pope; and there she died on the 29th of April, 1380, at the age of thirty-three. Father Raimondo was then at Genoa, and declares that in that city, at the hour of her death, he heard a voice communicating to him a last message from Catherine, which he afterwards found she had uttered on her deathbed word for word as he heard it, "and of this," he adds solemnly, "let that Eternal Truth, which can neither deceive nor be deceived, be witness."

Catherine's works consist of a treatise occupying a closely-printed quarto volume, which Father Raimondo describes as "a dialogue between a soul, which asked four questions of the Lord, and the same Lord, who made answer and gave instruction in many most useful truths,"—of her letters, 373 in number, and of 26 prayers. The dialogue is entitled, *The Book of Divine Doctrine, given in person by God the Father, speaking to the mind of the most glorious and holy virgin Catherine of Siena, and written down as she dictated it in the vulgar tongue, she being the while entranced, and actually hearing what God spoke in her.* The work is declared to have been dictated by the saint in her father's house in Siena, a little before she went to Rome, and to have been completed on the 13th of October, 1378. This dialogue has been divided into five parts, though no such division existed in it as it fell from her lips. The first four parts exist in manuscript, as taken down from the lips of the entranced saint; but the fifth treatise is not extant in the original, but only in the Latin version of Father Raimondo, from which the published Italian version has been re-translated. The French oratorian, Father Casimir Oudin, in his supplement of ecclesiastical writers, omitted by Bellarmine, says very quietly, "She wrote, or Raimondo de Vineis wrote in her name, a work inscribed," &c., &c. And it is very possible that the suspicion indicated may be a just one; but there is nothing in the matter of the work itself to belie the origin attributed to it. It may be remarked, however, that the context, as it stands, does not even pretend to give the unbroken utterances of the saint. It is intermingled, without any advertisement to the reader, typographical or other, that he is about to enter on matter of a different authorship, with long passages descriptive of the saint's mode of receiving the revelation, written in the person of the secretary. But the saint's own utterances are exactly such as might have been expected from such a patient. They resemble the worst and emptiest style of the pulpit eloquence of her time and country, and consist entirely of mere verbose and repetitive inanities and platitudes. It is impossible to read them without being strongly reminded of the productions, which have been given forth in these latter days as spiritual communications made to persons in trance or otherwise constituting themselves "mediums,"—a similarity which suggests sundry curious considerations. The most probable supposition seems to be that these "dialogues" were composed by Father Raimondo, from notes taken down from Catherine's trance ramblings. The 26 prayers might have been expected to throw more light on the character and mental calibre of the saint, whose communings with the Infinite they represent. But nothing of the kind is to be gathered from them. The impression they are calculated to produce is either that the saint was a self-conscious actor and pretender, or that they are not her compositions,—the latter perhaps being the more probable hypothesis. Though addressed in form to the Deity, there is little in these effusions that can with accuracy be called prayer. The speaker, or rather writer, seems continually to forget his avowed object, and runs off into long statements of the nature and attributes of the Deity, and ecclesiastical positions based thereon, evidently prompted rather by didactic views as to mortal hearers, than by effort to hold communion with the Almighty. It is all dry, cold, repetitive, verbose theology, instead of the warm utterances of either a contrite or a thankful heart. It remains to say a few words of the saint's letters, by far the most interesting and valuable of her reputed works. They are 373 in number, and form two stout quarto volumes of the Lucca edition. In the four octavo volumes of the recent cheap Milan reprint, only the first 198 are given, though no word appears to indicate that the collection is imperfect. On the contrary, the fourth volume is entitled "4th and last." Still more recently the letters have been reprinted by Barbèra at Florence, 1860, in 4 vols. small octavo, with a preliminary notice of the saint prefixed by the celebrated Niccolò Tommaseo, consisting of 210 pages. The 373 letters of the entire collection have among them many addressed to kings, popes, cardinals, bishops, conventual bodies, and political corporations, as well as a great number written to private individuals. And it seems very strange that among so many correspondents of classes whose papers are likely to be preserved, and many of whom, especially the monastic communities, would assuredly have attached a high value to such documents, no one original of any of these documents should have been preserved. Girolamo Gigli, the editor of the quarto edition of the saint's works, printed at Lucca and Siena, 1707–13, an enthusiastic investigator and collector of every description of information regarding her, gives, in his preface to the letters, a careful account of the manuscript collections from which they have at different times been printed, but has not a word to say of any scrap of original document. The epistles were first printed by Aldus in 1500, just 120 years after Catherine's death. The difficulties connected with the subject of the true authorship of these letters are much complicated by questions respecting Catherine's capability of writing, and her own statements of the miraculous manner in which she acquired that accomplishment. The discussion of these difficulties would require a larger space than can here be allotted to the subject. And the reader curious on the subject may be referred to a life of the saint by Mr. Trollope, from which much of the present notice has been taken. It is admitted on all hands, however, that a large portion of the letters were written by the hands of secretaries. The very high reputation, and that not wholly of a pietistic or ecclesiastical nature, which this large mass of writings has enjoyed for several centuries will probably appear to most English readers an extremely singular fact. A great deal of the praise bestowed on St. Catherine's writings by Italian critics has reference to their style and diction. Written at a time when the language, fresh from the hands of Dante, of Petrarch, and of Boccaccio, was still in its infancy, and in a city at all times celebrated for the purity of its vernacular, they have by the common consent of Italian scholars taken rank as one of the acknowledged classics of the language,—as a *testa di lingua*, as the Tuscan purists say. The Della Cruscans have placed them on the jealously-watched list of their authorities, and an enthusiastic Sienese compatriot, the before-mentioned Girolamo Gigli, has completed a *vocabulario Cateriniano*, after the fashion of those consecrated to the study of the works of Homer and Cicero. Of course no one from the "barbarous" side of the Alps can permit himself any word of observation on this point, especially when the judgment is in the main confirmed by the authority of the greatest of living Italian critics, Niccolò Tommaseo. Had no such decisive opinion been extant to guide his ignorance, it might perhaps have seemed to a foreigner that the saint's style was loose in its syntax, intricate in its construction, and terribly overloaded with the merest verbosity. But the philological excellences of her writings are, after all, the least part of the praise that has been lavished on Catherine as an author. Her admirers enlarge on the moving eloquence, the exalted piety, the noble sentiments, the sound argumentation of her compositions, especially the letters.

So large a number of devout writers have occupied their pens on "legends" and biographies of Saint Catherine that it would be far too lengthy a task to attempt to give even a list of them. The public library of Siena contains no less than 79 works of which the popular saint of the city is the subject. Almost all of them, however, seem to be based more or less directly and avowedly on the work of Father Raimondo. And enough has been said to give the reader a sufficient idea of the nature of that book. Of Girolamo Gigli's *Vocabulario Cateriniano* mention has also been made. Of course it will readily be understood that this work regards the saint's writings in a purely philological point of view. But the curious fate which attended this work may be noticed. It was burned by the hangman at Florence, not because it was supposed to contain any heterodoxy in matter of religion, but merely because the Della Crusca, which is occasionally somewhat slyly satirized in it, was enraged at the position taken up by the author, to the effect that the Sienese is a purer dialect of Italian than the Florentine! The notice of Saint Catherine by Niccolò Tommaseo, prefixed to the most recent edition of St. Catherine's works, has also been mentioned. It cannot be called "a life" in any sense. For the author makes no attempt to relate the story of her career, or to examine the evidence for any of the anecdotes which he does relate. It is written in a strain of enthusiastic pietistic admiration, which is certainly curious in the case of a highly-cultured 19th century layman; and its principal value consists in the judgment on the purely literary merits of the writer, by one who must be admitted to be the greatest living critic of Italy. (T. A. T.)

CATHERINE I., wife of Peter the Great of Russia, and after his death for two years (1725–27) empress of Russia, was the natural daughter of a country girl in Livonia. Being left entirely destitute when a mere child, she was brought up by a Lutheran pastor of Marienburg,

named Glück. About 1702, at a pretty early age, she was married to a Swedish dragoon, from whom, however, she was almost immediately separated by the vicissitudes of war. She never saw him again; for she was carried off by the Russian forces, and was slave or mistress to more than one Russian general, last of all to Prince Menschikoff, in whose house she attracted the notice of the czar. The czar was struck by her beauty and good sense, and made her his mistress, and then his wife publicly in 1711. After that, in the same year, she performed a service to her husband for which she will always be remembered in history. In the campaign on the Pruth, Peter, with an excessive contempt of the generalship and other military qualities of the Turks, had rashly placed himself in a position in which he was completely surrounded and cut off from all supplies. From this peril he was relieved by Catherine, who was expert enough to collect the necessary sum for bribing the Turkish general, and in this way to bring about a tolerable peace. Next year she was solemnly crowned empress at St. Petersburg. She continued to be the faithful companion and adviser of the czar, till his death in 1725. After that event she was herself raised to the Russian throne, chiefly through the address of her former lord, Prince Menschikoff, who put himself at the head of a powerful party, and gained over the guards at the capital. Her reign of two years was in no wise remarkable. Menschikoff was her minister, and directed affairs almost at his pleasure. Catherine was by no means free from the vices then prevalent at the Russian court. She spent whole days in dissipation, which hastened her end. She died in 1727, being somewhere about forty years of age. She was evidently a woman of considerable insight and expertness, able to manage the eccentric czar in his violent and extravagant moods, and above all capable of sympathizing with him and assisting him in his great schemes, though she could neither read nor write.

CATHERINE II., empress of Russia, was born at Stettin in 1729; by the dethronement of her husband Peter III., and the exclusion of her son, she ascended the Russian throne in 1762, and occupied it till her death in 1796. Her father, who was prince of Anhalt-Zerbst in Upper Saxony, served in the Prussian army. Her mother, a peevish, hard-tempered, and pedantic German of the old school, gave her a severe education, which, however, did not crush but strengthened the masculine temper of her daughter.

The Empress Elizabeth, having selected her nephew Peter, the duke of Holstein Gottorp, as her successor on the throne, had requested a sister of Frederick of Prussia to be the wife of the future emperor. But aware of the extraordinary manners then prevalent at the Russian court, Frederick shrank from the proposal and suggested the princess of Anhalt-Zerbst. Proposals being made in that quarter and thankfully accepted, the princess, whose original name was Sophia Augusta, was conducted to Russia by her mother in 1744; after some preliminary religious instructions she received the name of Catherine, and was admitted into the Greek Church, and was at length in 1745 with due splendor married to Peter, who was only a year older than herself. The marriage proved an unhappy and ill-assorted one. While Catherine grew up to be a handsome, strong-minded, and ambitious lady, Peter passed his life apparently on the very borders of idiocy. Though not destitute of generous and even noble impulses, he was silly, wayward, and extravagant. Excluded from all serious employment, and indeed incapable of it, he spent his time in drilling a troop of dogs that he kept in a kennel adjoining his wife's sleeping apartments, executed martial law on the rats he used to train to the same military functions, and felt very angry when Catherine ventured to laugh at the extravagance of his proceedings. From early boyhood he had been habituated to strong drink, and as he grew up he was intoxicated every day. He insisted, too, on making his own wife his confidante in the ceaseless love intrigues he carried on with the ladies of the court. Such was the husband to whom the poor girl of fifteen was married, and the man who was to have uncontrolled power over a vast empire. For a long time Catherine did her best to induce him to act in a reasonable way, but with little success. His wild and drunken habits continued, and from mere caprice as much as anything else, he became more and more alienated from her.

Though Catherine was thus severely tried during these early years of her married life, the natural firmness of her character bore her through, and her great acuteness and adroitness soon enabled her to gain firm footing in the court. She set herself resolutely to learn the Russian language, and soon acquired a perfect mastery of it. She made herself thoroughly acquainted with the history, manners, and institutions of the country, and identified herself completely with the people around her, so that she became a thorough Russian in character and sympathies, and, when occasion required, knew how to move the Russian heart. The best foreign culture of her time, too, she made thoroughly her own, being an assiduous reader of French literature during the long inactive hours of her youth. Voltaire and the other *philosophes* of the 18th century were her favorite authors; she professed to be a disciple of the new humanity they preached, expressed the highest reverence for them, and corresponded with some of them in after-life.

In this way, while her husband wasted his life in every kind of grotesque extravagance, Catherine was engaged in cultivating her mind, and in learning to understand her strange surroundings. Indeed, the Russian court of that era was nearly as extraordinary as her husband. Since the death of Peter the Great (1725) the crown had been again and again a plaything in the hands of intriguing courtiers, mostly of German origin. To accomplish a revolution, to pull down one ruler and set up another, and despatch the leaders of an opposing faction to Siberia, it was necessary only to gain over a few of the guards. In such a way had Elizabeth, youngest daughter of Peter the Great, won the crown in 1741. She had some natural capacity for command, but lived in the utmost license, in which she was only too perfectly imitated by the court. Placed in such a position as this, Catherine had a difficult part to play, and required for it all the deftness and insight of her nature. But she succeeded. She gradually acquired a considerable influence over the mind of Elizabeth, who admired her cleverness and beauty. The courtiers of both sexes learned to respect her. Even Peter came to recognize the superiority of her understanding, and though he never liked her, used to ask her advice in his many perplexities. But she did not escape the contagion of the court. In accordance with the prevailing custom, she became involved in one love intrigue after another. Consequently, when children were at length born of her (Paul, the eldest, in 1753), their paternity was matter of serious doubt.

In this way she lived till the beginning of 1762, when the death of Elizabeth opened the way to a very different career. The poor, half-imbecile Peter was now called on to leave his silly employments, and undertake the government of the most extensive empire in the world. All the schemes he embarked in were marked by a wild generosity and sense of justice; but, unhappily, in almost every one he managed to give deadly offence to the susceptible national spirit of Russia. Being a devoted admirer of the great Frederick, he gave back with impetuous haste all the advantages won in the Seven Years' War, sent home all the Prussian prisoners, restored the provinces torn from Prussia, and concluded peace and then an offensive and defensive alliance with his hero. Himself a Lutheran in his early years, he made little account of the religious etiquette of the Russian court, and still further alarmed the clergy by threatening to lay hands on the property of the church, while he grievously offended the soldiery by introducing the Prussian uniform and the severe Prussian drill. The ambition of Catherine would probably have been satisfied with the prospect of governing Russia through her husband, but he was too wayward a person to be an obedient instrument; and he soon publicly insulted her beyond forgiveness by compelling her to decorate his mistress, the Countess Woronzoff, with the order of St. Catherine. This and other matters, and the growing alienation of a long and distasteful married life, brought on a crisis. It became clear that they could not live together; and Catherine began to adopt precautionary measures in self-defence. She had little difficulty in doing so most effectively. The Orloffs, influential persons in the Russian guards, were devoted to her; the eldest, Gregory, was her lover. Those men, with the help of the Princess Dashkoff, Count Panin (the tutor of her son Paul), and others, planned the overthrow of Peter. Early on the morning of the 9th July (1762), Catherine was awakened at the palace of Peterhof by Alexis Orloff with

the injunction to act immediately; they had been betrayed. Accordingly, she set out for the capital, and finding Gregory Orloff on the spot, appealed to the guards, who were easily induced to raise the standard of revolt. In the church, the priests anointed her regent in the name of her son, while, outside, the Orloffs had her proclaimed empress in her own right. After that, going in procession through the streets, she was joyously saluted empress of Russia. In the mean time, Peter, all unaware of what was going on, was busy drilling his favorite German guards at Oranienbaum. On proceeding to Peterhof he found that Catherine had vanished, and suspected the truth. He was urged to fight, but all his fortitude forsook him. Next day he abdicated, expecting freedom to retire to Holstein; but he was compelled to proceed to Ropscha, where on the 17th, the Orloffs, after an unsuccessful attempt to poison him, strangled him with their own hands in the most revolting manner. Of this part of the proceedings Catherine seems to have had no knowledge. Thus easily, and apparently to the satisfaction of those concerned, was a revolution effected, by which a beautiful and ambitious woman, a foreigner, ascended the Russian throne, to the exclusion of the rightful occupants. For some time, however, Catherine did not feel quite secure, and had to trust to the influence of her admirers in suppressing discontent. The soldiery at Moscow were disposed to resent the liberties taken by their compeers in the disposal of the crown, and even among the guards at St. Petersburg doubtful symptoms appeared. But, eventually, they were all bribed or threatened into acquiescence. A conspiracy formed to place on the throne Ivan (a descendant of a brother of Peter the Great), who had already been emperor a few months in 1740, also proved abortive, and cost that unfortunate prince his life. Ten years later (1773), a Cossack, Pugatcheff, who gave himself out for the dethroned Peter, raised an insurrection in the Volga region, which, being supported by many of the extreme orthodox party and by the peasantry, threatened to prove formidable. But the undisciplined bravery of his troops was of no avail against the forces of Catherine; he was defeated, taken, and executed at Moscow. Her son Paul, whom she disliked and neglected, was placed under the strictest surveillance to the end of her reign.

As soon as she was securely seated upon the throne, Catherine began to attend to the foreign interests of her empire. Here she zealously observed the traditions of Russia. Debarred in so many ways from the free development of their resources, and surrounded in almost every direction by weak and semi-barbarous neighbors, the Muscovites had been constantly aiming at the extension of their frontiers especially towards the sea. This policy Catherine took up, and no native Russian could have better carried it out in its calculating steadiness and unscrupulousness. One of her first steps (1763) was to expel the Saxon duke of Courland, and to put Biron, a creature of her own, in his place; and by ceaseless intrigue she so managed things in Courland, that it was eventually glad to be incorporated with the Russian empire (1795). Towards Frederick she took a threatening attitude at the beginning of her reign; but finding nothing offensive to herself in the correspondence of the king with her late husband, and seeing that great profit might be derived from the good-will of Prussia, she concluded with it an offensive and defensive alliance, which continued to the end of Frederick's reign.

It was chiefly with a view to Poland that this treaty of alliance was made. The first result of it was the advance of a Russian army to the Vistula to compel the election of Poniatowski, an old lover of Catherine, to the throne of Poland (1763). But this was only the beginning of troubles. The old question of the toleration of dissenters soon turned up; one confederation, that of Radom, was formed by a party of Polish nobles to enforce, and another, that of Bar, to resist toleration. Catherine supported the former. The confederation of Bar was defeated and broken up, and its members fled over the frontiers to Turkey and Austria (1768). The Turks, alarmed and incensed at the progress of Russia on Polish ground, fanatically rushed into a war (1768–1774) for which they were not prepared, and were disgracefully beaten both by land and sea. The Russian arms marched victoriously through Bessarabia, Moldavia, and Wallachia to the banks of the Danube; while a fleet, led chiefly by English seamen, sailed from Cronstadt round the coasts of Western Europe into the Mediterranean, and after sweeping the Levant burned the Turkish fleet in Tchesme Bay (1770).

After the Turks had been so thoroughly disabled, Catherine had leisure once more to attend to the state of Poland. The liberum veto, the freedom of confederation, the want of a middle class, the want of union and of a healthy public spirit, the oppression and brutalizing of the peasantry, and many other causes, had reduced Poland to a state of incurable disease which it is impossible to describe. During the Seven Years' War the Russian armies had incessantly marched unchallenged over the Polish territory; that splendid opportunity for shaking off the northern incubus was allowed to pass away. Lately, famine and pestilence had so ravaged the country that pigs and dogs devoured the unburied bodies of men; a loaf of bread could not be had for a hundred ducats. But it was from no benevolent feelings towards Poland that Catherine wished to interfere with its territory; instead of favoring the efforts made towards political improvement, her aim was simply to prolong the state of anarchy till she was ready to enter upon as large a share of it as possible. Frederick was the first to suggest a partial partition of Poland as the best way out of many existing difficulties, The project was dropped for a time, till Catherine took it up, and invited Prussia and Austria to join in it. An agreement was at last come to (1772); and a common fund was raised to bribe the Polish diet, which gave its consent the following year. Catherine, in this and the two ensuing partitions, seized the lion's share, in all about two-thirds of the Polish territory. By the peace of Kainardschi with the Turks (1774), who resigned all pretensions of supremacy over the Tartars in Southern Russia, Catherine was free to occupy all the northern shore of the Black Sea. One Tartar khan was expelled, and another was induced to abdicate; the Tartars were massacred, and a flourishing country reduced to a wilderness. The Crimea, Kuban, and Taman were finally annexed to the Russian empire (1783).

Towards 1787 Catherine began to entertain still more magnificent schemes of conquest. She made a progress as far as Kherson through the midst of flourishing towns, villages, and farms, by fine roads, amidst festivals and illuminations, all of which Potemkin had artificially extemporized in the wilderness, in order to convince her how flourishing the recent conquests were. One of the gates of Kherson bore the inscription, "This is the way to Byzantium." Catherine was going to fulfil the dreams of her French flatterers by chasing the Turk from Europe, and restoring the Byzantine empire. The Turks were accordingly provoked into a new war (1787–92), and were again beaten everywhere. Important events in Poland, however, arrested the progress of Catherine on the Danube, and induced her to make a peace with Turkey (Jassy, 1792), by which the Dniester became the boundary between the two countries.

England and Prussia had been taking a hostile attitude to Russia. Under the furtherance of Hertzberg, the Prussian minister, many reforms had been introduced into Poland, and a constitutional hereditary monarchy established (1792). But a confederation of nobles, opposed to these salutary changes, invoked the aid of Catherine, who was only too glad of an opportunity to interfere; and as the progress of the French Revolution began to upset all existing political combinations, and to discredit everything like constitutionalism in governing quarters, Prussia found it prudent to acquiesce in the arrangements of Catherine. She restored all the old abuses and seized upon whatever territory pleased her, allowing Prussia a small share of it (1793). The resulting attempt at a national rising of Poland under Kosciusko failed; the Russian armies entered the heart of Poland and stormed Warsaw (1794); and along with Austria and Prussia, Catherine effected the last partition in 1795.

Thus was an event consummated, which some historians denounce as the foulest deed in the history of the world, and others justify not only as necessary to the order and tranquillity of Europe, but as a vindication of Heaven's laws on those who have contemned them. In any case, Catherine must almost alone bear the responsibility of it, and in her it would be useless to seek for any other motive than an unscrupulous ambition. She had skilfully taken her measures for it, in securing the acquiescence or co-op-

eration of Prussia and Austria, and in finally pushing it on while these and the other powers of Central and Western Europe were more and more involving themselves in the terrible struggles of the Revolution. She was a great hater of the Revolution; but while others were endeavoring to suppress it, she profited by the opportunity to accomplish the partition of Poland.

In the domestic government of Russia, Catherine professed to act on the principles she had learned from her French teachers. Most of her plans, however, proved illusory, in a country where all the elements and conditions of an ideal theory of government were wanting, even if Catherine had been perfectly resolute in her aims. The attempt to introduce a code of laws on the model of Montesquieu was a failure; but in the administration, especially the administration of justice, in the furtherance of education, of industry, and of commerce, real improvement seems to have been effected. All her schemes vitally suffered in two ways: from the absence of trustworthy public servants, and from the defects of her own character. In this, as in other reigns, bribery and corruption were prevalent to an extraordinary degree, and Catherine intrusted the government to her favorites and to upstarts, to the exclusion of the nobility. In the capital, at her court, and in her own circle there reigned the most systematic immorality, which she encouraged by her example. French admirers used to call her the Semiramis of the North. Mr. Carlyle calls her a female Louis Quatorze. She justified both comparisons by her beauty, her masculine ambition, and her summary disregard of virtuous restraint. One favorite was dismissed after another; but Potemkin eclipsed all others by the extraordinary union of qualities most requisite for success in Russia,—beauty, daring, extravagance, ambition,—and in the length of time his influence over Catherine continued. From 1775 till his death in 1791, that is, for a period of sixteen years, he was supreme; after Catherine's personal inclination for him had abated, he supplied her with new favorites and retained the power for himself, in all essential points directing Russian politics during that long period. To all her lovers she was munificent, not only during their season of favor, but after their dismissal, loading them with presents and pensions to such an extent, that altogether they are estimated to have cost Russia about £20,000,000. Towards the end of her reign discerning men began to fear that such extravagance, and the corruption attendant upon such a state of things, might lead to the exhaustion of the empire. In fact, the magnificence of her court, the marvellous extent of her empire, her foreign conquests, and the imposing position she held among the sovereigns of the world, only served to bring into more painful relief the moral corruption, the semi-barbaric violence, the hard-hearted cruelty, and systematic unscrupulousness which characterized the Russian court and the Russian policy. Things grew worse towards the end of her reign. The progress of the French Revolution damped all her sentimental enthusiasm for reform. The friend and correspondent of Voltaire and D'Alembert, and the patroness of Diderot, lived long enough to prohibit the publication of French works in Russia. She died of apoplexy in November, 1796. The best account of Catherine's early life is contained in the *Memoirs* written by herself in French, of which there is an English translation (1859). See also Hermann's *Geschichte Russlands;* Carlyle's *Friedrich the Second*, vol. vi.; Rulhière's *Histoire ou anecdotes sur la Révolution de Russie en l'année* 1762, and his *Histoire de l'Anarchie de Pologne.* (T. K.)

CATHERINE DE' MEDICI (1519–1589), the wife of one French king, and the mother of three, was born at Florence in 1519. She was a daughter of Lorenzo de' Medici, that ruler of Florence for whom Machiavelli wrote the *Prince*. Having lost both her parents at an early age, Catherine was sent to a convent to be educated; and she was only fourteen when she was married (1533) to the duke of Orleans, afterwards Henry II. It was her uncle, Pope Clement VII., who arranged the marriage with Francis I. Francis, still engaged in his life-long task of making head against Charles V., was only too glad of the opportunity to strengthen his influence in the Italian Peninsula, while Clement, ever needful of help against his too powerful protector, was equally ready to hold out a bait. During the reign of Francis, Catherine exercised no influence in France. She was young, a foreigner, a member of a state that had almost no weight in the great world of politics, had not given any proof of great ability, and was thrown into the shade by more important persons. For ten years after her marriage she had no children. In consequence, a divorce began to be talked of at court; and it seemed not impossible that Francis, alarmed at the possible extinction of the royal house, might listen to such a proposal. On hearing of it, Catherine, with her fine Italian tact, found her way into the presence of the king, threw herself at his feet, and expressed her readiness to submit to the royal pleasure, either to remain the wife of his son, or in case another wife should be chosen, to be one of her humblest attendants. This appeal won the heart of Francis, the divorce was no more heard of, and Catherine had the happiness of bringing him grandchildren ere he died. During the reign of her husband, too (1549–1559), Catherine lived a quiet and passive, but observant life. Henry being completely under the influence of his mistress, Diana of Poitiers, she had little authority. This continued even after the accession of her son Francis II. Francis was under the spell of Mary Stuart, and she, little disposed to meddle with politics on her own account, was managed by her uncles, the cardinal of Lorraine and the duke of Guise.

On the death of Francis, Catherine became regent during the minority of her second son, Charles IX., and now found before her a career worthy of the most soaring ambition. The new king was only ten years old. France was falling into a most critical condition. The opposition between the Reformation and the old religion was now beginning to assume a pronounced and openly hostile character, and the struggle was much intensified by the fact that most of the nobles who supported the Reformation represented also the old cause of feudal resistance to the centralizing tendencies of the court. The House of Guise were at the head of the Catholic party; Coligny and the Prince of Condé were the leaders of the Huguenots. Michel l'Hôpital, who, by the neutrality of his position and the disinterestedness of his character, was the fittest to advise Catherine, recommended the national policy of taking no side in the contest, — by the enforcement of toleration, of civil reform, and of justice to all parties, to raise the Government above the region of controversy, and prevent civil war. Catherine took the advice in so far as to avoid siding decidedly with either party, but her character, and the habits of policy to which she had been accustomed, rendered her incapable of any noble aim. She had only one virtue, and that was her zeal for the interests of her children, especially of her favorite third son, the duke of Anjou. Like so many of the Italians of that time, who were almost destitute of a moral sense, she looked upon statesmanship in particular as a career in which finesse, lying, and assassination were the most admirable, because the most effective weapons. By habit a Catholic, but above all things fond of power, she was determined to prevent the Protestants from getting the upper hand, and almost equally resolved not to allow them to be utterly crushed, in order to use them as a counterpoise to the Guises. Thus she is, more than any one else, responsible for the thirty years of civil war that was thenceforward to devastate France. For a time her plan succeeded well enough. At the battle of Dreux (1562) the Huguenots were defeated by the duke of Guise; and at the siege of Orleans, the duke himself, now her most formidable rival, fell by the hands of an assassin. She had undoubtedly become the most important personage in France, but rage and suspicion so possessed men's minds that she could no longer control the opposing parties, and one civil war followed another to the end of her life. But it is with the massacre of Bartholomew (24th August, 1572) that her name will be especially associated in history. While the affection of the young king for Coligny inspired him with groundless confidence, Catherine decoyed the Protestant leaders to Paris by the prospect of a marriage between Henry of Navarre and her daughter Marguerite. Anxious for her own influence over Charles IX., and true to her favorite plan of perpetuating the feud between the Huguenot leaders and the House of Guise, she wrought upon the king's mind till he consented to the death of Coligny, while the unprincipled hate of the Guises and the fanaticism of the mob did the rest. In short, Catherine supplied all the preliminary conditions of the massacre, and then let loose the infuriated passions that were to consummate it. After

the death of Charles in 1574, and the succession of Anjou under the name of Henry III., Catherine pursued her old policy; but as her influence is lost in that of her son, it is unnecessary to dwell upon it. She died in 1589, a short time before the assassination of Henry, and the consequent extinction of the House of Valois.

(See Martin's *Histoire de France*, vol. ix.; Michelet; Ranke's *Geschichte Frankreichs*, vol. i.)

CATHERINE OF ARAGON (1485–1536), the first queen of Henry VIII., and the youngest child of Ferdinand and Isabella of Spain, was born the 15th December, 1485, while her mother was on her way to Toledo from the Spanish army, then engaged in the conquest of Granada. The first four years of her life were passed in the camp before Granada; after the taking of the city it became the capital and the residence of the court. Here, then, Catherine spent her youth, carefully educated by her mother, herself a woman of no common learning and ability, during a period of marvellous prosperity for Spain, while the Moors were being finally conquered, America was discovered, and the Spanish chivalry was in its very bloom. In 1501, being requested in marriage by Henry VII. for his eldest son Arthur, Catherine embarked at Coruña, landed at Plymouth the 2d October, and, with the usual pageantry, was united to Arthur the month following. Their marriage was of no long duration; in the April of next year Arthur died. His widow, however, continued to reside in England, as proposals were made and accepted for her betrothal to Henry, second son of Henry VII., now heir presumptive to the throne. Catherine, already eighteen, was disinclined to an engagement with a boy of thirteen; nevertheless the ceremony of betrothal took place in 1503. The marriage did not take place till 1509, after the accession of Henry to the throne, a dispensation from the pope having been procured. The early years of the marriage were happy enough. Henry was a handsome, affable, and jovial king, fond of magnificent display, covetous of distinction in the tilting ground, and ambitious of popularity. His wife had the good sense to humor him in his favorite diversions, while she herself lived a dignified self-denying life of almost conventual strictness, conscientious in the performance of her religious duties, devoted to her husband, kind to her friends, charitable to her enemies, and careful of the interests of her adopted country. In the year of Flodden (1513) she was regent of the kingdom during the absence of Henry in France, and performed the duties of that office with great courage and ability. But the repeated loss of children cast a gloom over those years. Three sons died almost as soon as they were born; Mary, a sickly child, born in 1516, was the only survivor.

It was not till 1527 that Henry's scruples as to the validity of his marriage with Catherine became public, though there can be no doubt his affections had been alienated from her long before. It was anticipated by Henry and Clement that the conventual habits of Catherine would have rendered it easy for her to retire from the throne, and spend the rest of her life in a monastery. But they were mistaken; however submissive she might be to her husband in everything else, and however ready to act charitably towards the minor irregularities of his conduct, she was resolved not to allow any doubt to be cast upon the legality of their marriage or the title to the throne of her daughter Mary, nor to surrender any of her rights as queen. This the Papal legate, Campeggio, soon found out on his arrival in England in 1528. After long hesitation, and much tortuous diplomatic manœuvring on the side of the Pope, a court, consisting of the legates Campeggio and Wolsey, was at last constituted, 28th May, 1529, at Blackfriars, to hear the case of the royal parties. Catherine appeared only to protest against the legality of the court; and then, after a solemn address to the king for justice, appealed to the Pope, and withdrew. Notwithstanding the proceedings for the divorce, and the fact that Henry had brought Anne Boleyn to live in the palace, Catherine and he were not quite separated till the beginning of 1531, when, finding he could not prevail upon her to withdraw her appeal to the Pope, or in any way to give up her passive resistance, he commanded her to retire from Windsor. After that she never saw him again, nor her daughter Mary. Her residence was often changed; but it was principally at Ampthill. At length an open declaration of the Pope against Henry obliged the monarch to solve the difficulty by the assertion of the royal supremacy (1531). In a court held at Dunstable, Cranmer, recently appointed archbishop of Canterbury, pronounced the marriage of Henry and Catherine null and void (1553). Naturally, Catherine, though still as charitably disposed as ever towards Henry, treated this and all other attempts to deprive her of her rights with resolute contempt. Her health, which had begun to fail long before the divorce was agitated, now completely gave way. After writing a letter of forgiveness and of gentle admonition to her husband, and taking all the care she could of her faithful attendants, she died at Kimbolton Castle the 7th January, 1536. (See Miss Strickland's *Queens of England*, vol. iv.; Froude, vol. i.; Lingard, vol. v.)

CATHERINE OF BRAGANZA (1638–1705), queen of Charles II. of England, was born at Villa Viçosa in Portugal, 25th November, 1638. Her father, John, duke of Braganza, who was rightful heir to the crown of Portugal, then under Spanish sway, headed the revolt of 1640, which after many years' fighting succeeded, and became king of Portugal. Her mother was a woman of great ability, and governed Portugal after the death of her husband. She was penetrating enough to foresee the Restoration in England, and, some years before, proposed the marriage of Charles with her daughter Catherine, in order to secure an ally in the prolonged struggle against Spain. After the Restoration the marriage was agreed upon, not without much diplomatic manœuvring, especially on the side of Spain, which was naturally averse to it. The marriage treaty was very advantageous to England, as the Portuguese promised a dowry in money of £500,000, the towns of Tangier and Bombay (the first English possession in the East), and many privileges of trade with their colonial dependencies. On his marriage at Plymouth, 13th May, 1663, Charles expressed himself highly pleased with his Portuguese bride. But the union did not prove a happy one. Catherine had been brought up in a convent, and therefore had not the tact and the manners suited to one of the most fashionable and profligate courts of Europe. But the principal fault lay in the heartless and inconstant nature of Charles. He insisted on bringing to court his abandoned mistress, Lady Castlemaine, and, when the queen expressed her indignation at the insult, made Clarendon himself lecture her on the duty of submission. Gradually Charles's neglect of her grew into a feeling of settled alienation, and after repeated humiliations her spirit was broken. Being a Roman Catholic, too, she was an object of suspicion and calumny during the Popery panics. Perhaps the only satisfaction she enjoyed from her connection with England was the decisive aid rendered by the country to her native land in its struggle against Spain. After a life of great retirement during the reign of James II. and the early part of that of William, she returned to Portugal in 1692. Some little time before her death (at the close of 1705), she acted with great ability in the capacity of regent to her brother, Don Pedro. She had no children.

CATHERINE OF VALOIS (1401–1437), consort of Henry V. of England, was born at Paris in 1401. She was most unfortunate in her early years; for her father, Charles VI., king of France, was subject to prolonged fits of insanity, and her mother, one of the most abandoned women of her time, neglected her children to such an extent that they were often without suitable food and clothes. At last, in one of his lucid intervals, Charles had her children separated from their mother, and Catherine, the youngest of them, was sent to a convent to be educated. On his accession to the English throne in 1413, Henry V. asked Catherine in marriage; but as the proposal was coupled with the demand of a large dowry in money, and especially the restitution to England of the provinces once held in France, it was unceremoniously rejected. In the invasion of France which ensued, Henry proved himself so able to assert his claims, and the country had been thrown into such a state of distress and disorder, that the court of Charles, then under the control of Philip of Burgundy, was fain to comply with all the demands of the English king. Accordingly Henry, who had already seen and loved Catherine, received her in marriage at Troyes in 1420, and, along with her, the immediate possession of the provinces claimed, the regency of France during the life of his father-in-law, and the reversion of the sovereignty of France. Early next year Catherine was solemnly crowned at London. In December, 1421, Henry VI. was born at Windsor. Catherine was again in France, when her royal husband died

(1422). She returned to London with the funeral cortege; but, after taking some part in the arrangements connected with the regency during her son's minority, she almost disappears from the history of the country. The only remarkable circumstance of her subsequent life is her secret marriage. Her second husband, Owen Tudor, was sprung from a princely house of Wales, had followed Henry to his French wars, and had been made a squire of his body for bravery displayed at Agincourt. Subsequently, he became an officer in the queen's household, and in this capacity gained her affections. He seems to have been a man of high character; but as his position in England was of the lowest, the marriage was for many years kept a profound secret. The vexations the queen had to endure in consequence of its ultimate disclosure probably hastened her death, which took place in 1437. As is well known, her eldest son to Owen Tudor was created earl of Richmond, and, marrying Margaret Beaufort, the heiress of the house of Somerset and representative of the junior branch of John of Gaunt, became the father of Henry VII., and the ancestor of the Tudor line of kings.

CATHOLIC (Gr. *καθολικός*, general, universal), a designation adopted at a very early period by the Christian church to indicate its world-wide universality in contrast with the national particularism of Judaism. It has also been used by ecclesiastical writers, from Ignatius downwards, to denote the church as the depository of universally-received doctrine (*quod semper, quod ubique, et quod ab omnibus*) in contrast with heretical sects. In the latter or exclusive sense it is still claimed on the ground of historic continuity by the Roman Catholic Church; but the claim, in so far as it is exclusive, is, of course, not recognized by other Christian denominations. See ROMAN CATHOLIC CHURCH.

CATHOLIC APOSTOLIC CHURCH, a religious community often called "Irvingites," but not itself acknowledging any other name than that of "the Catholic Apostolic Church," which, the members say, belongs to them in common with the whole of baptized Christendom. The relation of the celebrated preacher Edward Irving to this community was, as they state it, somewhat similar to that of John Baptist to the early Christian church, *i.e.*, he was the forerunner and prophet of the coming dispensation, not the founder of a new sect; and indeed the only connection which Irving seems to have had with the existing organization of the Catholic Apostolic body was in "fostering spiritual persons who had been driven out of other congregations for the exercise of their spiritual gifts." Shortly after Irving's trial and deposition, certain persons were at some meetings held for prayer designated as "called to be apostles of the Lord" by certain others claiming prophetic gifts. In the year 1835, six months after Irving's death, six others were similarly designated as "called" to complete the number of the "twelve," who were then formally "separated" by the pastors of the local congregations to which they belonged to their higher office in the universal church on the 14th July, 1835. This separation is understood by the community not as "in any sense being a schism or separation from the one Catholic Church, but a separation to a special work of blessing and intercession on behalf of it." The twelve were afterwards guided to ordain others,—twelve prophets, twelve evangelists, and twelve pastors, "sharing equally with them the one Catholic Episcopate," and also seven deacons for administering the temporal affairs of the Church Catholic. The central episcopacy of eight-and-forty was regarded as "indicated by prophecy," being foreshown in the forty-eight boards of the Mosaic Tabernacle. For ecclesiastical purposes the church universal is under their charge in twelve tribes; for Christendom is considered to be divided into twelve portions or tribes, each tribe being under the special charge of an apostle and his coministers, and the seat of the Apostolic College being at Albury in England.

For the service of the church a comprehensive book of liturgies and offices was provided by the "apostles;" and lights, incense, vestments, holy oil, water, chrism, and other adjuncts of worship have been appointed by their authority. The ceremonial in its completeness may be seen in the church in Gordon Square, London, and elsewhere. The daily worship consists of "matins" with "proposition" (or exposition) of the sacrament at 6 A.M., prayers at 9 A.M. and 3 P.M., and "vespers" with "proposition" at 5 P.M. On all Sundays and holy days there is a "solemn celebration of the Eucharist" at the high altar; on Sundays this is at 10 A.M. On other days "low celebrations" are held in the side-chapels, which with the chancel in all churches correctly built after apostolic directions are separated or marked off from the nave by open screens with gates.

Each congregation is presided over by its "angel" or bishop (who ranks as pastor in the Universal Church); under him are four-and-twenty priests, divided into the four ministries of "elders, prophets, evangelists, and pastors," and with these are the deacons, seven of whom regulate the temporal affairs of the church—besides whom there are also "sub-deacons, acolytes, singers, and doorkeepers." The understanding is that each elder, with his co-presbyters and deacons, shall have charge of 500 adult communicants in his district; but this has been but partially carried into practice. This is the full constitution of each particular church or congregation as founded by the "restored apostles," each local church thus "reflecting in its government the government of the Church Catholic by the angel or high priest Jesus Christ, and His forty-eight presbyters in their fourfold ministry (in which apostles and elders always rank first), and under these the deacons of the Church Catholic." The priesthood is supported by tithes; it being deemed a duty on the part of all members of the church who receive yearly incomes to offer a tithe of their increase every week, besides a free-will offering for the support of the place of worship, and for the relief of distress. Each local church sends "a tithe of its tithes" to the "Temple," by which the ministers of the Universal Church are supported; by these offerings, too, the needs of poorer churches are supplied, and other expenses connected with the administration of the Church Catholic. From recent statements made by members of this community it appears to be making steady progress. It claims to have among its clergy many of the Roman, Anglican, and other churches, the orders of those ordained by Greek, Roman, and Anglican bishops being recognized by it with the simple confirmation of an "apostolic act."

For further details of doctrines, ritual, &c., see *Restoration of Apostles and Prophets*, by R. N. Bosworth; also his *Readings on the Liturgy*, and *The Church and Tabernacle*.

CATILINA, LUCIUS SERGIUS, a member of an ancient patrician family of Rome, first appears in history during the proscription of Sulla, conspicuous among the ruthless band of murderers, slaying his inoffensive brother-in-law with his own hand, and torturing and mutilating the much-loved Gratidianus. His foul vices were unconcealed; he was believed to have made away with his wife and his son to win the profligate and wealthy Aurelia Orestilla; it was even suspected that he had been guilty of an intrigue with the Vestal Fabia. Nevertheless, in 66 B.C., he found himself qualified for the consulship, and only incapacitated by the impeachment brought against him by P. Clodius Pulcher for extortion during his government in Africa. Catiline would not brook even delay in his advance to power, and accordingly he formed a conspiracy, in which Autronius, Piso, and even, according to rumor, Crassus and Cæsar were concerned. The new consuls were to be murdered while offering up their vows on the 1st of January; and the fasces were to be seized by Catiline and Autronius. The plot failed, but only because the signal was given too hastily; and the discovery brought no punishment upon those implicated, for the intervention of a tribune was readily obtained. Soon after, Catiline, having bribed both judges and accuser, was acquitted in the trial for extortion. His scheme was forthwith immensely widened. The city was to be fired, and those who opposed the revolution were to be slain; all debts were to be cancelled; and there was to be a proscription of all the wealthy citizens. Among the conspirators were many men of the first rank and influence. Arms and money were collected, soldiers were enlisted, and the assistance of the slaves was sought. But Catiline's hopes were again disappointed; once more he failed to obtain the consulship; and, moreover, it soon became apparent that one of the new consuls, Cicero, was mysteriously able to thwart all the schemes of the conspirators. He was, in fact, informed of every detail, through Fulvia, the mistress of Curius, one of the plotters, who was himself soon persuaded to turn informer. Before the next *comitia consularia* assembled, the orator had given so impressive a warning of the danger which

was impending, that Catiline was once more rejected, and the consuls were invested with absolute authority. The other consul, C. Antonius, being absent in Macedonia, Cicero had everything in his own hands. On the 8th of November, he again rose in the senate to make so vigorous an attack upon Catiline that he rushed from the temple, amid the curses of the senators, and fled to the army. Next day Cicero awoke the terror of the people by a second declaration which he delivered in the Forum. Still not one of the rebels deserted, though a free pardon and great rewards were offered to informers,—a remarkable proof, it has been said, of the wretchedness and discontent of the lower orders at that time. It has also, however, been suggested that there existed no conspiracy of a kind concerning which any member of the lower orders could give information. Legal evidence of the plot was, nevertheless, obtained by the means of the Allobrogian ambassadors, implicating Lentulus, Cethegus, and Statilius, who, on the nones of December, were condemned to be strangled by the common executioner in the vile dungeon of the Capitol. This act of speedy vengeance, which was opposed as illegal by Julius Cæsar, was strenuously advocated by Cato and, indirectly, by Cicero. Thus a heavy blow was dealt to the cause of Catiline, who, in the beginning of 62 B.C., saw his legions, partially armed and diminished by desertion, shut in between those of Metellus Celer and Antony. Near Fæsulæ he hazarded battle with the forces of the latter, commanded by M. Petreius, for the proconsul was or pretended to be ill. So terrible an engagement ensued that the bravest of the victors were slain, and of the conquered not one was taken alive. Catiline's body was found far in advance of his own ranks, amidst a heap of the enemy whom he had slain.

Such is the account of the conspiracy of Catiline, and such is the character of its author, as we find them in the speeches of Cicero, and the histories of Sallust and Dion Cassius. Though there is nothing incredible in either, it must not be forgotten that our sole authorities for these statements were all members of one political party, and that the aristocratical. Some of the incidents given as facts by Dion Cassius are manifest absurdities; and Cicero shared the common habit of ancient orators, and paid more regard to the effect than the truthfulness of an accusation. We find him at one time admitting that Catiline had almost persuaded him of his honesty and merit, nay, even seeking a political union with him; at another, when his alliance had been rejected and an election was at hand, declaiming against him as a murderer, and as a profligate horribly conspicuous among profligates. And, lastly, though Sallust's vivid narrative is consistent throughout, it is not hard to see that he cherished very bitter feelings against the democratical party. Nevertheless, we have certainly no ground for accepting the view which makes Catiline a worthy successor of the Gracchi, an honest enemy of the hateful oligarchy, and a disinterested champion of the provincials. The following is probably as accurate a statement of the case as can now be given. There was at the time on the part of many of the Roman nobles a determination to raise themselves to power, despite the opposition of the senate, while the bolder among them were quite prepared to resort to force, if that appeared likely to be for their advantage. When, therefore, the senatorial party successfully assumed the aggressive, and its leader, Cicero, ventured on the bold course which we have described, they at once took up arms. Among them Catiline stands out conspicuous, and receives all the attacks of their enemies. Whether he was morally worse than the rest we cannot say with confidence; it was enough that he was far the foremost in force of body and of mind.

CATLIN, GEORGE (1796–1872), a writer on the North American Indians, was born at Wilkesbarre, Luzerne Co., Pennsylvania, in 1796. He was brought up to the law, and practised that profession in Philadelphia for two years; but art was his favorite pursuit, and forsaking the law he established himself at New York as a portrait painter. In 1832, his attention having been called to the fact that the pure American race was disappearing before the march of civilization, he resolved to rescue from oblivion the types and customs of this singular people. With this object in view he spent many years among the Indians in North and South America. He lived with them, acquired their languages, and studied very thoroughly their habits, customs, and mode of life, making copious notes and many studies for paintings. In 1840 he came to Europe with his collection of paintings; and in the following year he published at London a work on the *Manners, Customs, and Condition of the North American Indians* in two volumes, illustrated with 300 engravings. In 1844 he published *The North American Portfolio*, containing 25 plates of hunting scenes and amusements in the Rocky Mountains and the prairies of America. This was followed in 1848 by *Eight Years' Travels and Residence in Europe*, in which Catlin narrates the adventures of three different parties of American Indians, whom he had introduced to the courts of England, France, and Belgium. In 1861 he published a curious little volume, in "manugraph," entitled *The Breath of Life*, on the advantage of keeping one's mouth habitually closed, especially during sleep; and in 1868 appeared his *Last Rambles among the Indians of the Rocky Mountains and the Andes*. He died in Jersey City, New Jersey, December 22, 1872.

CATMANDOO, the capital of Nepal, in India. See KHATMANDU.

CATO, M. PORCIUS, surnamed *Sapiens*, *Priscus*, *Censorius*, or *Major*, was born at Tusculum in the year 234 B.C of an ancient plebeian family, noted for some military services, but not ennobled by the discharge of the higher civil offices. This man may be taken as a type of the genuine Roman character at the critical moment when the free state was in its fullest vigor, but was threatened with sudden and rapid decline. His early youth fell in with the period of Hannibal's invasion of Italy. Before he had reached middle age Rome had escaped from imminent danger of destruction, and had entered upon its career of universal conquest beyond the limits of the Italian peninsula. He was bred, after the manner of his Latin forefathers, to agriculture, to which he devoted himself assiduously when not engaged in military service. But having attracted the notice of L. Valerius Flaccus, a magnate of the city, he was brought to Rome, and became successively quæstor (204), ædile (199), prætor (198), and consul (195). Meanwhile he served in Africa under Scipio, and took part in the crowning campaign of Zama (202). He had a command in Sardinia, where he first showed his strict public morality, and again in Spain, which he reduced to subjection, and gained thereby the honor of a triumph (194). In the year 191 he acted as military tribune in the war against Antiochus, and contributed to the great revolution by which Greece was finally delivered from the encroachments of the East, and subjected to the dominion of the West. From this period the morals and principles of the Romans became fatally affected by their contact with the advanced and corrupt civilization of the Hellenic world. Cato was among the first of his countrymen to perceive the danger, and to denounce it. His character as an able soldier was now well established; and henceforth he preferred to serve the state in the Forum at home. For several years he occupied himself in scrutinizing the conduct of the candidates for public honors, and whenever he seemed to detect in them a decline from the stainless virtue of the olden time, he persistently opposed their claims. He questioned the "pretended battles" of Minucius Thermus, and baffled his demand for a triumph (190); he denounced the "peculation" of Acilius Glabrio, the conqueror of Antiochus (189); he declaimed against Fulvius Nobilior for meanly flattering his soldiers, and for carrying about with him in his campaigns a "frivolous verse-writer," such as Ennius. If he was not personally engaged in the prosecution of the Scipios (Africanus and Asiaticus) for corruption, it was by his spirit that the attack upon them was animated. Africanus, indeed, refused to reply to the charge, saying only, "Romans, this is the day on which I conquered Hannibal," and the citizens absolved him by acclamation; nevertheless, so marked was the blot which Cato had hit in the character of the self-seeking commanders of the time. that Africanus himself found it necessary to retire self banished to his villa at Liternum.

But Cato was engaged in making head against corruptions more deeply-seated and more widely-prevalent than these. The pride of conquest, the infection of foreign manners, and the dissolution of national ideas and prejudices had made formidable inroads upon the narrow simplicity of the ancient Romans. Both the Etruscans and the Greeks were imbued with a more refined and artificial culture; and with their higher education and enhanced power of persuasion, both these peoples were now exerting a powerful influence

upon the minds of their conquerors. Cato conceived it to be his special mission to resist this invasion. It was in the discharge of the censorship that his character as a maintainer of primitive discipline was most strongly exhibited, and hence that he derived the title by which he is most generally distinguished. He revised with unsparing severity the lists of senators and knights, ejecting from either order the men whom he judged unworthy of it, either from their want of the prescribed means, or from notorious crimes or vices. The expulsion of the great imperator L. Quinctius Flamininus was a splendid example of his rigid justice. He regulated with pedantic strictness the expenses of the table, and also of dress and personal ornament, especially of the women. He contended gallantly, but even more ineffectually, against bribery at the public elections; and though he gained little success in the crusades to which he thus religiously devoted himself, it may be allowed that the example of the great censor did actually raise and maintain a higher spirit of public morality among his contemporaries, and gave encouragement and strength to many struggling consciences even in later generations.

From the date of his censorship (184) to his death in 149, Cato held no public office at home or abroad; but continued to the last to distinguish himself in the senate as the persistent opponent of the new ideas and the men who supported them. He was struck with horror, along with many other Romans of the graver stamp, at the license of the Bacchanalian mysteries (181), which he attributed to the fatal influence of Grecian manners; and he vehemently urged the dismissal of the sophists who came as ambassadors from Athens. It was not till his eightieth year that he consented to learn even the rudiments of the Greek language. His speeches, of which as many as 150 were collected, were principally directed against the young free-thinking and loose-principled nobles of the day. It is hard to say, was the remark of Livy, whether he attacked them most or they him; for they too did not fail to retaliate, and when he was required to defend himself in his eighty-first year against a capital charge, he was heard to complain of having to plead his cause before men of other minds and of another generation. Almost his last public act was to urge his countrymen to the third Punic war and the destruction of Carthage. Rome, he constantly declared, could never be safe while so great a city lay so near her; and he plucked, on one occasion, from under his robe the fresh figs which, he said, had been gathered but three days before on the coast which fronted the mouth of the Tiber, exclaiming again and again, "Delenda est Carthago!"

The great principle of Cato's life was to do everything by rule. With him the individual life was a continual discipline, and public life was the discipline of the many. He regarded the individual householder as the germ of the family, the family as the germ of the state. All his actions were measured, and every one assigned to its proper place and hour; he was a great economist of his time, and thereby enabled himself to get through a great variety of work, though it all lay within narrow limits. He exacted similar application from his dependents, and proved himself a hard husband, a strict father, a severe and cruel master. There was little difference, apparently, in the esteem in which he held his wife and his slaves; his pride alone induced him to take a deeper interest and indulge a warmer feeling in regard to his sons. It may be remarked, however, that among the Romans themselves there was little in this behavior which seemed worthy of censure; it was respected rather as a traditional example of the old Roman manners. In the remarkable passage in which Livy describes the character of Cato (*Hist.* xxxix. 40), there is no word of blame for the rigid discipline of his household.

During the course of his long and industrious life, Cato contributed to the formation of the Latin language by at least two important works, the treatise *De Re Rustica*, which is supposed to be at least substantially his own, and the *Origines*, of which last only fragments remain. The one is a miscellaneous collection of rules of good husbandry, conveying much curious information on the domestic habits of the Romans of his age, the other seems to have been a more methodical compilation of Roman history from the foundation of the city to his own time. The fragments which remain of it furnish us with information which is often interesting, but sometimes perplexing, and it is observed that Livy seems to have made no use of the work, of which he could not have been ignorant. Of the numerous speeches of Cato but few passages have been preserved. His collection of *Apophthegmata*—he was himself curt, caustic, and sententious in conversation — is wholly lost.

We possess the life of Cato as written by Cornelius Nepos, Plutarch, and Aurelius Victor. Many particulars of his career and character are to be gathered from Livy and Cicero. (C. M.)

CATO, M. PORCIUS (commonly distinguished from his great-grandfather, Cato the Censor, by the title of *Uticensis*, from the place of his death and the renown attending upon it), furnishes a remarkable specimen of the effect of Hellenic training upon the hard and narrow but determined spirit of the old Latin race. While he inherited from his illustrious ancestor, and from the general discipline of his family through many generations, a sour and severe temper, a pedantic adherence to form and usage, and an utter lack of sympathy with any temper or habits alien from his own, his feelings had been deepened, if not expanded, by the study of the Greek philosophy. As a devoted follower of the Stoic teaching he had attained to very lofty principles, and made them, with almost undeviating consistency, the rule of his life and conduct. He became a fanatic in the pursuit of holiness and pureness of living, in the highest sense in which such graces could be acquired by a pagan, with a view to himself and his own perfection only, but with no love of man and no faith in Providence. He waged a brave but hopeless war against the evil tendencies of his age; but he attached to himself no party, gave strength to no cause, effected no good in his generation, and at the last critical moment betrayed his trust to humanity by fleeing from immediate evil by an unreflecting suicide. But his aims were, for the times in which he lived, generous and noble, and his career well deserves to be studied by succeeding generations. It is only in a very slight outline that it can be here presented..

Cato was born in the year 95 B.C., and on the death of his parents was brought up in the house of his uncle, Livius Drusus, who was just then beginning to incite the Italians to claim a share in the Roman franchise and its privileges. This was the commencement of the intestine troubles of the Republic, and the whole of Cato's after-life was passed amidst domestic dissensions and civil wars. In his early years he expressed with striking boldness his disgust at the cruelties of Sulla. The priesthood of Apollo, to which he early consecrated himself, commended him to a life of rigid observances, and gave a great impulse to his fervid imagination. He learned the principles of the Stoics under a Greek teacher named Antipater, but his oratory in the Forum represented only the harsh, vehement, and caustic type of his Roman countrymen. After fighting in the ranks against Spartacus he became a military tribune, 67 B.C., and served a campaign in Macedonia. On his return he obtained the quæstorship, and distinguished himself for his zeal and integrity in the management of the public accounts, which recommended him for a provincial appointment in Asia. Again he acquitted himself with marked disinterestedness, and conceived a disgust equal to that of his great ancestor at the corruption of the public men with whom he came in contact. He saw, however, much to admire in the discipline which Lucullus had enforced in his own Eastern command, and he supported his claims to a triumph, while he opposed the inordinate pretensions of Pompeius. When the favor of the nobles gained him the tribuneship he exerted himself to convict Murena, one of their chief men, of bribery. Cicero, more pliant than himself, defended the culprit and obtained his acquittal; but Cicero was glad to avail himself of the firmness and stern justice of his recent adversary, when he urged the execution of Catiline's associates. By this time Cato had become a great power in the state. Though possessed of little wealth and no family influence, his character for unflinching resolution in the cause of the ancient free state rendered him a valuable instrument in the hands of the nobles, perplexed as they were by the open hostility of Cæsar and the oppressive patronage of Pompeius and Crassus. They were the better disposed, perhaps, to make use of him from the oddity of his unpractical temper, which made it the easier for them occasionally to disclaim and repudiate his assistance. They did not, indeed, find him so complacent a dupe as Cicero, nor did they treat him

more faithfully. They thrust him into the snare prepared for him by the triumvirs, and let him be sent on a mission of gross injustice towards the king of Cyprus, which his pedantic loyalty to the state forbade him to refuse. He continued to struggle against the combined powers of the triumvirs in the city, and became involved in scenes of violence and riot, while desperately resisting the superior force of their turbulent adherents. He succeeded, however, in obtaining the prætorship in 54, in which office he strenuously exerted himself in the hopeless and thankless task of suppressing bribery, in which all parties were equally interested. Resolved not to stoop to such practices himself, he failed to attain the consulship; and he had made up his mind to retire from the arena of civic ambition when the civil war broke out in 49.

Cato had now persuaded himself that the sole chance for the free state lay in conceding an actual supremacy to Pompeius. Accordingly he did not scruple to support the unjust measures of the nobles against Cæsar, which gave too fair a color to the invasion of Italy. Cato was, indeed, little prepared for his commander's flight across the Adriatic, and the surrender of the city, the government, and therewith the ostensible right, to the victorious rebel. Though he followed Pompeius to Epirus he found little satisfaction in his camp, where the fugitives were loudly threatening a bloody vengeance on their enemies. He excused himself from accompanying the forces of the Senate into Thessaly, by which he escaped being present at the battle of Pharsalia. After that great disaster, when his chief had abandoned his party and provided only for himself, he too felt at liberty to separate himself from the main body of the republicans, and conducted a small remnant of their forces into Africa. His march through the deserts of Libya gained him immortal glory. The struggle between the Senate and Cæsar was renewed in the African province. Cato shut himself up in Utica, and prepared to defend it as the most important post for communication with Italy. The battle of Thapsus, and the total rout of the senatorial forces, now threw upon him the whole weight of maintaining a cause which had become evidently desperate. The people of the place were anxious to make terms with the victor; but he would not trust the Roman citizens and soldiers to the clemency of the heir of Marius. Hitherto the civil wars of Rome had been continually marked by bloody retaliation; even if Cæsar himself were disposed to mercy he might not be able to restrain the violence of his allies; and it was rumored that terrible execution had been inflicted upon the captives of the last battle. Accordingly Cato determined to keep the gates closed till he had sent his adherents off by sea. While the embarkation was in progress his own demeanor continued calm and dignified. He supped familiarly with his friends, discoursing with them, as was his wont, on philosophical topics. On being informed that the last of the transports had left the port he cheerfully dismissed his attendants, and soon afterward stabbed himself on his couch. Assistance was promptly offered, but he refused to avail himself of it, and so perished, much, it may be said, to his own fame, but with little advantage to his country (46 B.C.).

Cato had been reading, we are told, in his last moments Plato's dialogue on *The Immortality of the Soul*, but it is not likely that the Stoic, with his keen and rigid logic, put much faith in the vague aspirations of the idealist of Academus. His own philosophy had taught him to act upon a narrow sense of immediate duty without regard to future contingencies. He conceived that he was placed in the world to play an active part, marked out by circumstances, and when disabled from carrying out his principles, to retire gravely from it. He had lived for the free state, and it now seemed his duty to perish with it. Cæsar had slain the commonwealth; it never occurred to him that Cæsar himself was mortal, and that the commonwealth might live again. Had he condescended to ask his life, the conquerors would have been proud to grant it; in two years more he might have been the survivor, for he was hardly yet fifty years of age, and might have formed a rallying point for the few devoted spirits, though few indeed they were, who really cared for freedom. Cato has left perhaps, from the circumstances of his life and of his death, the most marked name in the history of Roman philosophy, but he was a student, possibly a dreamer only, composed no works, and bequeathed to posterity no other instruction than that of his example. The memory of his career proved indeed fruitful. The school of the Stoics, which took a leading part in the history of Rome under the earlier emperors, looked to him as its saint and patron. It continued to wage war against the empire, hardly less openly than Cato himself, for two centuries, till at last it became actually seated on the imperial throne in the person of Marcus Aurelius. (C. M.)

CATO, DIONYSIUS, a name concerning which it is doubtful whether it be the name of the author, or merely part of the title, of the *Dionysii Catonis Disticha de Moribus ad Filium*, a small work, consisting of moral apophthegms, chiefly in hexameters. The name usually given is simply Cato, but Dionysius is added on the authority of a MS. declared by Scaliger to be of great antiquity. Other titles by which the book is known are—*Cato Moralissimus* and *Cato, Carmen de Moribus*. The latter is also the title of a work by the famous M. Cato the elder; but extracts given from this by Aulus Gellius prove that it was in prose. The authorship of the *Disticha* has been ascribed to a large number of persons, including Seneca and Boetius, but in truth we know nothing of the writer, or of the exact time when it was written. The style is generally pure, and the existence of occasional corruptions argues little against its antiquity, since interpolations have certainly been made, and not improbably emendations attempted. The first mention of the work which we find is in a letter addressed to Valentinian; it is also referred to by Isidorus and Alcuin, and frequently by Chaucer. It appears to have had considerable reputation in the Middle Ages; and at the revival of learning it was studied and highly praised by such men as Scaliger and Erasmus. There have been numerous editions in MS. and print, of which the best is that of Arntzenius, Amsterdam, 1754. In 1483 a translation was issued from Caxton's press at Westminster.

CATS, JACOB (1577–1660), one of the oldest, and long the most popular, of Dutch poets and humorists, was born at Brouwershaven in Zeeland. Deprived of his mother at an early age, and adopted with his three brothers by an uncle, Cats was sent to school at Zierikzee. At school he was an idle boy, and learned but little; removed, however, to the young and thriving university of Leyden, he seems to have read hard, and to have acquired a respectable knowledge of Greek and jurisprudence. After a visit to France to learn the language, and a turn in Italy with the same object, he returned to Holland, and settled at the Hague where he began to practise as an advocate. His pleading in defence of a wretched creature accused of witchcraft got him many clients and some reputation. As Cats so far anticipated the common sense line of argument afterwards adopted in cases of the sort as to be often referred to later as an authority, his success was by no means undeserved. A serious love affair occurred about this time, which was broken off on the very eve of marriage by a tertian fever in the bridegroom. The fever defied all attempts at cure for some two years. For medical advice and change of air Cats betook himself to England, where he consulted the highest authorities, and exhausted their pharmacopœia in vain. He resigned himself to his fate, returned to Zeeland to die, and was cured mysteriously by a strolling quack. He then went to Middleburgh, where (1602) he married a lady named Valkenburg, who bore him five children. At Middleburgh he devoted himself to farming and poetry, retiring gradually from the exercise of his profession, and producing his first great works—the *Emblems of Fancy and Love*, the *Galatea* (a pastoral romance), the *Mirror of Past and Present*, the *Marriage*, and others. In 1621, on the expiration of the twelve years' truce with Spain, the breaking of the dykes drove him from his farm. He was made pensionary (stipendiary magistrate) of Middleburgh; and two years afterwards he received the same distinction from the larger city of Dort. His *Nuptial Ring* was the result of his leisure during this part of his career. In 1627 Cats came to England on a mission to Charles I.; that prince made him a knight, but otherwise the poet's success as an ambassador was not indicated by any result. In 1635 he was made grand pensionary of Holland; and in 1652, a year after his resignation of this office, the second in the commonwealth, he again figured in England as an unsuccessful envoy. His long Latin oration left Cromwell absolutely unmoved; and Cats returned to Holland altogether to relinquish the

practice of State affairs. In the seclusion of his villa of Sorgvliet (Fly-from-Care), near the Hague, he resided till his death, occupied in the composition of his autobiography (*Eighty-two Years of My Life*) and of many poems (*Old Age and Country Life, Coffins for the Living*, &c.). He was buried by torchlight, and with great ceremony, in the Klooster-Kerk at the Hague, and is still spoken of as "Father Cats" by his countrymen.

Cats, who lived and reigned with Hooft and Vondel in the golden age of Flemish literature, was an exceedingly prolific writer. His versification is smooth and regular, although somewhat monotonous; his style is homely and familiar; and the naiveté and simplicity of most of what he says, and of his manner of saying it, are peculiarly attractive. He never soared, or tried to soar; he was content to plod on, scattering round him as he went the blunt straight maxims, the shrewd little moralities, the excellent pieces of advice, which his countrymen—of whose practical and prosaic genius he is the highest literary representative—have found so pleasant and so full of profit. Hardly known outside of Holland, among his own people for nearly two centuries he enjoyed an enormous popularity,—his *Book of Emblems*, a great favorite with Sir Joshua Reynolds in his childhood, being often styled "The household Bible." Of late years, however, his diffuseness and the antiquated character of his matter and diction have come to be regarded as difficulties in the way of study, and he is perhaps rather more renowned than read. A statue to him was erected at Ghent in 1829.

See Jacob Cats, *Complete Works*, 1790–1800, 19 vols.; Pigott, *Moral Emblems, with Aphorisms, &c., from Jacob Cats*, 1860; and Octave Delepierre, *Sketch of the History of Flemish Literature*, 1860. Southey has a very complimentary reference to Cats in his "Epistle to Allan Cunningham."

CATSKILL or KAATSKIL MOUNTAINS, a group of moderate elevation belonging to the great Appalachian system of North America. They are situated for the most part in Greene County, New York, and are mainly remarkable for the beauty of their scenery and the magnificence of the outlook over the neighboring country. The principal summits are Round Top, High Peak, and Overlook, which attain a height of nearly 4000 feet. To the north of High Peak is situated the celebrated gorge or "clove" of Catterskill, with its waterfall. The cascades are three in number, and the total height is about 300 feet; but the supply of water is often deficient, and has even to be managed by the hotel proprietors. The place can easily be reached from Mountain House, an hotel which is built at an elevation of 2500 feet, on the front of Pine Orchard Mountain, about 12 miles from the town of Catskill. Another hotel has more recently been erected on the summit of Overlook, at a height of 3800 feet.

CATTACK [Cuttack], a district of British India, in the province of Orissa, under the jurisdiction of the Lieutenant-Governor of Bengal, in 20° N. lat., and 85° to 87° E. long. It is bounded on the N. by the district of Balasor, from which it is separated by the Baitaraní and Dhámrá rivers; on the E. by the Bay of Bengal, on the S. by the district of Purí, and on the W. by the Orissa Tributary States. The district comprises the nucleus or middle portion of the great delta formed by the Mahánadí River, and consists of three distinct tracts;—first, a marshy woodland strip along the coast, from 3 to 30 miles in breadth; second, an intermediate stretch of rice plains; third, a broken hilly region, which forms the western boundary of the district. The marshy strip along the coast, like the Bengal Sundarbans, is covered with swamps and malaria-breeding jungles, but lacks their forest scenery. As one approaches the sea the solid land gives place to a vast network of streams and creeks, whose sluggish waters are constantly depositing silt, and forming morasses or quicksands. Cultivation does not begin till the limits of this dismal region are passed. The intermediate rice plains stretch inland for about 40 miles, and occupy the older part of the delta between the sea-coast strip and the hilly frontier. They are intersected by four large rivers, which dash down from the western mountains, and then split into innumerable branches on the level delta. Their distributaries, after tortuous interlacings, frequently rejoin the parent stream as it approaches the sea. This intermediate tract is a region of rich cultivation, dotted with great banyan trees, thickets of bamboos, exquisite palm foliage, and mango groves. The hilly frontier separates the delta of British Orissa from the semi-independent Tributary States. It consists of a series of ranges, 10 to 15 miles in length, running nearly due east and west, with densely-wooded slopes and lovely valleys between. The timber, however, is small, and is of little value except as fuel. The political character of these three tracts is as distinct as are their natural features. The first and third are still occupied by feudal chiefs, and have never been subjected to a regular land-settlement, by either the Musalmán or the British Government. They pay a light tribute, now permanently fixed. The intermediate rice plains, known as the Mughulbandí, from their having been regularly settled by the Muhammadans, have yielded to the successive dynasties and conquerors of Orissa almost the whole of the revenues derived from the province. The deltaic portions are of course a dead level; and the highes hills within the district in the western or frontier tract do not exceed 2500 feet. They are steep, and covered with jungle, but can be climbed by men. The most interesting of them are the Assa range, with its sandal trees and Buddhist remains; Udayagirí (Sunrise-hill), with its colossal image of Buddha, sacred reservoir, and ruins; and Assagiri, with its mosque of 1719. The Mahávinayaka Peak, visible from Cattack, has been consecrated for ages to Siva-worship by ascetics and pilgrims.

Cattack district takes its character from its rivers. These issue in magnificent streams through three gorges in the hilly frontier. On the south, the Mahánadí, literally the Great River, rushes down upon the delta from a narrow gully at Naráj, about seven miles west of the town of Cattack. On the extreme north of the district, the sacred Baitaraní, the Styx of the Hindus, emerges from a more open country, and forms the boundary line between Cattack and Balasor. The Bráhmaní enters the district about half way between the two. The Cattack delta is thus divided into two great valleys, one of them lying between the Baitaraní and the Bráhmaní, the other between the Bráhmaní and the Mahánadí. The rivers having, by the silt of ages, gradually raised their beds, now run along high levels. During floods they pour over their banks upon the surrounding valleys, by a thousand channels which interlace and establish communication between the main streams. As the rivers enter the district by three great gorges in the hills, so, after numerous bifurcations, they find their way into the sea by three principal mouths. On the north, the Baitaraní and Bráhmaní debouch into the Bay of Bengal, under the name of the Dhámrá, at Point Palmyras; while the Mahánadí, after a variety of interlacings, forms two great estuaries,—one, bearing the name of the Mahánadí, at False Point, and the other, called the Deví, in the south-eastern corner of the district. Silt-banks and surf-washed bars render the entrance to these rivers perilous. The best harbor in Cattack district is at False Point, on the north of the Mahánadí estuary. It consists of an anchorage, land-locked by islands or sandbanks, and with two fair channels navigable towards the land. The Famine Commissioners in 1867 reported it to be the best harbor on the coast of India from the Húglí to Bombay. The dearth of the preceding year (1866) had led to the discovery of its value as a port for throwing supplies into the starving province. The harbor is safe and roomy, and the channel properly buoyed. The Dhámrá harbor, further up the coast, although not so well protected, is more resorted to by native ships. Four canals have been made through Cattack since 1862 for regulating and distributing the water supply by means of irrigation, and for navigation. They are—the High Level Canal, the Kendrápárá Canal, the Táldandá Canal, and the Máchhgaon Canal, with their respective distributaries. The High Level Canal is designed to provide a great trade-route between Cattack and Calcutta, and to irrigate the country through which it passes. The other three are intended for irrigation and as navigable channels within the district. The canals were undertaken by the East India Irrigation Company in 1862; but the company proving unable to continue the works, Government purchased them on the 31st December, 1869, for £941,368. Cattack district is subject to destructive floods, and from time immemorial embankments have been maintained along the sides of the rivers. In 1870 their aggregate length was 680 miles.

The district has an area of 3178 square miles, with a total population of 1,494,784, 95 per cent. of whom, or

1,430,040, are Hindus. The rest consist of Muhammadans, 40,013; Christians, 2314; and persons of unspecified religion, 22,398. The last comprise the aboriginal tribes, who here, as elsewhere, eling to their mountains and jungles. They chiefly consist of the Bhumij, Tálá, Kol, and Savar peoples, the Savars being by far the most numerous, numbering 16,589 souls. They are regarded by the orthodox Hindus as little better than the beasts of the wildernesses which they inhabit. Miserably poor, they subsist for the most part by selling firewood or other products of their jungle; but a few of them have patches of cultivated land, and many earn wages as day laborers to the Hindus. They occupy, in fact, an intermediate stage of degradation between the comparatively well-off tribes in the Tributary States (the stronghold and home of the race), and the Páns, Báurís, Kandrás, and other semi-aboriginal peoples on the lowlands, who rank as the basest castes of the Hindu community. The great bulk of the Indo-Aryan or Hindu population consists of Uriyas, with a residue of immigrant Bengalis, Lálá Káyets from Behar and Northern India, Telingás from the Madras coast, Marhattás from Central and Western India, a few Sikhs from the Punjab, and Marwárís from Rájputáná. The Muhammadans are chiefly the descendants of the Patháns who took refuge in Orissa after the subversion of their kingdom in Bengal by the Mughuls in the 16th century.

Only three towns in Cattack district contained in 1872 upwards of 5000 inhabitants, viz., Cattack, the capital, 50,878; Jájpur, 10,753; Kendrápárá, 10,682. Jájpur was the capital of Orissa under its Hindu kings; it is still considered a sacred town, and thousands of pilgrims annually flock to it.

Rice forms the staple product of the district; its three chief varieties are *biálí* or early rice, *sárad* or winter rice, and *dálua* or spring rice. The other cereal crops consist of *mánduá* (a grass-like plant producing a coarse grain resembling rice), wheat, barley, and *chiná*, a rice-like cereal. *Suán*, another rice-like cereal, not cultivated, grows spontaneously in the paddy fields. Pulses of different sorts, oilseeds, fibres, sugar-cane, tobacco, spices, and vegetables also form crops of the district. The cultivators consist of two classes—the resident husbandmen (*Thánt*), and the non-resident or migratory husbandmen (*Páhé*). At the time of the last settlement of land revenue in 1837, the rights of the resident cultivators were formally recognized by Government, and secured to them by palm-leaf leases. They hold their homestead lands rent free, and are not liable to be ousted so long as they continue to pay the rents assessed on their cultivable lands. Nor can such rents be enhanced until the expiration of their leases, which run concurrently with the land-settlement to 1897. The non-resident cultivators were formerly tenants-at-will, but since 1859 a large proportion of them have acquired rights of occupancy under the Acts of the Indian Legislature.

Weekly steamers ply between Calcutta and Dhámrá. The High Level Canal, when completed, will afford ample means of communication inland toward Bengal. The revenues of the Cattack district have steadily increased under the British rule. The total revenue in 1829–30 was £139,642, the expenditure on civil administration £114,438; in 1870–71 the revenue was £243,958, the civil expenditure £223,659. In the latter year the land revenue amounted to £77,629. Excluding the indigenous village schools maintained by the people themselves, the schools inspected by the Educational Department in 1872–73 numbered 53, attended by 2435 pupils, and maintained at an outlay of £4081, to which Government contributed £2699. The hot season commences in March and lasts till about the middle of June; the rains continue from the middle of June till the end of October, when the cold weather sets in. The average rainfall for five years previous to 1870 was 63·18 inches, the average temperature 84° Fahr. Intermittent fever, elephantiasis, smallpox, and bowel complaints form the prevalent diseases. Cholera is always present among the natives, and occasionally assumes the epidemic type. The district of Cattack, with the rest of Orissa, passed into the hands of the English from the Marhattás in 1803.

(W. W. H.)

Cattack, the most important town in the above district, and the capital of the province, is situated in 20° 28′ N. lat. and 85° 55′ E. long., on the tongue of land where the Mahánadí first bifurcates, throwing off the Kátjurí on its southern and the Birúpá on its northern bank. Cattack city formed one of the five royal strongholds of ancient Orissa, and was founded by a warlike prince who reigned from 953 to 961. Its native kings protected it from the rivers by a masonry embankment several miles long, built of enormous blocks of hewn stone, and in some places 25 feet high. A fortress defended the north-west corner of the town, and was captured by the English from the Marhattás in October, 1803. It is now abandoned as a place of defence. The city has long been the commercial and administrative headquarters of Orissa; it is connected with False Point harbor by the Kendrápárá Canal. The High Level Canal, at present in course of construction, will open out inland communication between it and Calcutta. In 1825 the town contained 6512 houses, and a population of about 40,000. Population in 1872, 50,878, viz., Hindus, 40,849; Muhammadans, 7436; Christians, 1968; others, 625.

(W. W. H.)

CATTARO, the chief town of a circle in the Austrian kingdom of Dalmatia, situated on a narrow ledge between the mountains of Montenegro and the Bocca di Cattaro, a winding and beautiful inlet of the Adriatic. It is strongly fortified towards both the sea and land,—towards the sea by the fortress of Castelnuovo, at the mouth of the gulf, and towards land more especially by the Castle of San Giovanni on the heights; the long lines of wall from this castle to the town form a striking feature in the landscape. The town is the seat of a Catholic bishop, and contains a small cathedral, a Catholic collegiate church, and several convents; but the population is largely Slavonic, and the Greek Church is almost on a level with the Latin. The trade is comparatively restricted, and but little advantage is taken of the gulf except for the fisheries. The principal article of export is dried flesh or *castradina*. Population, 3600.

Cattaro is probably to be identified with the Roman *Ascrivium* (or *Askrourion*); but it does not appear under anything like its present name till the 10th century, when it is described by Constantinus Porphyrogenitus as *Dekatera*. In the reign of Basil the Macedonian (867–886) it was captured by the Saracens; but it afterwards maintained itself as a more or less independent republic till 1419, when from the fear of the Turks it accepted the protection and dominion of Venice. In the following centuries it was several times besieged by the enemies of Venice; and in 1563 and 1667 it was nearly destroyed by earthquakes. By the peace of Campo-Formio it passed to Austria; but in 1805, by the peace of Presburg, it was assigned to Italy, and in 1810 it united with the French empire. Its restoration to Austria did not take place till 1814. See Tozer, *Highlands of Turkey*, 1869; *Saturday Review*, March, 1876.

CATTERMOLE, George (1800–1868), an English painter, chiefly in water-colors, was born at Dickelburgh, near Diss, Norfolk, in August, 1800. At the age of sixteen he began working as an architectural and topographical draughtsman; afterwards he contributed designs to be engraved in the annuals then so fashionable and popular; thence he progressed into water-color painting, becoming an associate of the Water-Color Society in 1822, and a full member in 1833. In 1851 he withdrew from active connection with this society, and with the practice of water color painting, and took to oil-coloring. His most fertile period was between 1833 and 1851. In 1855, as an exhibitor in the British Fine Art section of the Great Exhibition in Paris (water-color branch), he received one of the five first-class gold medals awarded to the British painters. He also enjoyed professional honors in Amsterdam and in Belgium. He died on the 24th July, 1868. Among his leading works are The Murder of the Bishop of Liége (15th century), The Armorer Relating the Story of the Sword, The Assassination of the Regent Murray by Hamilton of Bothwellhaugh, and (in oil) A Terrible Secret. He was largely employed by publishers, illustrating the *Waverley Novels* and the *Historical Annual* of his brother the Rev. Richard Cattermole (his scenes from the Wars of Cavaliers and Roundheads in this series are among his best engraved works), and many other volumes besides. He is stated to have been "unsettled in his habits, and uncertain in engagements." Cattermole was a painter of no inconsiderable gifts, and of great facility in picturesque resource; he was defective in solidity of form and texture, and in realism or richness of color. He excelled in rendering scenes of chivalry, of mediævalism, and generally of the romantic aspects of the past. Indeed, his faculty in this way might almost be compared—though on a considerably lower level, and with less of the spell of originality

—to that of Walter Scott. Just as Scott was fading from the region of mediæval romanticism in letters, Cattermole entered upon it in fine art.

CATTI, or CHATTI, a powerful and warlike German nation, who, though defeated by Drusus, Germanicus, and other Roman generals, were never wholly subjugated, till in the 4th century they disappeared among the Franks. They inhabited a district extending from the Weser on the E. to the Rhine on the W., and bounded on the S. by the Agri Decumates. They thus occupied about the same position as the modern Hesse—though their territory was more extensive, and included also part of North-Western Bavaria,—and the name *Hesse* is probably the same as *Chatti*. They lived in a communistic society, but possessed several towns, of which the chief was *Mattium*, now Maden.

CATTLE, a term applied to the various races of domesticated animals belonging to the genus *Bos*, known also as Oxen. They have been divided into two primary groups, the humped cattle or zebus (*Bos indicus*) of India and Africa, and the straight-backed cattle (*Bos taurus*), which are common everywhere. By many naturalists these groups have been regarded as mere races of the same species, and it is a well-ascertained fact that the offspring arising from the crossing of the humped and unhumped cattle are completely fertile; but the differences in their osteology, configuration, voice, and habits are such as to leave little doubt of their specific distinctness. Oxen appear to have been among the earliest of domesticated animals, as they undoubtedly were among the most important agents in the growth of early civilization. They are mentioned in the oldest written records of the Hebrew and Hindu peoples, and are figured on Egyptian monuments raised 2000 years before the Christian era; while the remains of domesticated specimens have been found in the Swiss lake-dwellings along with the stone implements and other records of Neolithic man. In infant communities an individual's wealth was measured by the number and size of his herds—Abram, it is said, was rich in cattle; —and oxen for a long period formed, as they still do among many Central African tribes, the favorite medium of exchange between nations. After the introduction of a metal coinage into ancient Greece, the former method of exchange was commemorated by stamping the image of an ox on the new money; while the same custom has left its mark on the languages of Europe, as is seen in the Latin word "pecunia" and the English "pecuniary," derived from "pecus," cattle. The value attached to cattle in ancient times is further shown by the bull figuring among the signs of the zodiac; in its worship by the ancient Egyptians under the title of Apis; in the veneration which has always been paid to it by the Hindus, according to whose sacred legends it was the first animal created by the three divinities who were directed by the supreme Deity to furnish the earth with animated beings; and in the important part it was made to play in Greek and Roman mythology. The Hindus were not allowed to shed the blood of the ox, and the Egyptians could only do so in sacrificing to their gods. Both Hindus and Jews were forbidden, in their sacred writings, to muzzle it when treading out the corn; and to destroy it wantonly was considered a public crime among the Romans, punishable with exile.

The domestic cattle of Europe, of which there are at least fifteen British, and a considerably larger number of Continental breeds, have been, according to Professors Nilsson and Rütimeyer, who have specially studied this subject, derived from at least three distinct species or races—*Bos primigenius*, *Bos longifrons*, and *Bos frontosus*. The first of these, the Urus, would seem, from its remains, to have been domesticated among the Swiss lake-dwellers,—abounding then, and down to historic times, in the wild state, throughout the forests of Europe. Cæsar describes it as existing, in his time, in the Hercynian Forest, in size almost as large as an elephant, but with the form and color of a bull; and it is mentioned by Heberstein so late as the 16th century as still a favorite beast of chase. The name Urus, applied to it by the Romans, is derived from Ur, a root common to the Indo-European languages, and signifying original, primitive; and may be traced in the Thur of Poland, Stier of the Germans, and the Latin Taurus, as also in various names of places, as the Canton of Uri, Thuringian Forest, Turin, and Tours. The Urus was characterized by its flat or slightly concave forehead, its straight occipital ridge, and the peculiar curvature of its horns. Its immense size may be gathered from the fact that a skull in the British Museum, found near Atholl in Perthshire, measures 1 yard in length, while the span of the horn cores is 3 feet 6 inches. Several breeds of cattle, as the Friesland of the Continent, and the Pembroke of England, are supposed to have sprung from this source; while the so-called wild cattle of Britain (*Bos taurus*, var. *Scoticus*) make the nearest approach, according to Rütimeyer, of living forms to the Urus. This breed is of a white color, except the tips of the horns, which are dark, and the ears and muzzle, which are either black or brownish red. Uniformity in color, however, is secured by the slaughter of all calves which differ from the pure type. British wild cattle now exist only in Cadzow Forest, Chillingham Park, Lyme Park, and Chartley, in all of which they are strictly preserved. The purest bred are those of Chillingham—a park which was in existence in the 13th century. These have red ears with brownish muzzle, and show all the characteristics of wild animals. According to Mr. Hindmarsh, who obtained his information from the proprietor, "they hide their young, feed in the night, basking or sleeping during the day; they are fierce when pressed, but, generally speaking, very timorous, moving off on the appearance of any one even at a great distance." The bulls engage in fierce contests for the leadership of the herd, and the wounded are set upon by the others and killed; thus few bulls attain a great age, and even those, when they grow feeble, are gored to death by their fellows. The white cattle of Cadzow are very similar to those of Chillingham in their habits, but being confined to a narrow area are less wild. They still form a considerable herd, but of late years, it has been stated, they have all become polled. It is probable, as Sir Walter Scott used to maintain, that Cadzow and Chillingham are but the extremities of what, in ruder times, was a continuous forest, and that the white cattle are the remnants of those herds of "tauri sylvestres" described by early Scottish writers as abounding in the forests of Caledonia, and to which Scott evidently refers in the following lines:—

> "Mightiest of all the beasts of chase
> That roam in woody Caledon,
> Crushing the forest in his race,
> The mountain bull comes thundering on."

It is still a matter of controversy whether these wild cattle are the unsubdued, although degenerate, descendants of the mighty Urus, or merely the offspring of a domestic breed run wild, which have reverted somewhat to the ancient type. Their comparatively small size, and their evident tendency to vary in color, seem to point out the latter as the more probable view. A breed similar to the Chillingham cattle existed in Wales in the 10th century, being white, with red ears; and Welsh chroniclers relate how on one occasion a Prince of Wales demanded, as compensation for certain injuries, 100 white or 150 black cattle, and how also the anger of King John was at one time appeased by a gift of 1400 of the white variety,—showing that the latter were numerous, and sufficiently under control to be collected and conveyed from one part of the country to another, also that they were more highly valued than the black cattle,—in short, that they existed at that time as a domesticated breed. According to Professor Low (*Domesticated Animals of the British Islands*), this Welsh breed existed under domestication, in a comparatively pure state, in Pembrokeshire at the beginning of the present century. As the wild cattle of Britain are prevented, by rigorous selection, from deviating from their present color, it is impossible to assert that the ancient Urus was mainly white, although Darwin (*Animals and Plants under Domestication*) has brought forward some facts to show that domestic cattle run wild seem to have a slight tendency to revert in that direction. Immense herds of wild oxen in the Ladrone Islands are described in *Anson's Voyages* as "being milk-white, except the ears, which are generally black;" and in the southern districts of the Falkland Islands, where cattle, introduced from La Plata, have run wild for at least a century, they are "white, with their feet, or whole head, or only their ears, black."

Bos longifrons, according to Nilsson, existed in the wild state in Sweden; but Rütimeyer holds that there is not sufficient evidence to prove that it ever existed otherwise

than domesticated in Central Europe. It seems to have been the most common race of domestic cattle among the ancient lake-dwellers, and several of the existing Swiss breeds are believed to be derived from it. Remains of the same race are found in Britain associated with those of the elephant and rhinoceros, and there is little doubt that Cæsar found large domestic herds of this kind on his arrival in Britain, and that these supplied food to the Roman legions. Professor Owen regards it as the original of our Welsh and Highland cattle. *Bos longifrons* was smaller than the ordinary breeds now existing, and had short horns. Whether it is to be regarded as originally a wild European species, which Neolithic man succeeded in domesticating, or merely as a domestic race introduced by settlers from the East, as many on philological grounds suppose, it has undoubtedly had a very considerable influence in the formation of our existing breeds.

Bos frontosus was somewhat larger than *B. longifrons*, with which it coexisted in certain districts of Scandinavia. Its remains are found chiefly in the lake-dwellings of the Bronze period, although occurring sparingly in those of earlier date. They have also been found in Irish crannoges; and Nilsson regards it as the progenitor of the present mountain cattle of Norway.

The breeds and sub-breeds produced from those ancient races are exceedingly numerous. "In Britain," says Youatt, "they are almost as various as the soil of the different districts, or the fancies of the breeders." This variety may in some degree be attributable to their being the descendants, in all probability, of more than one species, to slight differences in the climate and pasturage of different districts, or to the sudden appearance of what Darwin has termed "spontaneous variations;" but it is beyond doubt mainly due to the long-continued and careful selection of the breeder. The British forms, a detailed account of which will be found under the article AGRICULTURE, vol. i. p. 343, may be conveniently arranged in three classes:—(1.) *Polled Cattle*, an artificial variety which may be produced in any breed by selection; thus the polled cattle of Galloway had small horns so late as the middle of the last century, but by only breeding with bulls of the shortest horns, the grandfather of the present earl of Selkirk succeeded in entirely removing those appendages; (2.) *Short-horned Cattle*, the descendants of *Bos longifrons*, represented in greatest purity by the Welsh and Highland cattle, and probably differing little from the cattle found in Britain from the Polished Stone age to the end of the Roman period; these were afterwards driven with their masters from the open country to the hilly districts, before the Saxon invaders, who probably brought with them (3.) the *Long-horned Cattle*, larger than the preceding, and of a red and white color, which have given rise to those breeds of cattle that now occupy the less elevated and more fertile tracts of England. Those Saxon cattle may be regarded as representing the *primigenius* type. The long and short horned varieties, however, interbreed freely, so that in many of our breeds the two types are inextricably mixed.

Of Continental forms the Hungarian is conspicuous from its great size, and the extent of its horns, which often measure 5 feet from tip to tip. The cattle of Friesland, Jutland, and Holstein form another large breed, and these, it is said, were introduced by the Goths into Spain, thus becoming the progenitors of the enormous herds of wild cattle which now roam over the Pampas of South America. The latter, it is alleged by Spanish writers, have all sprung from seven cows and a bull brought from Andalusia to the city of Assuncion in Paraguay, about the year 1556. They are widely spread over the plains of that continent, but are most numerous in the temperate districts of Paraguay and La Plata—a fact which bears out the view taken by Darwin, that our oxen are the descendants of species originally inhabiting a temperate climate. Except in greater uniformity of color, which is dark-reddish brown, the Pampas cattle have deviated but little from the Andalusian type. They roam in great herds in search of pasture, under the leadership of the strongest bulls, and avoid man, who hunts them chiefly for the value of their hides, of which enormous numbers are exported annually from Buenos Ayres. They are, however, readily reclaimed; the wildest herds, according to Professor Low, being often domesticated in a month. These cattle have hitherto been chiefly valued for their hides, and as supplying animal food to the inhabitants, who only use the choicest parts; but lately attempts have been made, and with considerable success, to export the beef in a preserved state to Europe. Although the South American cattle have thus sprung from a single European breed—that continent possessing no indigenous species of Taurine *Bovidæ*—they have already given rise to many well-marked varieties, as the polled cattle of Paraguay, the hairless breed of Colombia, and that most monstrous of existing breeds, the Natas, two herds of which Darwin saw on the banks of the Plata, and which he describes as "bearing the same relation to other cattle as bull or pug dogs do to other dogs." Cattle have been introduced by the colonists into Australia and New Zealand, where they are now found in immense herds, leading a semi-wild existence on the extensive "runs" of the settlers. The Hottentots and Kaffres possess several valuable breeds, as the Namaqua and Bechwana cattle, the latter with horns which sometimes measure over 13 feet from tip to tip along the curvature. The cattle of those semi-barbarous South Africans appear to be among the most intelligent of their kind,—certain of them, known as *backleys*, having been trained to watch the flocks, preventing them from straying beyond fixed limits, and protecting them from the attacks of wild beasts and from robbers. They are also trained to fight, and are said to rush into battle with the spirit of a war-horse.

Oxen, especially in Britain, have come to be regarded as dull and stupid animals, but this is only true of such breeds as are reared solely for fattening and killing. The wild cattle of Chillingham, and the semi-wild herds that abound on the plains of South America, show no lack of sagacity in avoiding threatened danger, or in combining to meet a common foe; while the *backley* of the Kaffres shows how susceptible they are of education. Wherever, indeed, the ox is employed as a beast of burden or of draught, and it is so in most countries, its intelligence is scarcely inferior to that of the horse, while it surpasses the latter in docility and in the patient endurance of toil. In the south-west of England the Devonshire cattle are largely employed in husbandry, and the greater attention which has consequently been bestowed upon them has been amply rewarded in the superior docility and intelligence of the breed. Among the Swiss mountains there are herds of cows, whose leaders are adorned with bells, the ringing of which keeps the cattle together, and guides the herdsman to their pasture grounds. The wearing of the bells has come to be regarded as an honorable distinction by the cows, and no punishment is felt so keenly as the loss of them, the culprit giving expression to her sense of degradation by the most piteous lowings.

The period of gestation in the cow is nine months, when she usually produces a single calf; occasionally, however, two are born, and when these are of different sexes, the female is almost invariably barren, and is known as a "free-martin," that is, a cow free for fattening, from the Scotch word "mart," signifying a fattened ox.

It is impossible to over-estimate the services rendered by the ox to the human race. Living, it ploughs its owner's land and reaps his harvest, carries his goods or himself, guards his property, and, as has been seen, even fights his battles, while its udders, which under domestication have been enormously enlarged, yield him at all seasons a copious supply of milk. When dead, its flesh forms a chief source of animal food; its bones are ground into manure or turned into numerous articles of use or ornament; its skin is made into leather, its ears and hoofs into glue; its hair is mixed with mortar; and its horns are cut and moulded into spoons and other useful articles.

Humped cattle are found in greatest perfection in India, but they extend eastward to Japan and westward to the African Niger. They differ from the European forms not only in the fleshy protuberance on the shoulders, but in the number of sacral vertebræ, in the character of their voice, which has been described as "grunt-like," and also in their habits; "they seldom," says Mr. Blyth, "seek the shade, and never go into the water and there stand knee-deep like the cattle of Europe." They now exist only in the domesticated state, and appear to have been brought under the dominion of man at a very remote period, all the representations of the ox on such ancient sculptures as those in the caves of Elephanta being of the humped or zebu form. There are several breeds of the zebu, the finest occurring in the northern provinces of India, where they are used for riding,—carrying, it is said, a man at the

rate of six miles an hour for fifteen hours. White bulls are held peculiarly sacred by the Hindus, and when they have been dedicated to Siva, by the branding of his image upon them, they are thenceforth relieved from all labor. They go without molestation wherever they choose, and may be seen about Eastern bazaars helping themselves to whatever dainties they prefer from the stalls of the faithful. See AGRICULTURE, vol. i. p. 343. (J. GI.)

CATTOLICA, a town of Sicily, in the province of Girgenti, and 15 miles north-west of the town of that name. In the vicinity there are extensive deposits of sulphur and rock salt. Population, 6380.

CATULLUS, G. VALERIUS, one of the most brilliant and original among Latin authors, belongs to the Ciceronian age, and is one of the two poets whose works adorn and illustrate the last years of the Roman republic. Our knowledge of his life is almost entirely derived from his own writings. The few statements concerning him which have been received on external evidence require to be confirmed or corrected by reference to allusions contained in these writings. The most important of these external evidences are the statements of Jerome, in the continuation of the Eusebian *Chronicle*, under the year 87 B.C.: "Gaius Valerius Catullus, scribtor lyricus Veronæ nascitur," and, under 57 B.C.: "Catullus XXX. ætatis anno Romæ moritur." Questions have been raised, and variously answered, in regard to the correctness both of the names assigned to the poet, and of the dates of his birth and death given in these passages. Although he appears to speak of himself in his poems only by the name of Catullus, there is no controversy as to the Gentile name, *Valerius*. Suetonius, in his *Life of Julius Cæsar* (ch. 73), mentions the poet by the names "Valerium Catullum." Other persons who had the *cognomen* Catullus belonged to the Valerian gens. Among these, the best known is M. Valerius Catullus Messalinus, one of the *Delatores* in the reign of Domitian, and one of the personages introduced in the famous scene at the Alban Villa of the emperor, described in the fourth satire of Juvenal:—

"Et cum mortifero prudens Veiento Catullo."

The testimony of inscriptions shows, further, that this name was common in the native province of Catullus, and belonged to other inhabitants of Verona, besides the poet and his family (Schwabe, *Quæstiones Catullianæ*, p. 27). Scholars are still divided in opinion as to whether his *prænomen* was *Gaius* or *Quintus*. In the best MSS. the volume is called simply *Catulli Veronensis liber*, and this is the title which his English editor, Prof. Robinson Ellis, adopts. For the name Gaius we have the undoubted testimony, not only of Jerome, which rests on the much earlier authority of Suetonius, but also that of Apuleius. In support of the second, a passage is quoted from the *Natural History* of Pliny (XXXVII. 6, 81), where in some editions the prænomen Q. is prefixed to the name. The Q. is, however, omitted in the best MSS., and in other passages of the same author the poet is spoken of as "Catullus Veronensis." The mistake is supposed to have arisen from a confusion with Q. Catulus, the colleague of Marius in the Cimbric War, himself also the author of lyrical poems. The only other ground in favor of adopting the latter name is a conjectural emendation of Scaliger in the 67th poem (line 12), where he changes the *qui te* of the MSS. into "Quinte." Though a question on which such eminent scholars as Mommsen, Haupt, L. Müller, and apparently Mr. Ellis, take one side, while Schwabe, W. S. Teuffel, and Mr. Munro (*Journal of Philology*, iii.) take the other, can scarcely be considered absolutely settled, yet the arguments adduced by Schwabe and Mr. Munro for accepting the authority of Jerome and Apuleius seem difficult to answer. A more important question is raised concerning the dates of the poet's birth and death. It is quite certain, from allusions contained in the poems, that the date of his death given by Jerome (57 B.C.) is wrong, and that Catullus survived the second consulship of Pompey (55 B.C.) (*cf.* lv. 6, cxiii. 2), and was present in August of the following year at the prosecution of Vatinius by Licinius Calvus (*cf.* liii.). From the allusion in lii. 3—

"Per consulatum perierat Vatinius,"

it was assumed, till the appearance in 1862 of Schwabe's *Quæstiones Catullianæ*, that Catullus must have lived to witness the consulship bestowed on Vatinius in the end of 47 B.C. This consideration induced Lachmann to fix on 77 B.C. instead of 87 B.C. as the date of the poet's birth. It has, however, been shown by Schwabe, and is now generally admitted, that the line "Per consulatum," &c., refers to the fact that Vatinius, after being prætor in 55 B.C., was in the habit of boasting of the certainty of his attaining the consulship, as Cleopatra was in the habit of confirming her most solemn declarations by appealing to her hope of one day administering justice in the Capitol (*cf.* Haupt, "Quæstiones Catullianæ," contained in vol. i. of his *Opuscula*, 1875). We have thus certain evidence that Catullus lived till the month of August, 54 B.C., but there is no allusion in his poems to any event of a later date than the prosecution of Vatinius. Some of the poems (as XXXVII. and lii.) may very probably have been written during his last illness. He seems to have lived just long enough to collect his works together, to dedicate them to Cornelius Nepos, and to see his

"lepidum novum libellum
Arido modo pumice expolitum."

If he died in 54 B.C. or early in 53 B.C. there must be a further error either in the first or the second of Jerome's statements. Catullus must either have been born later than 87 B.C. or have lived to a greater age than thirty. The difficulty in regard to the first supposition is that it increases the disproportion between the ages of the poet and his mistress Clodia, who must have been born about 94 B.C. But as he was supplanted in her affections by a still younger man, M. Cælius Rufus, who appears for a time to have been equally infatuated by her, and as Cicero in his defence of Cælius describes her as one "quæ etiam aleret *adolescentes* et parsimoniam patrum suis sumptibus sustentaret" (*Pro M. Cœlio*, ch. XVI. 1), this difficulty is not a serious objection to the date. Catullus is described by Ovid, in true keeping with all the characteristics of his poetry, as "hedera juvenalia cinctus Tempora" (*Amor.*, iii. 9, 61); and this description seems more applicable to a man who dies in his thirtieth year than to one who dies three or four years later. Further, the age at which a man dies is more likely to be accurately remembered than the particular date either of his death or of his birth. The common practice of recording the ages of the deceased in sepulchral inscriptions must have rendered a mistake less likely to occur in that respect, than in respect of the consulship in which he was born. Other instances can be given of the carelessness of Jerome in respect to dates, and Mr. Munro gives a probable explanation of the mistake in the confusion between the first and the last of the four consulships of Cinna.[1] It seems, therefore, on the whole most likely that the words "XXX. ætatis anno" are correct, and that Catullus was born in 94 B.C., in the consulship of Cn. Papirius Carbo II. and L. Cornelius Cinna IV.

The statement that he was born at Verona is confirmed by passages in Ovid and Martial. Pliny the elder, who was born at Como, speaks of Catullus in the preface to his *Natural History*, as his "countryman" (conterraneus), and the poet speaks of Verona as his home, or at least his temporary residence, in more than one place (lxvii. 34, lxviii. 27, XXXV. 3); and in mentioning the Transpadan among the other inhabitants of Italy, he adds the words "ut *meos* quoque attingam" (XXXVIII. 13).

His occasional residence in his native place is further attested by the statement of Suetonius (*Julius Cæsar*, 73), that "Julius Cæsar accepted the poet's apology for his scurrilous verses upon him, invited him to dine with him on the same day, and continued his intimacy with his father as before." As this incident could only have happened during the time that Julius Cæsar was proconsul, the scene of it must have been in the Cisalpine province, and at the house of the poet's father, in or near Verona. The verses apologized for were those contained in poems XXIX. and lvii., the former of which must have been written after Cæsar's invasion of Britain, so that this interview probably took place in the winter of 55–54 B.C. The fact that his father was the host of the great proconsul, and lived on terms of intimacy with him, justifies the inference, that he was, in wealth and rank, one of the principal men of the province, an inference confirmed by the social position which Catullus himself assumed in Rome, and by his enjoyment of property independent of

[1] This is also suggested as possible by Schwabe, who, however, prefers adhering to the date 87 B.C.

his father (*cf.* poems xxxi. and xliv.) during his father's lifetime. The only other important statement concerning the poet's life which rests on external authority is that of Apuleius, that the real name of the Lesbia of the poems was Clodia. One other statement, not concerning the poet's life, but concerning the reputation which he enjoyed after his death, is given in the *Life of Atticus* by Cornelius Nepos (12, 4). It is to the effect that he regarded Lucretius and Catullus as the two greatest poets of his own time.

The volume of poems which Catullus collected and published before his death consists of 116 pieces, varying in length from 2 to 408 lines, the great mass of them being, however, short pieces, written in some lyric or iambic, or in elegiac metre. These poems are not arranged either in chronological order or in accordance with the character of the topics with which they deal. The only principle which seems to have guided the author in his arrangement was that of placing the longer poems, of a less personal and fugitive character, in the middle of the volume, while the first part contained those written in lyric or iambic metres, and the latter part consisted entirely of verses written in the elegiac metre. Many of the last treat of the same topics and refer to the same persons as those forming the subject of the short poems at the beginning of the volume. The elegiac, as well as the phalecian and iambic metres, were employed by him as the vehicle both of his tenderest and his bitterest feelings. Though no chronological order is observed, yet internal evidence enables us to determine the occasions on which many of the poems were written, and the order in which they followed one another. They give a very vivid image of various phases of the poet's life, and of the strong feelings with which persons and things affected him. They throw much light also on the social life of Rome and of the provincial towns of Italy in the years preceding the outbreak of the second civil war. Apart from their poetic charm, they thus possess the interest of bringing vividly before us some aspects of one of the most critical epochs in the history of the ancient world. In this respect they may be compared with the letters of Cicero, which record the impression produced by the same time on a man of similar susceptibility of feeling and keenness of apprehension, but of character and pursuits as far removed as possible from those of the provincial poet, who modestly contrasts the greatness of the "most eloquent of the descendants of Romulus" with his own humble pretensions.

The poems extend over a period of seven or eight years, from 61 or 62 till 54 B.C. Among the earliest are those which record the various stages of the author's passion for Lesbia. It is in connection with this passion that he is generally mentioned, or alluded to, by the later Roman poets, such as Propertius, Ovid, Juvenal, and Martial. The real name of Lesbia, as we learn from Apuleius, was Clodia. The admiration which Catullus felt for the great Lesbian poetess, which is clearly indicated by the imitation of her language in his 51st and 62d poems, affords an obvious explanation of the Greek name which he gave to his Roman mistress. After the exhaustive examination of the subject by Schwabe, it may be regarded as certain that she was the notorious sister of Publius Clodius Pulcher, the βοῶπις who plays an important part in the drama of Cicero's fortunes, brought before us in the first three books of the *Letters to Atticus*,—the "Palatina Medea," whose character stands out so prominently in the speech *Pro Cœlio*,—the "quadrantaria Clytemnestra," as she was called by her lover Cœlius (*Quintilian*, viii. 6, 23), in reference to the suspicion she incurred of having poisoned her husband, Q. Metellus Celer (consul, 60 B.C.) in 59 B.C. (*cf.* Munro, *Journal of Philology*, iii.). In the year 56 she charged M. Cœlius Rufus, after tiring of him, as she had of Catullus, with an attempt to poison her. It was in defence of him that Cicero described the spell she exercised over young men, in language which might have been applied to her previous relations with the youthful poet, as well as those with the youthful orator and politician.

It may probably have been on hearing of this defence, that Catullus, whose feelings had by that time changed from passionate devotion to scornful animosity, wrote the short poem (xlviii.) *Disertissime Romuli nepotum*, which associates his name with the great orator of the age. Poems concerning Lesbia occur both among the earliest and the latest of those contained in the series. They record the various stages of passion through which Catullus passed, from absolute devotion and a secure sense of returned affection, through the various conditions of distrust and jealousy, attempts at renunciation, and short-lived "amoris integrationes," through the "odi et amo" state, and the later state of savage indignation against both Lesbia and his rivals, and especially against Cœlius Rufus, till he finally attains, not without much suffering and loss, the last state of scornful indifference. Among the earliest of the poems connected with Lesbia, and among those written in the happiest vein, are ii. and iii. (*Passer, deliciæ meæ puellæ* and *Lugete, O Veneres Cupidinesque*), and v. and vii. The 8th, *Miser Catulle, desinas ineptire*, perhaps the most beautiful of them all, expresses the first awakening of the poet to a sense of her unworthiness, before the gentler have given place to the fiercer feelings of his nature. His final renunciation is sent in a poem written after his return from the East, with a union of imaginative and scornful power, to his two butts, Furius and Aurelius (xi., *Furi et Aureli, comites Catulli*), who, to judge by the way Catullus writes of them, appear to have been hangers-on upon him, who repaid the pecuniary and other favors they received by giving him grounds for jealousy, and making imputations on his character (*cf.* xv., xvi., xviii., xxiii.).

The intrigue of Cœlius Rufus with Lesbia began in 59 or 58 B.C. (*cf.* Schwabe, *Quæst. Catull.*, p. 66). It was probably in the earlier stages of this liaison that the 68th poem was written, from which it appears that Catullus, at the time living at Verona, and grieving for the recent death of his brother in the Troad, had heard of Lesbia's infidelity, and, in consideration of her previous faithlessness in his favor, was not inclined to resent it very warmly—

"Rara verecundæ furta feremus eræ."

Two other poems in the series express the grief which Catullus felt for the death of his brother—one, the 65th, composed at the same time as the 68th, and addressed to the orator Hortensius, who is there, as in some of Cicero's letters, called Hortalus or Ortalus, and sent to him along with the *Coma Berenices* (lxvi.), a translation of a famous elegy of Callimachus. The other poem referring to this event (ci.) must have been composed some years later, probably in 56 B.C., when Catullus visited his brother's tomb in the Troad, on his return from Bithynia. Between 59 and 57 B.C. most of the lampoons on Lesbia and her numerous lovers must have been written (*e.g.*, xxxvii., xxxix., lxix., lxxii., lxxvii., lxxix., xc., &c.). Some, too, of the poems expressive of his more tender feelings to her, such as viii. and lxxvi.,

"Miser Catulle, desinas ineptire,"

and

"Si qua recordanti benefacta priora voluptas,"

belong also to these years; and among the poems written either during this period or perhaps in the early and happier years of his liaison, some of the most charming of his shorter pieces, expressing the affection for his young friends Verannius and Fabullus (ix., xii., xiii.), may be included.

In the year 57 the routine of his life was for a short time broken, by his accompanying the proprætor, C. Memmius, the friend to whom Lucretius dedicates his great poem, as one of his staff, to the province of Bithynia. The desire of seeing foreign lands, which was as strong a passion among cultivated Romans as among cultivated Englishmen of the present day, was probably the chief inducement to this temporary change of life, especially as Catullus had the prospect of gratifying this passion in congenial society; for the testimony of Cicero as well as of Lucretius shows that Memmius, whatever else he was, was a man of some accomplishment in literature and poetry; and among his younger companions in the prætor's train, was his friend and brother-poet Helvius Cinna (*cf.* x.). Some expressions in x., written shortly after his return, imply that he had some hopes of bettering his fortunes by this absence from Rome, as humorous complaints of poverty and debt (xiii., xxvi.) show that his ordinary means were insufficient for his mode of life. He frankly acknowledges the disappointment of these hopes, and still more frankly his disgust with his chief (x., xxviii.). Some of the most charming and perfect among the shorter poems express the delight with which the poet changed

the dulness and sultry climate of the province for the freedom and keen enjoyment of his voyage home in his yacht, built for him at Amastris on the Euxine, and for the beauty and peace of his villa on the shores of Lake Benacus, which welcomed him home "wearied with foreign travel." To this period and to his first return to Rome after his visit to his native district belong the poems xlvi., ci., iv., xxxi., and x., all showing by their freshness of feeling and vivid truth of expression the gain which the poet's nature derived from his temporary escape from the passions, distractions, and animosities of Roman society. This happier vein is not to be traced in many of the poems which can be assigned to the years intervening between this time and the poet's death. Two poems, written in a very genial and joyous spirit, and addressed to his younger friend Licinius Calvus (xiv. and l.), who is ranked as second only to himself among the lyrical poets of the age, and whose youthful promise pointed him out as likely to become one of the greatest of Roman orators, may, indeed, with most probability be assigned to these later years (xiv.). From the expression "Odissem te odio Vatiniano," in the third line of xiv., it may be inferred almost with certainty that the poem was written not earlier than December (the "Saturnalia") of the year 56 B.C., as it was early in that year, as we learn from a letter of Cicero to his brother Quintus (ii. 4, 1), that Calvus first announced his intention of prosecuting Vatinius. The short poem numbered liii. records an incident in connection with the actual prosecution, which occurred in August, 54 B.C. The poems which have left the greatest stain on the fame of Catullus—those "referta contumeliis Cæsar*is*," the licentious abuse of Mamurra, and probably some of those personal scurrilities addressed to women as well as men, or too frank confessions, which posterity would willingly have let die—were written in the last years of his life, under the influence of the bitterness and recklessness induced by his experience. The complaint expressed in poem xxxviii.—

"Male est, Cornifici, tuo Catullo,"

and one or two other short poems such as lii.—

"Quid est, Catulle? quid moraris emori?"

appear to be expressive of his state of mind in his last illness. In the first of them we recognize the tender trustfulness, in the last the "sæva indignatio," of his temperament. There is a return of the old graciousness and playfulness of his nature in the dedication to Cornelius Nepos (i.)—

"Quoi dono lepidum novum libellum,"

which must have been written immediately before the publication of his volume.

Of several of the more interesting among the minor poems, as, for instance, xvii., xxxiv., and xlv., we have no means of determining the date. Nor can it be determined with certainty whether the longer and more artistic pieces, which occupy the middle of the volume—the *Epithalamium* in celebration of the marriage of Manlius Torquatus; the 62d poem, written in imitation of the Epithalamia of Sappho, "Vesper adest: iuvenes, consurgite;" the *Attis*, and the Epic Idyll representing the marriage festival of Peleus and Thetis—belong to the earlier or the later period of the poet's career. If the conjecture of Schwabe and other commentators is correct, that the person addressed in the first part of the 68th is the Manlius of the *Epithalamium*, and that the lines from 3 to 8—

"Naufragum ut eiectum . . . . pervigilat,"

refer to the death of Junia, it would follow that the first Epithalamium was written some time before that poem, and thus belongs to the earlier time. We should be inclined to attach as much weight to the consideration that the ringing, cheerful notes of the poem proclaimed it to be the utterance of the unclouded dawn of his genius, before his nature was saddened and embittered by the two great griefs of his life,—the faithlessness of his mistress and the death of his brother. The fact that the translation of Sappho,—

"Ille mi par esse deo videtur,"

and the translation from Callimachus (lxvi.),—

"Omnia qui magni dispexit lumina mundi,"

belong to the earlier period, might afford grounds for conjecturing that the other poems not relating to personal topics, and written after the manner of Sappho or the Alexandrine poets, belonged to the same period. But the *Attis* and the *Peleus and Thetis*, although perhaps suggested by the treatment of the same or similar subjects in Greek authors, are executed with such power and originality as declare them to be products of the most vigorous stage in the development of the poet's genius. That his genius came soon to maturity, and did not need the ripening process of time and experience through which Horace attained to the perfection of his art, is a reason for hesitation in assigning any particular time between 62 and 54 B.C. for the composition of the *Attis* and of that part of the *Epithalamium* ("Peliaco quondam prognatæ vertice pinus") which deals with the main subject of the poem. But the criticism of Mr. Munro in his edition of Lucretius, which shows similarities of expression, which cannot be mere casual coincidences, between the Ariadne-episode in the *Epithalamium* of Catullus (from line 52 to 266) and the poem of Lucretius, leaves little doubt that that portion at least of the poem was written after the publication of the *De rerum natura*, in the winter of 55–54 B.C. There is no reason for supposing that Catullus could have had any access to that poem in the lifetime of Lucretius, and even if he were personally known to him and had been acquainted with his poem before its publication, the liberty which ancient poets assumed of using the thoughts and language of previous or contemporary writers could not have included the right of appropriating them before they saw the light.

No ancient author has left a more vivid impression of himself on his writings than Catullus. Neither the *Letters to Atticus* of Cicero nor the *Satires* and *Epistles* of Horace afford more trustworthy indications of feeling and character. The interests which occupied his life and inspired his poetry were limited to the passions and the purer pleasures of youth, such as friendly intercourse with men of congenial and cultivated tastes, the enjoyment of outward nature and foreign travel, the cultivation of his art, and the study of the early Greek lyric and the later Alexandrine poets. Coming to Rome in early youth from a distant province, not at that time included within the limits of Italy, he lived as an equal with the men of his time of most intellectual activity and refinement, as well as of highest social and political eminence. Among those to whom his poems are addressed we find the names of Hortensius, Cicero, and Cornelius Nepos, attesting the fact that his society was valued by older men of established reputation and graver pursuits. With Memmius he was at least on sufficiently intimate relations to form one of the members of his staff during the time of his provincial government. He lived on terms of affectionate friendship with Licinius Calvus, with Helvius Cinna, whose distinction (whatever his real merits as a poet may have been) is attested in Virgil's line—

"Nam neque adhuc Vario videor, nec dicere Cinna
Digna,"

with Varus, in all probability the Quintilius Varus whose death Horace laments to Virgil in the 24th ode of the first book, and other poets and men of letters contemporary with him. It is interesting to notice among those mentioned as belonging to the circle of his younger friends, one who lived to become one of the most eminent men as statesman, orator, and man of letters in the following generation, Asinius Pollio, characterized by Catullus as—

"leporum
"Disertus puer et facetiarum."—xii. 8.

Catullus brought into this circle the genius of a great poet, the social vivacity of a vigorous nature, the simplicity and sincerity of an unambitious, and the warmth of an affectionate disposition. He betrays all the sensitiveness of the poetic temperament, but it is never the sensitiveness of vanity, for he is characterized by the modesty rather than the self-confidence which accompanies genius, but the sensitiveness of a heart which gives and expects more sympathy and loyalty in friendship than the world either wants or cares to give in return. He shows also in some of his lighter pieces the fastidiousness of a refined taste, intolerant of all boorishness, pedantry, affectation, and sordid ways of life. The passionate intensity of his temperament displays itself with similar strength in the

outpourings of his animosity as of his love and affection. It was, unfortunately, the fashion of the time to employ in the expression of these animosities a license of speech and of imputation which it is difficult for men living under different social conditions to understand, still more difficult to tolerate. Cicero, in reference to such imputations says, in his defence of Cælius (ch. iii.)—"Sunt ista maledicta pervulgata in omnes, quorum in adolescentia forma et species fuit liberalis;" and a few sentences later he says of this kind of *maledictio*, "si petulantius iactatur, convicium, si facetius, urbanitas nominatur." It is not easy to realize what the style of those scurrilities must have been, which were "more petulant" and "less urbane" than those of Catullus. But the language of Cicero implies that they were taken, and meant to be taken, merely as a *façon de parler*, and would not be regarded either by the objects of them or by those who read them as conveying the serious belief of the writer. Mr. Munro (*Journal of Philology*, iii.) has examined the 29th poem—

"Quis hoc potest videre, quis potest pati,"

the longest and most important of the lampoons on Cæsar and Mamurra, and has shown with much learning and acuteness the motives and intention of Catullus in writing them. Had Julius Cæsar really believed, as Suetonius writing two hundred years afterwards says he did, that "an eternal stigma had been cast upon him by the verses concerning Mamurra," we should scarcely apply the word magnanimity to his condonation of the offence. But these verses survive as a memorial not of any scandal affecting Julius Cæsar which could possibly have been believed by his contemporaries, but of the license of speech which was one of the symptoms of the social and political disorganization of the age, of the jealousy with which the younger members of the Roman aristocracy, who a little later fought on the side of Pompey, at that time regarded the ascendency both of the "father-in-law and the son-in-law," and the social elevation of some of their instruments, and also, to a certain extent, of the deterioration which the frank and generous nature of Catullus underwent from the passions which wasted and the faithlessness which marred his life.

The great age of Latin poetry extends from about the year 60 B.C. till the death of Ovid in 17 A.D. There are three marked divisions in this period, each with a distinct character of its own: the first represented by Lucretius and Catullus, the second by Virgil and Horace, the last by Ovid. Force and sincerity are the great characteristics of the first period, maturity of art of the second, facility of the last. The educating influence of Greek art on the Roman mind was first fully experienced in the Ciceronian age, and none of his contemporaries was so susceptible of that influence as Catullus. With the susceptibility to art he combined a large share of the vigorous and genial qualities of the Italian race. Like most of his younger contemporaries, the *νεώτεροι* of whom Cicero speaks (*Epist. ad Atticum*, vii. 2), he studied in the school of the Alexandrine poets, with whom the favorite subjects of art were the passion of love, and stories from the Greek mythology, which admitted of being treated in a spirit similar to that in which they celebrated their own experiences. It was under this influence that Catullus wrote the *Coma Berenices*, the 68th poem, which, after the manner of the Alexandrines, interweaves the old tale of Protesilaus and Laodamia with the personal experiences of the poet himself, and the *Epithalamium* of Peleus and Thetis, which combines two pictures from the Greek mythology, one of the secure happiness of marriage, the other of the passionate despair of love betrayed. In this last poem Catullus exercises a power of creative pictorial imagination far transcending that displayed in any of the extant poetry of Alexandria. We have no means of determining what suggested the subject of the *Attis* to Catullus, whether the previous treatment of the subject by some Greek writer, some survival of the myth which he found still existing during his residence among the "Phrygii Campi," or the growth of various forms of Eastern superstition and fanaticism, at Rome, in the last age of the Republic. Whatever may have been its origin, it is the finest specimen we possess, in either Greek or Latin literature, of that kind of short poem more common in modern than ancient times, in which some situation or passion entirely alien to the writer, and to his own age, is realized with dramatic intensity. But the genius of Catullus is, perhaps, even happier in the direct expression of personal feeling than in artistic creation, or the reproduction of tales and situations from mythology. The warmth, intensity, and sincerity of his own nature are the sources of the inspiration in these poems. The most elaborate and one of the finest of them is the *Epithalamium* in honor of the marriage of a member of the old house of Manlius Torquatus with Junia (or, according to another reading, Vinia) Aurunculeia, written in the glyconic in combination with the pherecratean metre. To this metre Catullus imparts a peculiar lightness and grace by making the trochee, instead of the spondee as in Horace's glyconics and pherecrateans, the first foot in the line. His elegiac metre is constructed with less smoothness and regularity than that of Ovid and Tibullus, or even of Propertius, but as employed by him it gives a true echo to the serious and plaintive feelings of some of his poems, *e.g.*, lxxvi.—

"Si qua recordanti benefacta priora voluptas,"

xcvi.,

"Si quicquam mutis gratum acceptumque sepulchris,"

and ci.,

"Multas per gentes et multa per æquora vectus,"

while it adapts itself, as it did later in the hands of Martial, to the epigrammatic terseness of his invective. But the perfection of the art of Catullus is seen in his employment of those metres which he adapted to the Latin tongue from the earlier poets of Greece, the pure iambic trimetre, as in iv.—

"Phaselus ille quem videtis hospites,"

the Scazon iambic, employed in viii. and xxxi.—

"Pæninsularum, Sirmio, insularumque,"

and the phalecian hendecasyllabic, a slight modification of the Sapphic line, which is his favorite metre for the expression of his more joyful moods and of his lighter satiric vein. The Latin language never flowed with such ease, freshness, and purity as in those poems. Their perfection consists in the entire absence of all appearance of effort or reflection, and in the fulness of life and feeling, which gives a lasting interest and charm to the most trivial incident of the passing hour. In reference to those poems Mr. Munro has said with truth and force: "A generation had yet to pass before the heroic attained to its perfection; while he (Catullus) had already produced glyconics, phalecians, and iambics, each 'one entire and perfect chrysolite,' 'cunningest patterns' of excellence, such as Latium never saw before or after,—Alcæus, Sappho, and the rest then and only then having met their match" (*Journal of Philology*, No. iii.).

From expressions in some of the poems (xvi. 12, liv. 7) it is clear that several of them had been published or circulated separately before they were finally collected in the edition which has come down to us. Lines are quoted from Catullus by ancient writers which are not found in any of the poems which we possess. If these passages are correctly attributed to Catullus, it follows that he must have omitted some of his earlier poems from the collection which he made before his death. In some of the older editions (as for instance that of Döring, 1834) two poems addressed "ad Hortorum Deum," and numbered 19 and 20, have been included, of which there is no ground to believe Catullus to have been the author. The lines numbered in Döring's edition 18 are attributed to him by an ancient grammarian, though they are not included in the MSS. of his collected works. The text, as it has reached us, is in many places corrupt, and its restoration still exercises the acuteness of English and German scholars. There appears to have been one MS. of Catullus extant in France in the 9th century, from which the 62d poem, *Vesper adest, iuvenes, consurgite*, &c., was copied at that time into an anthology of Latin poems. Another MS. is known to have existed in Verona in the middle of the following century. This MS. is not again heard of till the beginning of the 14th century, when it was again discovered and read by Petrarch. It was soon after lost again. The two oldest extant MSS. are immediate copies of it. One of these, dated 1375, now belongs to the Paris Library, the other to the Bodleian (*cf.* Bährens, *Prolegomena*). The *editio princeps* appeared in 1472, and other editions appeared a few years later at Parma and Venice. "In the 16th century Catullus, like most of the chief Latin classics, was corrected and illustrated with signal zeal and success. The editions of Avancius, Gaurinus, Muretus, Statius, and Scaliger do honor to the learning of Italy and France, even in that age of erudition" (Munro, *Journal of Philology*, iii.). Nothing more was done of any importance, in

the way of emendation or commentary, till Lachmann published his edition of the text in 1829. Since that date editions have appeared by Haupt, Rossbach, Schwabe, Müller, Bährens (1876), and other German editors, and by Professor Robinson Ellis—the last accompanied by an elaborate *apparatus criticus, prolegomena*, &c. Most important contributions to the interpretation of the matter and meaning of Catullus have been made by Haupt, Schwabe, and Mr. Munro in the *Journal of Philology*. Among recent English translations may bo mentioned those of Mr. Theodore Martin, Dr. Cranstoun, and Mr. R. Ellis—the last being written in the metres of the original poems. (W. Y. S.)

CAUCASIA, a governor-generalship of the Russian empire, which extends from about 38° 40′ to 46° 40′ N. lat., and includes the whole range of the Caucasus, the vast steppes that lie to the north of the mountains between the Sea of Azoff and the Caspian, and all the Russian territory to the south. On the south side it is bounded by the Turkish empire and Persia, while on the north it is conterminous with Astrakhan and the province of the Don army. The principal division is into Cis-Caucasia or the European portion, and Trans-Caucasia or the Asiatic,—the watershed of the Caucasus having recently been adopted as the line of partition. Cis-Caucasia thus includes the government of Stavropol, the Kuban district, the Terek district, and Daghestan; while Trans-Caucasia comprises the governments of Tiflis, Baku, Elizabethpol, Erivan, and Kutai, and the circles of Sukhum, Zakatal, and the Black Sea or Chernomorsk. The total area is 172,837 square miles, and the population is estimated at 4,893,332.

CAUCASUS, a great chain of mountains, extending from the Black Sea to the Caspian. It has a general direction from W.N.W to E.S.E., which it preserves with great uniformity for so extensive a chain, having a range of nearly 700 English miles in length, from its commencement near Anapa on the Black Sea, till it sinks into a range of low hills, as it approaches Baku on the Caspian. Its width on the other hand is comparatively small, not exceeding in general about 70 or 80 miles, and even where widest not attaining more than 120 miles.

Few great mountain chains have their boundaries so clearly marked by nature. On the N. it is bounded by the vast plains and steppes of Russia, which extend completely across from the Sea of Azoff to the Caspian, and are carried up to the very foot of the mountain slopes; on the S. it is bounded at first by the Black Sea, for a distance of nearly 240 miles, and afterwards by the broad and level valley of the Rion as far as Kutaïs, about 70 miles inland. Farther eastward the valley of the Kur may be considered as forming its southern limit from the neighborhood of Tiflis to the Caspian, a distance of more than 250 miles. But between the towns of Kutaïs and Tiflis the country is more broken, the underfalls and minor ramifications of the Caucasus extending to the south so as to meet those of the mountain chain which forms the southern boundary of the valley of the Rion. The two ranges are, indeed, united at this point by a transverse range of very moderate elevation, which forms the watershed between the streams that flow into the Black Sea, and the Kur and its tributaries, which flow eastward towards the Caspian. This dividing range (commonly known as the mountains of Suram from the town of that name) may therefore be regarded as constituting a connecting link between the Caucasus and the southern range, which extends from the Black Sea in the neighborhood of Poti to that of Tiflis, and itself attains to a very considerable elevation, several of its summits having an altitude of from 9000 to 10,000 feet. But these ranges belong to the great mountain group of Armenia, and are inseparably connected with the mountains of Lazistan, and with those which extend inland to join the northern branches of the Taurus; and they cannot with any propriety be regarded as forming part of the system of the Caucasus. The transverse range above described, though forming the watershed between the two basins of the Rion and the Kur, is in itself but an inconsiderable ridge of hills, and the point where it is traversed by the high road between Kutaïs and Tiflis has an elevation of only about 3000 feet above the sea. Hence the Caucasus may properly be considered as forming an isolated chain, unconnected with any other of the great mountain systems of Asia; while those to the south of it belong in reality to the widespread ramifications of the range known to the ancients as Mount Taurus, which extends from Asia Minor through Armenia into Persia.

It is unfortunate that some modern geographers, especially Germans, have introduced into their systematic treatises the practice—first adopted by the Russian residents in the provinces south of the Caucasus—of designating these southern ranges by the appellation of the Little Caucasus, a term tending to produce confusion, and to encourage the notion of their being connected with the great northern range in a manner which is certainly not the case in any true orographical sense. In the present article the name of the Caucasus will be employed only as applied to the great mountain range which, as has been already stated, forms a continuous barrier from the shores of the Black Sea to those of the Caspian, and to which alone the appellation has been applied from the time of the Greeks to our own day.

The origin of the name is unknown. It was employed by the Greeks in very early times, and has continued in use among geographers ever since. But no general name

Map of Caucasus and Lieutenancy of Caucasia (750 miles by 650).

for the whole chain is known to the tribes that inhabit it, or to those that immediately adjoin it. Nor does it appear that any of the local or native designations of portions of the mountains known by this name are such as may reasonably be supposed to have given rise to the term.

At the present day the line of the Caucasus is generally regarded as constituting the boundary between Europe and Asia; and though it is only in quite modern times that this line of demarcation has been established among geographers, it is so much the most convenient natural limit that it can hardly fail to continue to be received as such. The scientific conclusion has, moreover, been confirmed of late years by the official sanction of the Russian Government, which has adopted the watershed or central ridge of the Caucasus as the line of separation between its European and Asiatic provinces.

In its general character and conformation the range of the Caucasus may be considered as presenting more analogy with the Pyrenees than with the Alps. Its general uniformity of direction, its comparatively small width, and its well-defined limits towards both the south and the north, are strong features of resemblance to the former, rather than to the latter, of these well-known ranges. To these it may be added that, like the Pyrenees, the ridge of the Caucasus generally preserves for long distances together a high *average* elevation, and is not broken by those deep depressions, constituting natural passes across the chain, which are of such frequent occurrence in the Alps. Another point of resemblance between the Pyrenees and the Caucasus is to be found in the fact that in both cases two of the highest summits are in some measure detached from the main range; and just as the Mont Perdu and the Maladetta both lie south of the central ridge of the Pyrenees, and are

consequently distinctly included in Spain, so Mount Elbruz and Kazbek—the two best known summits of the Caucasus—are situated decidedly north of that chain, and must therefore be geographically assigned to Europe, if the line of demarcation be drawn along the watershed of the range. Both these mountains are, in fact, of recent volcanic origin, and, geologically speaking, unconnected with the granitic masses which constitute the central axis of the chain.

It had long been known that the highest summits of the Caucasus exceeded the most lofty of the Alps in positive elevation; but until very recently no accurate measurements of them existed, and little or nothing was known of any of the individual peaks except the two already mentioned. Of these Mount Elbruz owes its celebrity not merely to the fact that it is in reality much the most lofty summit of the whole range, attaining an elevation of not less than 18,526 feet, but to the circumstance that from its partly isolated position, it is conspicuously seen, both from the Black Sea, and, on the other side, from the plains and steppes of Russia, where it is said to be distinctly visible from a distance of more than 200 miles. Kazbek, on the contrary, attracted attention from an early period, on account of its proximity to the pass of Dariel, in all ages the only frequented pass across the range of the Caucasus. Hence it was long supposed to be the second in height of the whole range, which is now found not to be the case, though it attains an elevation of 16,546 feet, or nearly 800 feet higher than Mont Blanc. But between these two giant peaks rise those of Koschtan Tau and Dych Tau (both of the names until very recently quite unknown), of which the former rises to nearly 17,100 feet, while the latter attains to 16,925 feet; these are therefore entitled to rank as the second and third summits of the Caucasus, while Kazbek can claim only the fourth place. It is, indeed, doubtful whether some of the other peaks on the great snowy range do not also exceed it in height.

For the purpose of description it may be convenient to divide the great range into three portions.

Western. 1. The first of these, comprising the western portion of the mountain chain, begins in the neighborhood of Anapa on the Black Sea, where it rises at first merely as a chain of hills of moderate height, but gradually assumes more and more of a mountain character, until the highest summits attain to an elevation of 9000 to 10,000 feet. It is not, however, till they approach the neighborhood of Elbruz that they pass the limit of perpetual snow; but the central chain, from the 41st degree of longitude eastwards, is almost constantly covered with snow, and throughout the greater part of the year exhibits a lofty range of snow-clad peaks, that can find no parallel in Europe, except in the Alps. Throughout this western portion of the Caucasus, the central chain forms a very distinct line of watershed, at no great distance from the Black Sea, but gradually receding from it, and thus leaving a wider interval between its shores and the main ridge. Even at Sukhum Kaleh, however, in longitude 41°, the central chain of the mountains is not more than 30 miles inland in a direct line as measured on the map. The whole of the intermediate space is filled up by the underfalls and subordinate ranges of mountains thrown out from the great chain, extending for the most part quite down to the sea, so as to constitute a coast line of a singularly rugged and inaccessible character. For a distance of nearly 200 miles from Novo Rossisk to Sukhum Kaleh there is nothing like a harbor, while the dense forests with which the mountains are still covered contribute to render the interior impassable.

From the proximity of the central ridge to the sea, in this western portion of the Caucasus, it naturally follows that no rivers of any importance are to be found on the southern slope of the mountains, though it is furrowed by numerous mountain torrents, which add to the impracticable character of this part of the country. On the northern side, on the contrary, the mountains slope more gradually towards the plains of Russia, and here several considerable streams are found, all of which pour their waters into the Kuban, which itself takes its rise in the glaciers of Elbruz. Among the most considerable of these streams may be mentioned the Urup, the Laba, and the Bjelaia.

Central. 2. The great central mass of the Caucasus, extending from the neighborhood of Elbruz to that of Kazbek, or from the source of the Kuban to the pass of Dariel, a distance of about 130 miles in a direct line, is at once the most important and interesting part of the whole chain, and is that which has of late years been the most fully explored. It is here that are found all the most lofty summits of the whole range. Besides the four above mentioned, there are at least five other peaks in this part of the chain that attain to not less than 15,000 feet, viz., Gumaran Khokh and Adai Khokh, which, according to the Russian survey, measure respectively 15,672 and 15,244 feet in height, while three others, not found in the survey, are estimated by the practised English mountaineers as follows:—Tungzorun, 15,000 feet; Tau Tötönal or Tetnuld, 15,500; and Uschba (one of the most remarkable mountains in the whole of the Caucasus), not less than 16,500 feet. But it is not merely that isolated summits attain to these great altitudes, but the whole line of the watershed or central ridge, from a point south of Elbruz to the group of Adai Khokh, on the west of the Ardon valley, is an uninterrupted line, which nowhere sinks below 10,000 feet, and is traversed only by glacier passes, some of them extremely rugged and difficult, others comparatively easy, but still presenting an extent of snow and ice equal to that of the well-known pass of St. Theodule in the Alps. There is here, therefore, an unbroken mass of glacier and perpetual snow of nearly 100 miles in length, or as far as from Mont Blanc to the St. Gotthard. It nowhere, however, attains to any great width, nor do any of the glaciers that descend its flanks equal in extent the largest of those in the Alps. Eastward of the Adai Khokh group the ridge is intersected by the upper valley of the Ardon, but the range of snowy peaks is continued after this interruption by the lofty summits of Tau Tepli and Gumaran Khokh on to Kazbek, where the whole chain is deeply cut through by the gorge of Dariel, and the corresponding depression of the pass between Kobi and Mleti. But while the series of peaks just referred to may be considered as the continuation of the true axis of the chain, the watershed, which has for so long a space run nearly from W.N.W. to E.S.E., bends suddenly due south, and sinks to the comparatively low gap of the Mamisson Pass, which is about 9400 feet in height, and entirely free from glacier. After a few miles it resumes its former direction, but without recovering its elevation or grandeur, the peaks of this part of the chain rising only to 11,000 and 12,000 feet, while the passes which traverse it range from about 9000 feet to less than 8000 feet, the elevation of the Krestowaja Gora, where the watershed is traversed by the high road from Vladikafkaz to Tiflis. In this part of the chain, therefore, we have a watershed of comparatively small altitude, with a parallel range to the north of it of much more lofty mountains. The central mass, on the contrary, from Elbruz to Adai Khokh, presents a lofty medial range of granitic structure, on both sides of which, but especially on the south, rise secondary chains of limestone mountains, preserving in a general way parallel courses with that of the main chain. Hence the upper valleys are troughs, bounded on both sides by lofty mountains, through which the upper waters of the streams that take their rise in the glaciers of the central chain are compelled to flow, until they make their escape by deep gorges cut through the lateral ranges. The most important of these parallel trough-like valleys is the upper valley of the Ingur, forming the district known as Suanetia, which is between 40 and 50 miles in length, and will thus bear comparison with the two great valleys of similar structure in the Alps, the Valais and the Valteline.

It may naturally be expected that so great a mass of glaciers and perpetual snow should send forth a number of considerable streams, and in fact all the principal rivers of the Caucasus have their sources in the district now under consideration. Commencing with those on the south side of the chain, which flow towards the Black Sea, we find—(1.) the Kodor, a considerable stream, which enters the sea about 12 miles south of Sukhum Kaleh; (2.) the Ingur, a much more important river, which rises in the great glaciers of the Central Caucasus, near a place called Jibiani, and, after flowing for nearly 50 miles in a course parallel to the great chain (as already described), and receiving in its course the outflows of numerous other glaciers, turns abruptly to the south-west, and after pursuing that direction for above 60 miles, discharges its waters into the Black Sea at the little town of Anaklia; (3.) the Zenesquali, which rises in the mountains almost immediately east of the sources of the Ingur, and in like manner flows at first nearly due west, then turns towards the south-west

and south, and joins the Rion about 30 miles above its mouth at Poti; and (4.) the Rion itself, the most important of all the Caucasian rivers that flow into the Black Sea. The Rion has a very circuitous course, having its source at the foot of the mountain, called Pasi Mta, very near the sources of the Zenesquali, and flowing at first in a south-easterly direction, past the little town of Gebi, about 8 miles below which it receives an affluent from the Mamisson Pass towards the north-east; it then turns about south-west till it has passed the village of Oni, after which it flows for a considerable distance (above 30 miles) nearly due west, through one of the parallel valleys above described, and then again turns due south until it has passed under the walls of Kutaïs, the capital of Imeritia. A few miles below that town it emerges from the hills into the broad and level valley that separates the underfalls of the Caucasus from the ranges to the south. It here receives a tributary called the Quirilha, which brings down the waters from the Suram range (the transverse ridge that unites the Caucasus with the mountains of Armenia), and then again turning to the west, pursues a winding course, but retaining the same general direction, till it enters the Black Sea at Poti, about 50 miles in a direct line from its junction with the Quirilha. The Rion is in the lower part of its course a deep and rapid stream, and is navigable for steamers as high as Orpiri, where it receives the Zenesquali, but unfortunately a shallow bar at its mouth prevents the entrance of large steamers from the sea. It is the river so well known in ancient times under the name of *Phasis*, and connected by Greek legends with Medea and the voyage of the Argonauts.

All the streams that take their rise on the southern side of the Central Caucasus, east of the Mamisson Pass, are tributaries of the Kur, and discharge their waters into that river, which itself, however, does not derive its origin from the Caucasus, but flows from the mountains of Armenia, and receives its first Caucasian affluent, the Lachwa, at the town of Gori. The most important of these tributaries is the Aragwa, which has a course almost due north and south, from its source above Mleti to its junction with the Kur at Mscheti. It is up the valley of this river that is carried the highroad from Tiflis to Vladikafkaz, which turns off at Mleti to cross the pass of the Krestowaja Gora, and from the natural facilities afforded by this line of route, it has been from the earliest ages frequented for the same purpose.

The rivers that flow from the Central Caucasus northwards have much longer courses than those on the south side, both from the more gentle slope of the mountains in that direction, and from the extent of the steppes beyond, through which they have afterwards to find their way to the sea. By far the most important of these rivers are the Kuban and the Terek, which receive as tributaries all the minor streams. Of these the Kuban takes its rise in a glacier at the foot of Mount Elbruz, immediately below the watershed of the main chain. It flows at first in a northerly direction, and preserves this course till it has altogether quitted the mountains, and entered the steppe of the Nogai Tartars, when it trends first towards the north-west and then abruptly towards the west, which general direction it pursues till it enters the Sea of Azoff by one mouth and the Black Sea by another. Its whole course is estimated at above 400 miles. During the latter part of its course, from east to west, it receives the waters of all the smaller streams that descend the northern slopes of the Western Caucasus. The Terek has its source in the central chain, where it issues from a small glacier at the foot of Zilga Khokh, its head waters being separated from those of the Ardon only by a pass of moderate elevation. Its upper valley, like so many others, has a direction parallel to the main range, so that it is compelled to flow towards the south-east as far as the village of Kobi, where it turns to the north-east, which direction it holds to the village of Kazbek, and from thence pursues a course almost due north, traversing the famous ravine or gorge of Dariel, until it finally issues from the mountains at Vladikafkaz. From thence it takes a north-westerly direction, which it follows for a distance of more than 70 miles, receiving on its way numerous affluents, the last of which is the Malka, after its junction with which, near the town of Jekaterinograd, it turns abruptly to the east and pursues its course in that direction through a tract of steppes and marshes for 200 miles to its mouth in the Caspian Sea. All the mountain streams that flow northwards from the great glaciers of the central chain, between the Kuban and the Terek, discharge their waters into the latter river. The most important of these are (proceeding from west to east) the Malka, the Baksan, the Tchegen, the Tcherek, the Uruch, and the Ardon,—all of them large and rapid streams, which flow through deep valleys in a generally northerly direction, until they emerge from the mountains, and successively unite their waters with those of the Terek. The Kuma alone pursues an independent course through the steppes to the north of the Terek, but this stream does not rise in the central chain of the Caucasus, but has its sources in the detached and outlying group of mountains near Pjätigorsk—the highest summit of which, the Beschtau, does not attain to a height of more than 4600 feet. Hence its waters, not being fed by perennial snows, are absorbed in the sands of the steppe before they reach the Caspian.

Eastern.

3. The Eastern Caucasus may be considered as comprising the whole of the main chain from the Pass of Dariel to the Caspian, together with its various ramifications, which are considerably more extensive than in the other portions of the range. It is at once the most complicated and the least known part of the whole, the highest portions not having yet been explored by any of those adventurous travellers who have added so much to our knowledge of the Central Caucasus. But it is certain that, while none of the summits in this part of the range equal those further west—the highest of them not attaining to 15,000 feet—there is nevertheless a long succession of snowy peaks, rising to a height of from 10,000 to 14,000 feet, which extends from the Pass of Dariel as far as Baba Dagh, in 48° E. long., the last of these lofty summits proceeding eastwards towards the Caspian. At the same time there is no great connected mass of glacier similar to that found in the Central Caucasus; indeed no considerable glaciers exist in this part of the range at all. The watershed is, however, continued at a high elevation (after passing the depression traversed by the pass of the Krestowaja Gora) as far as Mount Shebulos, from whence it sends out a considerable branch towards the north-east, known as the Andi Mountains, from the village and valley of that name, which forms the northern boundary of Daghestan, and separates it from Tschetchnia, or the country of the Tchetchens. The main range retains its general direction with little variation, from about north-west to south-east, and still presents many peaks of considerable elevation, the highest summits being Sari Dagh at the head of the River Samur, which attains to 12,000 feet, and Schach Dagh (called also Bazardjusi) which rises to 13,950 feet. The last of these lofty peaks is Baba Dagh (11,934 feet), from which the main chain descends gradually as it approaches the Caspian, and sinks into hills of moderate elevation before reaching the shores of that sea at Baku. The Peninsula of Apsheron, which here forms a promontory projecting into the Caspian, may be considered as forming the last faint prolongation of the Caucasian chain.

But while the axis forming the main watershed of the range thus preserves a pretty regular course, it throws off towards the north and north-east a number of offshoots, filling up the greater part of the space between the main range and the Caspian. It is here that is formed the remarkable country known as Daghestan, which is in fact a great mountain plateau, sloping gently towards the Caspian at an elevation of not less than 7000 to 8000 feet, furrowed by deep valleys or ravines, cut by the streams that descend from the central range. It was this peculiar conformation of the tract in question that so long enabled the mountain tribes of this part of the Caucasus to defy the arms of Russia. Gunib, the last stronghold of Schamyl, is a mountain that rises to 7742 feet, with precipitous sides; other summits in the same region attain to a still greater elevation,—Intscharo to 9469 feet, Schumi Dagh to 9733 feet, and Dschufa Dagh to 9900 feet. At the point where this fan-shaped plateau joins on to the main range is found a cluster of peaks, all of them rising above the level of perpetual snow; while Alachun Dagh, an offshoot of the main range, between Sari Dagh and Dschufa Dagh is said to attain to 12,100.

Of the streams that traverse the elevated plateau of Daghestan, four are known by the common name of Koissu, but are distinguished as the Andi Koissu, the Avari Koissu, the Kara Koissu, and the Kazikumi Koissu. After flowing through extremely deep and narrow valleys, in

many places mere gorges, they all unite their waters before they quit the mountains, and under the name of Sulak flow into the Caspian Sea about 90 miles north of Derbend. The only other river of Daghestan that deserves notice is the Samur, which takes its rise at the foot of Sari Dagh, and after sweeping round almost in a semicircle enters the Caspian a few miles south of Derbend. The most important of the streams that rise in the main chain east of the valley of the Terek, and flow northwards into that river, is the Argun. Those which traverse the country of the Tchetchens are of little consequence.

The secondary ranges on the south side of the Eastern Caucasus are of comparatively little interest or importance, and none of them attain to any considerable elevation. Two of these subordinate ranges, however, which branch off from the main chain but a little east of the Terek, constitute the limits which separate the valley of the Aragwa from that of the Jora, and the latter again from that of the Alazun. Both these rivers are among the most considerable of the affluents of the Kur, and the valleys through which they flow are two of the most fertile districts of Georgia. The valley of the Alazun especially, constituting the region known as Kakhetia, is celebrated for the abundance and excellence of its wines.

The preceding account of the physical structure of the Caucasus is derived from the latest works on the subject, but it must be admitted that our knowledge of this important chain is still far from possessing the completeness and accuracy which the geographer would desire. The Russian survey has been found by recent travellers to be often defective and erroneous in regard to the most interesting part of the chain—the range of glaciers and snow-clad peaks in the Central Caucasus—and will require much correction before it can compare with the maps that we now possess of the Alps and Pyrenees. Much confusion still exists with regard to the nomenclature of the different peaks, and this is aggravated by the different names given to them by the different races which inhabit the surrounding valleys. Thus Elbruz, as it is called by the Russians, is known to the neighboring mountaineers only as Minghi Tau, and the mountain called by the Russians Kazbek, from the village of that name, is known to the Georgians, from whose plains it is a conspicuous object, as Mkinwari.

Passes.

The scarcity of passes across the great chain of the Caucasus has been already adverted to. There exists in fact but one such natural pass, sufficiently practicable to afford direct communication between the countries to the north and south of the range, and this has in consequence been frequented in all ages. This is the line followed by the present highroad constructed by the Russians since their occupation of the country, from Vladikafkaz at the northern foot of the chain to Tiflis on the south. This route ascends the valley of the Terek from Vladikafkaz as far as Kobi (a distance of about 40 miles), where it quits the valley, which turns abruptly to the west, and is carried over the lofty crest or ridge known as the Krestowaja Gora (Mountain of the Cross), an elevation of nearly 8000 feet, from whence it descends to Mleti in the valley of the Aragwa, and follows the course of that stream nearly to Tiflis. The proper designation of this pass would undoubtedly be that of the actual passage over the summit level of the range, the Krestowaja Gora, but it is commonly known as the Pass of Dariel, from the remarkable gorge of that name through which it is carried between Lars and Kazbek,—a defile of the grandest and most impressive character, which is considered by recent travellers to be equal, if not superior, in point of scenery, to the finest defiles of the Alps. Previous to the formation of the present road, this deep and narrow gorge—affording only just passage for the torrent, while the mountains rise on each side abruptly to a height of at least 5000 feet above the level of the Terek—must have presented almost insuperable difficulties to the passage of traffic along this route. Hence it was known and celebrated from the earliest times, and is mentioned under the name of the Caucasian Gates (*Portæ Caucasiæ*) by Pliny (*Hist. Nat.*, vi. 2, § 30), who describes the pass as actually closed by a fortified gate, a measure which might have been easily adopted.

The only other line of communication in general use between the northern and southern regions bordering on the Caucasus, is that which skirts the eastern extremity of the range, where its offshoots descend to the shores of the Caspian. This passage presents almost no natural difficulties, the mountains for the most part not descending nearly to the sea, the shores of which are everywhere flat and low. In one place only does a range of hills, branching off from the more lofty masses of the chain, descend to within a short distance of the Caspian, so as to admit of the interval being closed by a fortified wall, which was in former times carried up the heights to the west for a considerable distance. The site is still guarded by a small fort and the town of Derbend, but the adjoining hills are not of a precipitous or impracticable character, so that the obstacles presented by this pass are merely of a military kind, and there is no difficulty in the construction of a road or railroad along this line, which has been, indeed, in all ages the natural highway by which nations north of the Caucasus have entered Georgia and Persia. Thus we are told by Herodotus (i. 104) that it was by this route that the Scythians penetrated into Media in the 7th century B.C.

On the other hand the western portion of the Caucasus, where it abuts upon the Black Sea, affords no natural passage along the coast, the underfalls of the chain descending so steeply to the sea, and being so rugged and broken, as well as densely covered with forest, as to preclude the existence of any practicable route on this side. It is certain, indeed, that Mithridates the Great, when hard pressed by Pompey, succeeded in forcing his way with an army from Colchis (Mingrelia) to the Cimmerian Bosporus, along this line of coast, but the same Greek writers who recorded this wonderful march, dwelt largely upon the difficulties that he encountered. In modern times the Russians, during their long contest with the Circassians, established a continuous system of forts or small fortified posts along the whole of this line of coast, from Anapa to Sukhum Kaleh; but these have now been almost all abandoned, and the communications are maintained exclusively by sea.

Climate.

Climate and Natural Productions.—The chain of the Caucasus is situated between 45° and 40° 30′ N. lat. It therefore corresponds in general position rather with the Apennines and the Pyrenees than with the Alps. But from its character as a great barrier extending across from sea to sea, it constitutes the limit between two climates which differ very widely from one another. The great steppes and plains of Russia on the north side of the chain are open to the cold winds of the north, and partake to a great extent of the severity of a Russian winter; while the valleys of Imeritia and Georgia on the southern side are sheltered by the vast mountain wall to the north of them, and thence enjoy a climate more in accordance with their southerly latitude. Thus Tiflis, though situated at a height of about 1500 feet above the sea, has a mean temperature of 55°, and Kutaïs of more than 58°. The average winter temperature of Tiflis does not fall below 36°, and that of Kutaïs is not less than 42·5°.

But a still more remarkable contrast is that presented by the varying amount of rainfall in the different portions of the chain, according to their distance from the Black Sea. While the rainfall at Tiflis does not exceed 20 inches, it amounts to more than 57 inches at Kutaïs, and not less than 63 inches at Redut Kaleh on the sea shore near Poti.

Vegetation and scenery.

The effects of these great variations in the meteorological conditions of the countries adjoining the Caucasus are naturally striking and strongly marked. Whatever be the contrasts presented by the two sides of the Alps, they are far more remarkable in the Caucasus. This is especially the case with the south-western valleys and slopes, where a great amount of rain is combined with a warm temperature. Hence all this part of the mountain country is characterized by a luxuriance of vegetation to which no parallel can be found in Europe. Magnificent forests clothe the mountain sides and extend down quite to the sea; while the rich valley, or rather basin, of the Rion equals any part of Italy in fertility, and is capable of producing all kinds of crops that flourish in the Italian plains. But as the traveller passes inland towards Tiflis, he is struck by the change that takes place after crossing the comparatively trifling range of the Suram Mountains. Arid upland plains and parched hill-sides take the place of the rich verdure and luxuriant forests of Imeritia and Mingrelia. A similar change is observed in the higher regions of the mountains

on crossing the Mamisson Pass, which separates the head waters of the Ardon from those of the Rion. While the valleys west of this—especially that of the upper Ingar, or Suanetia—are covered with the richest vegetation, those on the other side, the valleys of the Ardon and Terek, are almost wholly bare of trees, and present only mountain slopes covered with grass, where they are not sheets of bare rock. The extensive pine forests, which constitute so important a feature in the scenery of the Alps, are almost wholly wanting in the Caucasus, or at least of only partial and occasional occurrence; and the description given by Mr. Freshfield of the scenery of the Terek above Kazbek, that it presents "treeless valleys, bold rocks, slopes of forbidding steepness (even to eyes accustomed to those of the Alps), and stone-built villages, scarcely distinguishable from the neighboring crags," will apply with little variation to all the valleys that run northward from the central chain. But if the general scenery of these valleys be dull and uninteresting, there is a marked exception in the deep gorges by which in most cases their waters make their escape through the northern lateral ridge. These defiles are pronounced by competent judges to be far superior in grandeur to anything of the kind to be found in the Alps; that of Dariel has been already described, but the less known gorges of the Tcherek and the Uruch are considered by recent travellers to be still more striking and marvellous. At the same time the snowy ridges and peaks of the central chain are said to surpass those of the highest portions of the Alps in boldness and picturesqueness of outline, as well as in steepness and apparent inaccessibility, as much as they do in absolute elevation. On the whole it may be safely asserted that the Caucasus presents attractions to the traveller and the tourist beyond those of any other mountain chain within such comparatively easy reach, and that it will year by year become better known and more frequently visited. The vegetation of the Caucasus is in general not materially different from that of the mountain chains of Central Europe. The extensive forests that clothe its flanks are composed entirely of the ordinary European trees, among which the oak, the beech, the elm, and the alder are the most prevalent, but a peculiar character is imparted to them by the dense undergrowth of rhododendrons, azaleas, box-trees, and laurels, as well as by the huge climbing masses of ivy, clematis, and wild vine, which attain to a height and size wholly unlike anything to be seen in Western Europe. Fruit trees of various kinds abound on the lower slopes of the hills, where the plum, the peach, the apple, and the pear are found wild, as well as the walnut, which is extensively grown in the cultivated regions, where it combines with the plane and the lime tree to form one of the chief ornaments of the landscape. The wild animals found in the Caucasus are for the most part the same with those of the mountainous regions of Central Europe, while others point to a transition toward the zoological character of Asia. Thus while it has the bear, the wolf, the wild boar, the lynx, in common with the Alps, the jackal is not unfrequent on its southern side, the hyena is also found, and leopards are occasionally killed. Tigers do not appear to be ever found in the Caucasus proper, though they are killed from time to time in the districts of Lenkoran on the Caspian, south of the mouth of the Kur. The ibex or bouquetin, as well as the chamois, abounds among the higher summits of the range, and with them is found the wild goat (*Capra Ægagrus*), and a species of moufflon or wild sheep. These vast forests of the western ranges still afford shelter to the aurochs or European bison, which now exists here alone in a truly wild state. It may be mentioned also that the southern slopes of the Caucasus are the native country of the pheasant, which derives its name, as well as its origin, from the River Phasis.

Zoology.

Geology.—The geology of the Caucasus is still but imperfectly known, though the long-continued labors of Dr. Abich have thrown much light on the subject, and enabled us to trace at all events its general outlines. Throughout the most lofty part of the chain, from beyond Elbruz on the west to Kazbek on the east, the central ridge is composed of rocks of a granitic character; in great part indeed of pure granite. Immediately adjoining this granitic axis are found metamorphic rocks of the usual character,—mica-schists, talc-schists, &c.,—and beyond these, again, clay-slates and schists of uncertain age. The great limestone masses that form the secondary chains on each side of the central range (which rise to a height of 10,000 to 12,000 feet) are considered by Dr. Abich to belong to the Jurassic formation, while the flanks and underfalls of the mountains on both sides are composed of Cretaceous strata, and these are again succeeded by Tertiary marls and sandstones, extending around the base of the chains, and forming its lowest declivities. This succession of the strata may be observed with great regularity and distinctness on the north side of the range, and is found on the southern side also, though more disturbed and irregular.

Geology.

The principal disturbance on the north side is caused by the protrusion of the two great masses of Elbruz and Kazbek,—both of them of decidedly volcanic origin, and (geologically speaking) of comparatively recent date. They are composed principally of trachyte, but send down also vast streams of basaltic lavas, which form a striking feature in the scenery of the valleys beneath them.

The regularity of structure which may be considered as pervading the whole of this central mass of the Caucasus disappears almost entirely as one passes eastward of the Kazbek. Though the axis of elevation still preserves very much the same general direction from north-west to south-east, the fundamental granitic ridge is altogether wanting; and even the highest summits of the range are composed of calcareous slates and sandstones, which were supposed by earlier geologists to belong to the Palæozoic period, but are assigned by Dr. Abich to a much later age. Even the lofty summits of Schach Dagh (the giant of the Eastern Caucasus) are composed of a dolomitic limestone, which appears to belong to the Neocomian era. To the same period may probably be referred the greater part of the limestones and shales which constitute the singular plateaux of Daghestan already described. But from the great scarcity of organic remains the determination of their age is a question of much difficulty.

The mineral riches of the Caucasus are still in great measure unexplored. Iron and copper ores are known to exist in abundance; and coal is found in the valley of the Kuban, as well as in the upper valley of the Rion. But as it belongs to the Jurassic and not to the true Carboniferous age, it is doubtful to what extent it may prove productive. The remarkable springs of naphtha near Baku, which have long been known as an object of interest and a sanctuary of the fire worshippers, are now turned to account for the manufacture of petroleum on a large scale.

Minerals.

It has already been observed that glaciers exist on a great scale in the Caucasus, but they are confined to a higher elevation than in the Alps. Notwithstanding the vast mass of glacier and perpetual snow which exists in the Central Caucasus, none of the lateral glaciers descend below 7000 feet on the southern side of the range; while the lowest point reached by any of those on the northern side is not below 5700 feet. But, as in the case of all the principal mountain chains of Europe, there is abundant evidence of the glaciers having once been much more extensive and having descended to a much lower level in the valleys than they at present occupy. At the same time it may be observed that there is a total absence in the Caucasus of those lakes which form so conspicuous a feature in the country on both sides of the Alps, and which are supposed by many geologists to be connected with glacial action.

Glaciers.

Ethnology.—The ethnology of the Caucasus is still far from thoroughly known. From the earliest times it has been noted as the region where the greatest diversity of tribes and languages existed within the smallest space (Herodot., i. 203). Pliny tells us that no less than 130 different interpreters were required by the Greek traders at Dioscurias, the port where all the tribes of the neighboring mountains, as well as the more remote nations of the interior used to congregate, while others raised the number to 300 (Plin., *H. N.*, vi. 5, § 15). This is of course a great exaggeration, but it proves the fact that there existed then, as at the present day, an extraordinary number of races speaking different and in many cases wholly dissimilar dialects. The researches of modern scholars have thrown considerable light upon the subject, and enabled us at least to classify these different tribes in certain groups or families.

Ethnology.

I. The GEORGIAN, or, as they are sometimes termed by mod-

ern writers, the Kartalinian tribes, from their speaking a language called by themselves Kartli. These are in all probability the descendants of the people called by Greek writers Iberians, who were in possession of the country south of the Caucasus at the earliest period of which we have any historical account. The name of Georgian is comparatively modern, but its origin is unknown. To this family belong:—

1. The *Grusians* or *Georgians* proper, who inhabit the whole country east of the Suram mountains down to the lowland steppes of the River Kur. They extend also up the valley of the Aragwa to the very foot of the main range, and occupy the extensive valleys of Kakhetia and the slopes still further east.

2. The *Imeritians*, who extend from the watershed of the Suram mountains westward, including the valleys of the Rion or Phasis, and its tributary the Quirilha. Their western limit is the Zenesquali, which separates them from the Mingrelians.

3. The *Mingrelians*, who extend from the Zenesquali on the east to the Ingur and the Black Sea on the west, while the lower course of the Rion may be considered as constituting their limit on the south. Both these nations, though long politically independent of the Georgians, are undoubtedly of cognate race, and speak kindred dialects.

4. The *Gurians*, a small people occupying the strip of land between the Rion and the mountains on the south, which form the frontier between Russia and Turkey. Their language shows them to be of Georgian race, but they are closely connected with the Laz or Lazi, a tribe that inhabits the adjoining mountains within the Turkish territory, where they were already settled under the name of Lazi in the time of Strabo.

5. The *Suanians* or *Suanetians*, who occupy the upper valley of the Ingur, above the confines of Mingrelia. They are a wild and semi-barbarous mountain tribe, who have only lately been brought under subjection to the Russians, and are still left in a condition of semi-independence. But from the natural beauty of their country, and its proximity to the highest ranges of the Caucasus, they have attracted much attention from recent travellers. They are considered to belong to the same race with their neighbors the Georgians and Mingrelians; though they have existed from a very remote period as a separate tribe, being already mentioned under the name of Suanes or Suani by Strabo and Pliny, in whose time they were one of the most powerful nations in the Caucasus. Their language is a cognate dialect with the Georgian and Mingrelian, but presents very material differences.

II. The second principal group of the Caucasian mountaineers, and that which has of late years attracted the most attention of any, is that of the Teherkesses or Circassians (a name of Russian origin), who until within a few years past constituted the whole population of the Western Caucasus on both sides of the mountain chain. They were subdivided into numerous tribes, but may be considered as belonging to three principal divisions.

1. The *Circassians* proper, who designate themselves by the name of Adighè, and who formerly occupied the whole coast of the Black Sea from the neighborhood of Anapa to Pitzunta, as well as the northern slopes of the mountains towards the Kuban. It was this people who so long fixed the attention of all Europe by their long continued struggles against the Russian power, which, however, ended in their complete subjugation in 1864. But that event was followed by a wholesale emigration of the Circassians, who quitted their country to the number of 400,000 (or, according to other accounts, nearly 500,000) souls, and settled in the different provinces of the Turkish empire. The effect of this emigration, without a precedent in modern history, has been to leave the whole country between the Caucasus and the Black Sea, for a distance of nearly 200 miles, almost absolutely without inhabitants, except the small settlements of the Russians at Novo Rossisk. Tuapse, and Sukhum Kaleh.

2. The *Abkhasians*, a tribe occupying the coast eastward from Pitzunta to the confines of Mingrelia. They are undoubtedly a kindred race with the Circassians, though described as in all respects inferior to them. Their numbers have also been thinned to a great extent by emigration, since their last abortive attempt at insurrection in 1864, so that the interior of the country formerly occupied by them is now almost uninhabited.

3. The *Kabardans*, who hold the country north of the main chain of the Caucasus, from the valley of the Kuban to that of the Terek, and extending quite down to the steppes on the north. Though resembling the other Circassians in language and manners, and like them professing the Mahometan religion, they never offered any very serious opposition to the Russian arms, and have long been peaceful subjects of the Russian empire.

III. Adjoining the Circassian races on the east, and occupying the very centre of the Caucasian range, are the Ossetes, an isolated race, differing both in language and in customs from their neighbors on all sides. Their country is traversed by the great highroad across the Caucasus, which has brought them especially under the observation of travellers, and many conjectures have been formed with regard to their original and ethnic affinities. It is, however, conclusively proved that they are an Aryan race, and their language has considerable affinity with the Medo-Persian branch of that family. Many resemblances have been traced in their manners and customs with those of the Germans, and some writers have supposed them to be a remnant of the Goths, while others regard them as the representatives of the Alani, who played so conspicuous a part towards the close of the Roman empire; but there is no real foundation for either theory, and the evidence of their language seems decisive, that, though belonging to the great Aryan family, they have no special affinity with the Germanic or Teutonic branch of it. They call themselves Iron, the name Ossetes being that applied to them by the Georgians. Some of them are Mahometans, while the greater part profess Christianity, but retain many of their pagan rites and customs, and are in fact still more than half pagans. They hold the upper valley of the Terek, down to the pass of Dariel, as well as the mountain tract to the west of it, as far as the head-waters of the Ardon and the Mamissen Pass.

IV. The Tchetchens, a people who inhabit the northern slopes of the Eastern Caucasus, extending down to the valley of the Terek. They adjoin the Kabardans and Ossetes on the west, and the Lesghians towards the south, but do not extend up to the highest recesses of the range. They profess the Mahometan religion, and speak a language distinct from all others, of which it is said that there are more than twenty dialects, though their whole population is not estimated at more than 150,000 souls.

V. The Lesghians, a name under which are generally comprised all the inhabitants of the Eastern Caucasus, though consisting of many petty tribes, speaking dialects more or less different, and in some cases, it is said, radically distinct languages. Their chief seat is in the high mountain region extending eastwards from Kazbek, and including all the highest summits of the range as far as Baba Dagh; but they occupy also the southern declivities of the mountains towards the valleys of the Alazun and the Kur, as well as the rugged mountain tract of Daghestan towards the north-east between the central range and the Caspian. It was these wild mountain tribes that so long offered an unavailing resistance to the Russian arms; but it is said that the only real bond of union among them was their devoted attachment to Islamism, and that no connection of race unites them together. Their ethnic relations are certainly still very obscure and imperfectly known, and it is supposed by some ethnologists that among them may be found remnants of a number of different nations and races. But it is more probable that when they come to be better known, they will be found to have for the most part a common origin, notwithstanding the remarkable diversity of dialects spoken among them. A few very small tribes, such as the Udi and the Kubatschi, seem, however, to form an exception, and to belong to essentially distinct races. The most cultivated, as well as the most powerful of the tribes of the Daghestan, is that of the Avares or Avari, who adjoin the Tchetchens on the north, and extend from thence to the central chain. They are the only Lesghian tribe who profess a written language, for which they make use of the Arabic characters.

It is unnecessary here to speak of the numerous Turco-Tartar tribes that inhabit the borders of Daghestan, between the mountains and the Caspian, as well as of the Cossacks of the Kuban and the Terek,—all these tribes, whether nomad or settled, being confined almost wholly to the plains and steppes that surround the mountains, and not forming any considerable ingredient in the population of the Caucasus itself.

The estimates of the numbers of these mountain tribes are very various, and the Russian official reports do not distinguish the population of the mountains from that of the adjoining districts included in the same governments. But it seems probable that, since the great emigration of the Circassian tribes, the whole population of the Caucasus does not exceed a million of souls.

History.

History.—The Caucasus was known to the Greeks from a very early period. Without referring to the fable of the Argonauts, it is certain that Greek navigators penetrated in very early times into the remotest parts of the Euxine, and carried on trade with the native population of Colchis, the name which they gave to the rich country at the mouth of the Phasis or Rion. Here, at a somewhat later date, they founded the flourishing settlement of Dioscurias, the name of which is still retained in Cape Iskuria, a few miles south of Sukhum Kaleh. Hence their attention could not fail to be attracted by the vast snowy range of the Caucasus, and we find its name already familiar to Æschylus, who speaks of its "star-neighboring summits," and terms it the most lofty of mountains (*Prom. Vinct.*, 720). The same statement is repeated by Herodotus, who had a clear conception of its geographical position, as extending from the Caspian to the Euxine, and forming in this direction the limit of the Persian empire (i. 203, iv. 12). The mountain tribes still retained their independence under the successors of Alexander, and it does not appear that any considerable advance was made in the knowledge of these countries till the time of the great Mithridates, who subdued all the na-

tions up to the very foot of the mountains, and even succeeded in making his way with an army along the coast of the Black Sea from Colchis to the Cimmerian Bosporus. His wars in these regions were described by several Greek historians, and Strabo, writing from these materials, shows an acquaintance both with the Caucasus and the adjoining countries, remarkable for its clearness and accuracy. Pompey had declined to pursue Mithridates on his adventurous march, and no Roman general ever passed the Caucasus. Under the Roman Empire, however, the frequent relations maintained with the Armenians made the Romans familiar with the names of the Iborians and Albanians on the south side of the chain, while their connection with the tributary kings of Bosporus opened out to them communications with the steppe country to the north. Neither Pliny nor Ptolemy, however, add much that is material to the knowledge already possessed by Strabo.

In modern times the chief interest in these regions has arisen from the long-continued struggle of these mountain tribes against Russia, and the energy with which the Circassians and Lesghians especially maintained the contest for independence against all the power of that mighty empire. From the time of the annexation of Georgia, at the commencement of the present century, it became a great object with the Russians to obtain possession of the intermediate mountain country; but it was not till the treaty of Adrianople in 1829, by which the Turks ceded to the Russian Empire their nominal sovereignty over the Caucasian tribes, that their efforts assumed a systematic form. From that period till the year 1859, the contest was maintained almost without interruption, and with many alternations of success. The Russians had to encounter immense difficulties, to traverse dangerous passes, to burn down forests, and to sacrifice immense numbers of lives, in order to gain small portions of territory. The war was for a long time chiefly maintained by the Circassians under their native chiefs; and no sooner did their exertions relax in consequence of the exhaustion caused by a long continued contest, than a new enemy to Russia arose on the shores of the Caspian. Schamyl, the most devoted follower of the heroic Kasi Mullah, placed himself, on the death of that chief, at the head of the Lesghians. At once the prophet and the warrior of his race, by his enthusiasm and bravery he soon gained the confidence of the tribes, and prevailed upon them to follow a united and determined plan of action under his authority. His influence was daily increased, not only by the victories which he gained, but by the successful manner in which he frequently delivered himself and his followers from the most imminent dangers. His own escape from the rocky fortress of Achulko, where he was completely invested by the forces of General Grabbe, appeared both to his own countrymen and the enemy almost miraculous. The great exertions which were made by the Russians in the following years to reduce the tribes yet unsubdued, and those which had risen against their authority, were completely defeated by his indefatigable activity and bravery. In the year 1842, when the mountain tribes were filled with the greatest alarm in consequence of the advance of General Grabbe, that formidable enemy was completely defeated by Schamyl in the woods of Itchkeri. The Circassians, after again renewing their attacks upon the Russians in the neighborhood of the Black Sea, were ultimately driven back to their fastnesses; but Schamyl still continued to maintain his position on the Caspian, and inflicted severe losses upon the armies of the enemy. The Russians were evidently at a loss how to proceed against a chief who had baffled all their schemes, who had been a prisoner in their hands, whose rocky home had been frequently in their possession, who had incurred the most imminent dangers and been driven to the greatest emergencies, and who was still opposing them with unconquerable resolution, watching the progress of their troops, cutting off their supplies, and harassing them by constant attacks. Various Russian generals were sent in succession to the Caucasus, new plans of action, defensive and offensive, were tried, but without effecting any permanent conquest.

The Crimean War (1854–1856) produced a temporary suspension of the efforts of the Russians in the Caucasus; but after its termination hostilities were resumed with increased vigor, both on the side of Circassia and in Daghestan. In the western districts, indeed, the contest never assumed any important character, and was carried on by a series of petty expeditions against the Circassian and Abkhasian tribes, who never acted in concert, and were compelled to submission one after the other. But it was not till the year 1864 that the last of these wild tribes was finally subdued, and the complete subjugation of the Circassians was secured by the emigration of the whole people in the manner already noticed. The contest in Daghestan, though it had assumed for a time more formidable dimensions, had been already brought to a close. All the efforts of Schamyl could not prevent the Russians from gaining ground. Step by step they advanced steadily, though slowly, into the interior of the mountain country, and at last in the winter of 1858–59 made themselves masters of Weden, Schamyl's principal stronghold, which was taken by storm, and he himself was obliged to flee. This event was followed by the submission of many tribes, and though Schamyl threw himself into the apparently impregnable mountain fastness of Mount Gunib, even this was surprised by the Russian general Prince Bariatinski, and Schamyl himself made prisoner (Sept. 6, 1859). From this time the war in the Caucasus was virtually at an end; the mountain tribes submitted one after the other, and notwithstanding some occasional petty outbreaks, appear to have passed quietly into the condition of Russian subjects.

Bibliography.

It is only of late years that we have begun to obtain accurate information concerning the mountain chain of the Caucasus and the tribes that inhabit it. The works of the earlier travellers in this region—Pallas, Klaproth, &c.—treat principally of the countries that adjoin the Caucasus, rather than of the mountain ranges themselves, and even the elaborate work of Dubois de Montpéreux (*Voyage autour du Caucase*, 5 vols. 8vo, Paris, 1839–43) labors under the same defect. It was not, indeed, till after the complete subjugation or pacification of the mountain tribes by Russia that it was possible to carry on any systematic examination of the interior recesses of the great chain, and the foundation of a scientific knowledge of the Caucasus was first laid by the construction of the trigonometrical survey under General Chodzko from 1847 to 1863, and the publication of the map resulting from their labors on the scale of 5 versts to an inch. Recent travellers have indeed found that the portions of this work relating to the highest ranges of the Central Caucasus are often imperfect or erroneous; but the same was the case with the best maps of the Alps until very lately, and if our knowledge of the great Caucasian chain is still far inferior to that which we now possess of the principal European ranges, it is immeasurably in advance of that which we have attained concerning any other Asiatic mountains, except those parts of the Himalaya which have been surveyed by English engineers. Among recent writers the one who has contributed the most valuable information is A. Petzholdt, whose work (*Der Kaukasus*, 2 vols. 8vo, Leipsio, 1866) is the most useful book on the subject as yet published. The works of Dr. Radde also supply valuable materials of a more special and detailed character. The more recent work of Baron Thielmann (*Travels in the Caucasus, Persia, and Turkey in Asia*, translated into English and published by Murray in 2 vols. 8vo, 1875) also contains much useful matter in a compendious and convenient form. Mr. Freshfield's *Journey in the Central Caucasus and Bashan* (8vo, Lond., 1869) is not merely a record of his personal experiences, but an important contribution to our knowledge of the highest regions of the central chain, which he was the first to explore. His example has been already followed by Mr. Grove, who has described some portions of the mountains not visited by Mr. Freshfield (*The Frosty Caucasus*, 8vo, Lond., 1875), and there can be little doubt that successive explorers of a similar stamp will soon make us acquainted with the inmost recesses of the Central Caucasus. (E. H. B.)

CAUDETE, a town of Spain, in the province of Albacete, about 80 miles north of Cartagena. It was formerly fortified, and contains a town-house, a prison, a school of primary instruction, a Carmelite convent, and several other religious institutions. The inhabitants are engaged almost exclusively in agriculture and the manufacture of coarse fabrics for home consumption. Population, 6500.

CAUDINE FORKS (*Furculæ Caudinæ*), the name of an Italian valley, famous in Roman history on account of the disaster which there befell the Roman army during the second Samnite war, in 321 B.C. Livy describes the pass as an open space, grassy, and well-watered, completely surrounded by lofty and thickly-wooded mountains, except where a passage is afforded by two narrow gorges, situated opposite to one another (bk. ix. c. 2). It has been usually identified with the Val d'Arpaja, which is on the high road between Beneventum and Capua; and confirmation is found in the facts that this valley was known as the Caudine, and that close by there existed a village called Furculæ (now Forchia). But there is the almost conclusive objection that this valley does not answer to the above description (which is the only sufficient one which we possess), being surrounded by no mountains of any elevation, and having many outlets. A much more probable theory is that which declares it to be the little valley between Sta. Agata and Moirano, through which flows the small stream of the Isclero; and which, as it meets the Val d'Arpaja near Caudium, would have an equal right to the name of Caudine Forks.

CAVA, or La Cava, a town of Italy, in the province of Principato Citeriore, 28 miles by rail south-east of Naples, with a communal population of 19,500. It is the seat of a bishopric, has a cathedral and a diocesan seminary, and carries on the manufacture of silk, cotton, and woollen

stuffs. In the vicinity is the famous Benedictine abbey of La Trinita della Cava, which was founded in the 11th century, and almost rivals Monte Casino in the number and value of its literary treasures. Its archives contain about 40,000 separate documents of parchment, and more than 60,000 manuscripts on paper,—of which a complete inventory is being published by Don Michele Morcaldi under the title of *Codex Diplomaticus Cavensis*. The library, in spite of losses sustained within the last two centuries, still preserves a number of rich and valuable manuscripts, and a collection of early specimens of typography. Among these may be mentioned the *Codex Legum Longobardorum*, which dates from the beginning of the 11th century; a MS. copy of the Vulgate of the 8th, an Isidorus of the 9th, and a prayer-book illustrated with miniatures ascribed to Fra Angelico da Fiesole. (See Dantier's *Monast. Benedict. d'Italia*, and two articles in *Academy*, vol. viii. pp. 262 and 364, 1875.)

CAVAIGNAC, Louis Eugène (1802–1857), dictator at Paris during the insurrection of June, 1848, was born there in 1802. His father was a member of the National Convention, and the family was marked by republican proclivities. After going through the usual course of study for the military profession, he entered the army in 1824, and served in the Morea in 1828. When the revolution of 1830 broke out, he was stationed at Arras, and was the first officer of his regiment to declare for the new order of things. In 1831 he incurred the displeasure of the Government of Louis Philippe by joining in a protest against its reactionary tendencies; but in 1832 he was recalled to the service, and sent to Algeria. This continued to be the main sphere of his activity for sixteen years, till the revolution of 1848; and he took an active part, though in a subordinate capacity, in the different sieges and campaigns by which Algeria was gradually reduced under French rule. After passing through almost all the successive grades in the army, he was, in 1844, raised to the rank of general of brigade, as a reward for his skill and courage. When the revolution of February (1848) took place, the Provisional Government appointed him governor-general of Algeria; and they shortly after offered him the post of minister at war, which he declined. On his election to the National Assembly, however, Cavaignac returned to Paris. When he arrived, on the 17th May, he found the capital in an extremely critical state. The socialists of Paris, incited and organized by skilful leaders, were in a state of bitter hostility to the National Assembly, and a formidable insurrection was gradually maturing. The National Assembly had proved a bitter disappointment to them; for the peasant proprietors, terrified by the vast increase of taxation, and the general uncertainty of revolution, had returned a decidedly conservative majority. Several collisions had already taken place. The crisis was at last brought about by the threatened abolition of the national workshops (*ateliers nationaux*), which the reasonable majority of the Assembly was especially anxious for, as the finances were being ruined by the maintenance in utter idleness of 120,000 men. By the 22d of June a formidable insurrection had been organized, and it remained only for the National Assembly to assert its authority by force of arms. Cavaignac, first as minister at war, and then as dictator, was called to the task of suppressing the revolt. It was no light task, as the national guard was doubtful, regular troops were not at hand in sufficient numbers, and the insurgents had abundant time to prepare themselves. Variously estimated at from 30,000 to 60,000 men, well armed and well organized, they occupied the north-eastern part of the city, their front line stretching from the Pantheon on the south of the Seine by the Pont St. Michel to the Portes St. Martin and St. Denis. Resting on the Faubourg St. Antoine as central point, and threatening the Hotel de Ville, they had entrenched themselves at every step behind formidable barricades, and were ready to avail themselves of every advantage that ferocity and despair could suggest to them. Cavaignac, knowing the work he had before him, remained inactive, notwithstanding the urgent representations of the civil members of Government, till a sufficient regular force had been collected. At last, by a strong combined movement on the two flanks and against the centre of the insurgent forces, he attempted to drive them from their barricades,—with doubtful success for some time, as every inch of ground was disputed, and the Government troops were frequently repulsed, till, fresh regiments arriving, he forced his way to the Place de la Bastille, and crushed the insurrection in its headquarters. The contest, which raged from the 23d to the morning of the 26th of June, was, without doubt, the bloodiest and most resolute the streets of Paris have ever seen. It is calculated that more Frenchmen fell in it than in the bloodiest battles of the first empire.

Cavaignac was severely censured by some for having, by his delay, allowed the insurrection to gather head; but he was declared by an immense majority to have deserved well of his country, and continued to be president of the Executive Committee till the election of a regular president of the republic. It was expected that the suffrages of France would raise Cavaignac to that position. But the mass of the people, and especially the rural population, sick of revolution, and weary even of the moderate republicanism of Cavaignac, were anxious for a stable government. Against the five and a half million votes recorded for Louis Napoleon, Cavaignac received only a million and a half. Not without chagrin at his defeat, he withdrew into the ranks of the opposition. At the *coup d'état* of the 2d December, 1851, he was arrested along with the other members of the opposition; but after a short imprisonment at Ham he was released, and, with his newly-married wife, lived in retirement till his death in 1857. Cavaignac was no statesman, but was a loyal, skilful, and courageous soldier, a zealous republican, and in every way an honorable man.

CAVAILLON, a town of France and important railway junction in the department of Vaucluse, on the right bank of the Durance, about 13 miles south-east of Avignon. The town is ill-built and dirty, and carries on a considerable trade in dried fruits, madder, and other productions of the fertile district in which it is situated. It has a fine town-house, an old church of the 12th century, dedicated to the Virgin and St. Veran, and the mutilated remains of a triumphal arch which probably belongs to the time of Constantine. Numerous minor relics of the Roman period have been found to the south of the present town, on the site of the ancient Cabellio, a place of some note in the territory of the Cavarres. In mediæval and modern history the town has for the most part followed the fortunes of the Comtat Venaissin, in which it was included; and down to the Revolution it was the see of a bishop, and had a large number of monastic establishments. Population in 1872, 3906 in the town, and 8034 in the commune.

CAVALCANTI, Guido, an Italian poet and philosopher of the 13th century, who died in 1300. He was the son of a philosopher whom Dante, in the *Inferno*, condemns to torment among the Epicureans and Atheists; but he himself was a friend of the great poet. By marriage with the daughter of Farinata Uberti, he became head of the Ghibellines; and when the people, weary of continual brawls, aroused themselves, and sought peace by banishing the leaders of the rival parties, he was sent to Sarzana, where he caught a fever, of which he died. Cavalcanti has left a number of love sonnets and canzoni, which were honored by the praise of Dante. Some are simple and graceful, but many are spoiled by a mixture of metaphysics borrowed from Plato, Aristotle, and the Christian Fathers. They are mostly in honor of a French lady, whom he calls Mandetta. His *Canzone d'Amore* was extremely popular, and was frequently published; and his complete poetical works are contained in Giunti's collection, Florence, 1527, Venice, 1531–2. He also wrote in prose on philosophy and oratory.

CAVALIER, Jean (*c.* 1680–1740), the famous chief of the Camisards, was born at Ribaute, near Anduse, in Lower Languedoc. The date of his birth is variously given between 1679 and 1685. It could hardly be so late as the last-named year, and may probably be assigned to the period between 1679 and 1681. He was the son of a peasant, and in boyhood was employed first in keeping sheep, and afterwards as a baker's apprentice. A pious mother trained him in the Reformed faith. The persecution of Protestants, which began after the revocation of the Edict of Nantes, and which was carried on with pitiless cruelty in the Cevennes, drove him from his native land in 1701, and he took refuge at Geneva. By the *dragonnades* of Louis XIV. the Protestants of the Cevennes were at last driven to revolt; and Cavalier, inspired with the hope of being their deliverer, a hope which was raised to the pitch of enthusiasm, it is said, by certain prophecies, returned to his own country in 1702. The insurrection broke out

in July of that year, and Cavalier was one of the chosen leaders. Roland was named generalissimo, but Cavalier soon rose to share the chief command with him. Untrained in arms, he displayed not only a fiery courage, but extraordinary military skill. This must have been owing to some extent to the eager attention which he had paid, while keeping his sheep, to the manœuvres of the troops which were stationed in his native district. Although the *enfants de Dieu*, as the insurgents were called, numbered at the most only 3000 men in arms, they coped successfully again and again with the much more numerous forces of the king, and were never entirely conquered. After several affairs Cavalier changed the theatre of war to the Vivarais; and on the 10th of February, 1703, he defeated the royalist troops on the Ardèche. A few days later he was completely defeated on the same ground and was supposed to have fallen. But he reappeared, was again defeated at Tour-de-Bellot (April 30), and again recovered himself, recruits flocking to him to fill up the places of the slain. By a long series of successes he raised his reputation to the highest pitch, and gained the full confidence of the people. It was in vain that more and more rigorous measures were adopted against the Camisards; in vain that their mountain district was ravaged, sacked, and burned by the Catholics. Cavalier boldly carried the war into the plain, made terrible reprisals, and threatened even Nîmes itself. On April 16, 1704, he encountered Marshal Montrevel himself at the bridge of Nages, with 1000 men against 5000; and though defeated after a desperate conflict, he made a successful retreat with two-thirds of his men. Marshal Villars was next sent against him, and instead of fighting proposed negotiation. Roland resolutely turned a deaf ear to him; but Cavalier agreed to treat. A conference was held at Nîmes, hostages being given to Cavalier; and he appeared with an armed and mounted escort, which was drawn up facing the guard of the marshal. The terms proposed were deferred to the decision of the king, Cavalier in the meanwhile retiring to Calvisson. In this place for some days the Camisards held their meetings openly, and thousands eagerly flocked to them. The result of the negotiation was that Cavalier received for himself a commission with a pension of 1200 livres, and for his brother a captain's commission. He was authorized to form a regiment of Camisards to be sent to Spain; and liberty was restored to his father and other Protestant prisoners. The treaty, which did not include any provision for general liberty of conscience, excited great indignation among the companions of Cavalier. They called him traitor and coward, and deserted him. Disheartened, and with little confidence in the promises of the court, Cavalier afterwards visited Paris for the purpose of an interview with Louis XIV. He was presented privately to the king at Versailles, but was ill received. His disappointment and the reports which were current of intended attempts on his life or liberty induced him to leave France. He went to Switzerland, and afterwards to Holland; and there he married a daughter of Madame Dunoyer, the latter a lady of Nîmes, who had once been sought in marriage by Voltaire. He then passed into England for the purpose of recruiting his regiment of Camisards. He had an interview with Queen Anne, of which conflicting accounts are given. But so highly was his military genius valued that he was sent with his regiment to take part in the famous expedition to Spain, under the earl of Peterborough and Sir Cloudesley Shovel (May, 1705). At the battle of Almanza his Camisards encountered a French regiment which they had met in the Cevennes, and without firing, the foes rushed to a hand to hand fight and made a fearful slaughter. Cavalier was severely wounded, and was saved from death by an English officer. On his return to England a small pension was given him, and after long waiting he was made a major-general and named governor of Jersey. This post was afterwards exchanged for the governorship of the Isle of Wight. Cavalier died at Chelsea, in the first half of May, 1740, and there his remains were interred. Malesherbes, the courageous friend and defender of Louis XVI., bears the following eloquent testimony to this young hero of the Cevennes:—"I confess," he says, "that this warrior, who, without ever having served, found himself by the mere gift of nature a great general,—this Camisard who was bold to punish a crime in the presence of a fierce troop which maintained itself by like crimes,—this coarse peasant who, when admitted at twenty years of age into the society of cultivated people, caught their manners and won their love and esteem,—this man who, though accustomed to a stormy life, and having just cause to be proud of his success, had yet enough philosophy in him by nature to enjoy for thirty-five years a tranquil private life,—appears to me to be one of the rarest characters to be found in history." There is a work, little esteemed, entitled *Memoirs of the War in the Cevennes, under Colonel Cavalier*, which appears to have been written not by Cavalier himself but by a French refugee named Galli. For a more detailed account see Mrs. Bray's *Revolt of the Protestants of the Cevennes*, published in 1870.

CAVALLINI, Pietro (*c.* 1259–1344), born in Rome towards 1259, was an artist of the earliest epoch of the modern Roman School, and was taught painting and mosaic by Giotto while employed at Rome; and it is believed that he assisted his master in the mosaic of the Navicella, or ship of St. Peter, in the porch of the church of that saint. Lanzi describes him as an adept in both arts, and mentions with approbation his grand fresco of a Crucifixion at Assisi, still in tolerable preservation; he was, moreover, versed in architecture and in sculpture. According to George Vertue, it is highly probable that Cavallini executed, in 1279, the mosaics and other ornaments of the tomb of Edward the Confessor in Westminster Abbey. He would thus be the "Petrus Civis Romanus" whose name is inscribed on the shrine; but his extreme youth at this date tends to discredit the supposition. The work, if really his, must have been executed in Rome, where he appears to have constantly resided. He died in 1344 at the age of eighty-five, in the odor of sanctity, having in his later years been a man of eminent piety. He is said to have carved for the Basilica of San Paolo fuori le Mura, close to Rome, a crucifix which spoke in 1370 to a female saint.

CAVALLO, Tiberius (1749–1809), an electrician and natural philosopher, son of a physician established at Naples, was born in that city, March 30, 1749. His father died when he was only eleven years old, but he received a liberal education through the kindness of his friends, and completed his studies at the university of Naples. He was originally destined for commerce, and came to England in 1771, in order to obtain more complete information respecting the various objects of mercantile pursuit. But he soon abandoned his intention of adopting that mode of life, and determined to devote his time to science. His mind, however, was rather imitative than original; and he is said to have found it easier to learn Euclid by heart than in the ordinary way, which indeed he found impossible. He became a member of the Royal Academy of Sciences of Naples, and a fellow of the Royal Society of London. He died at London in 1809. The splendid improvements which had been lately made in electricity directed his attention to that department of natural philosophy; and his chief works are—*A Complete Treatise of Electricity* (1777), *Essay on Medical Electricity* (1780), and *The Elements of Natural and Experimental Philosophy* (1803).

CAVALRY. From the earliest dates at which there is any record of armed men being systematically trained and organized, cavalry has always formed an integral part of every army, although the relative size and importance of the army has varied, according to the nature of the country and the peculiarities of its inhabitants. Egypt probably affords the earliest historical records of any distinct attempt at military organization. In that country cavalry and horsemanship were held in high repute, according to the prophet Isaiah. Diodorus of Sicily tells us that Osymandias led 20,000 cavalry against the rebels in Bactriana, and that twenty-five generations elapsed between Osyman dias and Sesostris, who seems to have been the chief founder of Egyptian greatness, and to have lived at a period indistinctly laid down in history, but certainly long prior to the Trojan war. In early times chariots appear to have been associated with the horsemen of an army, although perfectly distinct from them. Frequent references are made in the Bible to "chariots and horsemen;" and Josephus states that the army of Israelites that escaped from Egypt numbered 50,000 horsemen and 600 chariots of war. Herodotus frequently speaks of the cavalry arm, and mentions the existence of a corps of young women whose breasts Hippocrates used to sear to enable them to use the bow and javelin. Plato likewise speaks somewhat vaguely of a corps of young ladies about 500 B.C. The existence

of Amazons as a race has never been supported by even moderately authentic testimony, although by some they were believed to live on the River Thermodon in the north of Asia Minor.

The first authentic account that we have of cavalry being regularly organized is given by Xenophon, who states that in the first Messenian war, 743 B.C., Lycurgus formed his cavalry in divisions. Some hundred years later, in 371 B.C., Epaminondas raised a corps of 5000 cavalry, and from this date it may be said the arm was much cultivated throughout Greece, until Philip and Alexander of Macedon raised it to a great pitch of excellence. Both these monarchs were indebted for several of their greatest successes to the prowess of their cavalry; and the exploits of Alexander's 7000 horsemen at the battle of Arbela, 331 B.C., in which he signally defeated Darius, may well serve as an example for future generations. The Greek cavalry were divided into heavy, or "cataphracti," and light, or "me cataphracti." To these Alexander added a third class, termed "dimachæ," who were trained to fight on foot or on horseback. After the death of Alexander the Great cavalry appears to have fallen into comparative disuse until the days of Hannibal and the Carthaginians. Dire experience, more especially the defeats of the Ticinus and the Trebia, taught the Romans the value of cavalry; and in the latter days of the republic it became the most popular and highly favored service of the Roman armies. According to Vegetius, the Roman cavalry was organized into ten troops or squadrons, forming a regiment of 726 horses, either intended to act independently or, more usually, attached to some special legion. As the Roman empire increased and brought many tributaries under its flag, the cavalry began to be drawn from those countries whose inhabitants were specially devoted to equestrian pursuits. The Gauls for many years furnished the principal part of the cavalry both in the Carthaginian and in the Roman armies, and appear to have rivalled the Numidians in efficiency. Strange to say, saddles were never used until the time of Constantine, and stirrups were introduced by the Franks about the middle of the 5th century.

In the Middle Ages the unwillingness to intrust any military power to the serfs rendered the upper classes the only soldiers, and as these did not deign to fight on foot cavalry became the basis of European armies. The knights and esquires were the nucleus, mounted attendant bowmen and pikemen being the secondary portion of the fighting power.

The invention of gunpowder and the decline of the feudal system wrought a change in military tactics, and from the organization of a standing army by Charles II. of France, in 1445, cavalry as it now exists may be said to date. As in early days, each country produced a species of cavalry in accordance with the characteristics of its inhabitants and the nature of its institutions. From Hungary came the Hussars, whose name is derived from the Hungarian word "Husz," twenty, and "ar," pay. Marshal Luxembourg appears to have been the first person who disciplined and organized these hussars, and in 1692 they were attached to his army as light troops and reconnoitrers. Carabineers were of a somewhat earlier date, and seem to have come originally from Basque and Germany. The word carbine has been traced to an Arab word "karab," but this derivation is somewhat doubtful. Originally it was the custom for carabineers or horsemen armed with firearms to mount infantry behind them, and in 1543 King Louis of Nassau made use of this hybrid force in his operations against Bergen.

A few years later, in 1554, Marshal De Brissac formed a corps of mounted infantry and called them Dragoons, thus justifying Dr. Johnson's definition of the word as "a man who serves indifferently either on foot or on horseback." The actual origin of the term dragoon has been ascribed to the dragon's head which, as a rule, adorned the muzzle of the firearm with which these horsemen were armed,—although this derivation again cannot be regarded as very certain. As firearms became more generally used, so the tactics and organization of cavalry underwent modifications. In the time of Francis I. the gens-d'armes of France were reckoned the best cavalry in Europe, and were formed in single rank. Somewhat later the Spaniards, and afterwards the Germans, carried off the palm; they went to the other extreme as regards formation, being formed in six and eight ranks, and were composed of a mixed force of arquebusiers and lancers. At this time military leaders failed to appreciate the true mission of cavalry, and assigned too great importance to the effect of firearms, too little to that of "cold steel." Maurice of Nassau was the first to train cavalry with a view to their mobility, and teach them to act by separate bodies, and in distinct lines. Now for the first time cavalry was organized by regiments, each regiment being composed of four squadrons, formed in five ranks, and numbering about 1000 horses. During the Thirty Years' War, from 1618 to 1648, the lance as a cavalry weapon gradually disappeared, partly on account of the amount of training which is necessary to insure its efficient use, and partly on account of the exaggerated value attached to firearms as cavalry weapons. After Maurice of Nassau, Gustavus Adolphus appears as the next great cavalry leader, and was so successful in the employment of his cuirassiers and dragoons—into which two divisions his horsemen were classed—that all other European nations began to imitate him, and adopted his formation in three ranks. After the death of Gustavus Adolphus, until the wars with the Turks, the French appear to have been the most instructed and efficient in the employment of cavalry. The wars of Louis XIII. and Louis XIV. soon developed military art, and such great leaders as Turenne, Condé, Montecuculi, and Marlborough made their name. At this period defensive armor for cavalry was abolished, and lances were unknown except among irregular horsemen, who came from the plains of Poland and Russia. Excellent, however, as the French cavalry at this period undoubtedly was, it could not vie with that of the Turks either as regards its own efficiency or the results that it achieved. So formidable and so much feared were the Turkish horsemen that the Russian infantry when opposed to them invariably carried *chevaux-de-frise* in light carts for their protection. It has been very justly remarked that no other cavalry has ever obtained such an ascendency as this over infantry.

Hitherto but little attention had been paid to the employment of cavalry off the field of battle for purposes of reconnoitring, although it had long exercised an important influence in action. Marshal Saxe, however, may be said to have introduced a new and more enlightened era in the history of the arm, he not only was the first to recognize the true mission and use of light cavalry, but also the necessity for celerity in movement and manœuvre on all occasions. Although he cannot be said to have introduced horse artillery, which did not appear on the field of battle till 1762, still, by his timely use of guns in conjunction with cavalry at the battle of Fontenoy, he first showed how the two arms might be combined.

It cannot, however, be said that cavalry has ever before or since played the important part in war that it did in the days of Frederick the Great. This monarch recognized that the "arme blanche," and not the firearm, was the proper weapon for a mounted soldier. He discontinued firing in line, and the pitch of excellence at which his horsemen arrived under the leadership of Seidlitz, and the results they obtained, have never been equalled by the cavalry of any other nation. The battles of Zorndorf, Rosbach, Striegau, Kesselsdorf, and Leuthen still remain the most signal examples of what may be attained if to long previous training and preparation are joined brilliancy and rapidity of execution in the field. It required, however, long experience and the occasional disasters which befell him in the first and second Silesian wars before Frederick the Great appreciated the true principles of mounted warfare or put them into execution.

The next period in the history of cavalry may be said to date from the rise of Napoleon I. until the battle of Waterloo. The Republican armies of France were but ill provided with mounted troops, and the disaster of Wurzburg in 1796 nearly annihilated the comparatively few squadrons that France then possessed. The genius of Napoleon evinced itself as remarkably in the organization as in the leading of his armies, and his first care was to create a force of cavalry such as would enable him to reap the fruits of his victories. To his cavalry he was mainly indebted for some of his most signal triumphs, notably Marengo and Austerlitz, and to the manner in which he employed his mounted scouts and reconnoitrers he owed the facility with which he so often out-manœuvred and anticipated his enemies. The Russian campaign of 1812 annihilated the French cavalry, and there was not time to reorganize it before it was necessary again to take the field. Hence some of Napoleon's most decided successes in 1813 proved

fruitless; as he himself remarked, had he possessed cavalry at the battles of Lützen and Bautzen the war would then have been brought to an end. It would here appear worthy of remark that defensive armor for cavalry, which had fallen into disuse, was re-introduced by Napoleon. He increased the French cuirassiers from one regiment to twelve, and they performed excellent service ever afterwards. Similarly in Napoleon's time the lance began to be again used in Europe; in 1807 it was found that a Polish regiment of lancers was so useful that twelve lancer regiments were afterwards formed, and a certain proportion of this arm has ever since been maintained in all European armies. Any remarks, however, on cavalry in the time of Napoleon would be incomplete were no reference made to the Cossacks, who so much contributed to render the retreats from Russia and after Leipsic peculiarly disastrous to the French. These irregular horsemen, mounted on small horses and armed with lances, hung on the flanks and rear of the retreating enemy, and, although seldom standing to meet an attack, appeared to be ubiquitous, alike affording a screen for their own army and obtaining the fullest information regarding the movements of that opposed to them.

In the forty years' peace cavalry deteriorated like everything else connected with military science. In the Crimea, as the entire war may be said to have consisted of one siege, there was but little occasion for the use of cavalry, and the few opportunities afforded were certainly not turned to the best account. In the 1859 campaign between the French and Italians on the one side and the Austrians on the other, the nature of the country was unsuited to the action of cavalry, and except in some isolated instances, as on the field of Solferino, cavalry played a very unimportant part in the war. For many years the value of cavalry was only exemplified on the plains of India, where both the British and the native horsemen performed many deeds of valor and did excellent service. In 1866 there occurred the first great European war since Waterloo in which cavalry could be turned to full account. From long disuse and want of practice neither Austrians nor Prussians made sufficient use of the large force of horsemen which was at their disposal, and neither on the field of battle nor off it did they achieve any great distinction, although, undoubtedly, of the two the Austrians carried off the palm. They performed reconnoitring duties far more efficiently than their antagonists, and the manner in which they covered the retreat of their army after Königgratz was a model of devotion and bravery.

Four years later the experience gained by the Prussians in 1866 on the plains of Bohemia was in the fullest degree utilized, whereas their opponents the French only showed how splendid material may be sacrificed and how brilliant courage may be thrown away. Incessant practice during the four preceding years of peace had rendered the Prussian cavalry most proficient in all the duties of reconnoitring and outposts. The information they obtained and the manner in which they concealed the movements of the army in their rear mainly contributed to enable the leaders of the German army to carry out successfully their strategic plans, and their prowess on the field of battle when turned to account as at Mars-la-Tour was exerted to the best effect. The French cavalry, on the other hand, were remarkable more for bravery than efficiency. In place of being scattered in small parties some days in advance of an army they marched in masses frequently in its rear. Off the field of battle they were of no service, and on it they were needlessly sacrificed through the incapacity of their leaders. History has few examples of bravery more devoted than that of the French cavalry at the battles of Wörth and Sedan, and none in which bravery was more entirely thrown away. After the fall of the empire it may be said that the French cavalry ceased to exist, and as it is an arm that cannot be improvised the republic had no time to replace what had been destroyed.

On the whole it cannot be said that the last two European wars have added much to the art of handling cavalry. The practice of spreading light troops two days' march in advance of an army was not new, although of late years it had fallen into disuse, and as regards the employment of mounted troops on the battle-field, it is still an unsettled question whether the recent improvements in firearms have or have not rendered it impossible for them ever to turn the tide of victory.

For the organization, equipment, and strength of the cavalry of the various armies of the present day see ARMY, vol. ii. (F. S. R.)

CAVAN, an inland county in the province of Ulster, in Ireland, situated between 53° 43′ and 54° 7′ N. lat., and 6° 45′ and 7° 47′ W. long., is bounded N. by Fermanagh and Monaghan, E. by Monaghan and Meath, S. by Meath, Westmeath, and Longford, and W. by Longford and Leitrim. It has an area of 746 square miles, or 477,394 acres.

The surface of the country is uneven, consisting of hill and dale, without any great extent of level ground, but only in its northern extremity attaining a mountainous elevation. The barony of Tullyhaw, bordering on Fermanagh, a wild dreary mountain district, known as the kingdom of Glan or Glengavlin, contains the highest land in the county, called Slieve Russell. In the same barony is Quilca Mountain, the place of inauguration for the Macquires, chieftains of Fermanagh, held in veneration by the peasantry, in connection with legends and ancient superstitions. The remainder of the county is not deficient in wood, and contains numerous lakes, generally of small dimensions, but of much interest for their picturesque beauty, more especially Lough Oughter, which lies between the towns of Cavan and Killashandra. The chief river in the county is the Erne, which originates in the Lake of Scrabby, one of the minor sheets of water communicating with Lough Gowna on the borders of Longford. The river takes a northerly direction by Killeshandra and Belturbet, being enlarged during its course by the Annalee and other smaller streams, and finally enters Lough Erne near the northern limit of the county. The other waters, consisting of numerous lakes and their connecting streams, are mostly tributary to the Erne. A copious spring called the Shannon Pot, at the foot of the Cuilagh Mountain, in the barony of Tullyhaw, is regarded as the source of the River Shannon. The Blackwater, a tributary of the Boyne, also rises in this county, near Bailieborough.

Branch lines of the Midland, Great Western, and Great Northern railways traverse the county.

The climate is not very genial owing to the dampness arising from its numerous lakes and the nature of the soil, and to the boisterous winds which frequently prevail, more especially in the higher districts.

The south-eastern portion of Cavan rests upon clay-slate, and the remainder of the county upon the Carboniferous limestone formation. A rich iron ore was formerly raised from Quilca Mountain. Indications of lead, silver, and sulphur have been observed; and fullers' earth, pipe-clay, potters' clay, and brick clay are frequently met with in Tullyhaw barony, in which there are also indications of coal. Several mineral springs exist in this county, the chief of which is near the once-frequented village of Swanlinbar. In the neighborhood of Belturbet, near the small lake of Annagh, is a carbonated chalybeate. There are several other springs of less importance; and the small Lough Leighs, or Lough-an-Leighaghs, which signifies the healing lake, on the summit of a mountain between Bailieborough and Kingscourt, is celebrated for its antiscorbutic properties. The level of this lake never varies. It has no visible supply nor vent for its discharge; neither is it ever frozen during the severest winters.

The soil is generally a stiff clay, cold and watery, but capable of much improvement by drainage, for which its undulating surface affords facilities. Agriculture has made little progress within the last twenty years; the extent of the farms being generally small. In the mountainous parts, however, where the land is chiefly under grazing, the farms are larger, and in stock raising the county has made considerable progress.

From the Owners of Land Return (1876) it appears that in 1875 Cavan was divided among 1044 proprietors, 328 of whom owned less than 1 acre, and 716 one acre and upwards. The largest holdings were those of Lord Farnham (29,455 acres), Earl Annesley (24,221), and E. J. Saunderson (12,362). The average ratable value of the land was 11s. 10¾d. per acre, while that of all Ulster was 15s. 8¼d.; and the average extent of the holdings was 435 acres per owner, or nearly double the average size for Ulster, which was 239.

The following tables give comparative statements of the agriculture acreage in the years in 1853 and 1875, and of the live stock in 1852 and 1875 respectively:—

	Oats.	Wheat, Barley, &c.	Flax.	Potatoes.	Turnips and other Green Crops.	Meadow.	Under Crops.
1853....	89,929	2,883	12,106	27,734	8,368	34,921	176,591
1875....	52,826	665	5,298	28,823	6,754	61,946	156,312

	Horses, Mules, and asses.	Cattle.	Sheep.	Pigs.	Goats.	Poultry.
1852....	19,381	92,690	16,167	24,715	14,024	328,241
1875....	19,439	120,399	27,322	42,263	15,800	422,501

The number of goats raised here greatly exceeds that in the other counties, with the exception of Kerry and Cork.

Cavan is not a manufacturing county. The bleaching of linen and the distillation of whisky are both carried on to a small extent; but the people are chiefly employed in agricultural pursuits and in the sale of home produce. The soil in those districts not well adapted for tillage is peculiarly favorable for trees. The woods were formerly very considerable, and the timber found in the bogs is of large dimensions; but plantations are now chiefly found in demesnes, where they are extensive.

The population is less mixed in race than most parts of Ulster, being generally of Celtic extraction. The dwellings of the peasantry are poor in accommodation. There are in the county only four towns with upwards of 1000 inhabitants, viz., Cavan, Cootehill, Belturbet, and Bailieborough. The population in 1851 amounted to 174,064, and in 1871 to 140,735 (with an excess of 223 males), showing a decrease in twenty years of 33,329 persons, being an average of 1666 per annum, or 19 per cent., on the population of 1851. This is considerably above the average decrease of Ulster. At the census of 1871 there were 113,174 Catholics, 21,223 Episcopalians, 15,004 Presbyterians, and 1334 of other denominations, showing that 80 per cent. of the inhabitants professed the Catholic faith.

With regard to emigration, it appears that 11,129 persons left the county within the five years ending 1875, being at the rate of 2226 per annum, which is about the average of the rest of the province. The poor law is administered by a subdivision of the county and parts of the adjacent district into four unions, and these relieved 5126 paupers in 1874. Education is dispensed by means of 8 superior and 340 primary schools. In 1871 the number of persons of five and upwards who could read and write was 55,773; 31,438 could read but could not write, and 48,104 could neither read nor write.

The county is divided into eight baronies—Castlerahan, Clanmahon, Clankee, Loughtee Lower and Upper, Tullygarvey, Tullyhaw, and Tullyhunco, and contains thirty-six parishes and parts of parishes. It is almost entirely within the diocese of Kilmore. In military arrangements it is in the Belfast district; and there are barracks for cavalry at Belturbet, and for infantry at Cavan, where also the staff of the county militia is stationed. The assizes are held at Cavan, where the county prison and the county infirmary are situated. Prior to the Union it returned six members to the Irish parliament, two for the county at large, and two for each of the boroughs of Cavan and Belturbet; but since that period it has been represented in the imperial parliament by two county members only.

The most ancient geographers describe this and the adjacent counties of Leitrim and Fermanagh as occupied by the tribe of the Erdini. At the period of the English settlement, and for some centuries afterwards, it was known by the name of the Brenny, or O'Reilly's country; and its inhabitants, protected by the nature of the country, long maintained their independence. In 1584 Cavan was formed into a county of Ulster by Sir John Perrott, lord-deputy of Ireland, and subdivided into seven baronies, two of which were assigned to Sir John O'Reilly, free of all contributions, and three to other members of the family; while the two remaining baronies, possessed by the septs of Mackernon and Macgauran, and situated in the mountains bordering on O'Rourke's country, were left subject to their ancient tenures and the exactions of their Irish lord, the Crown reserving 200 beeves upon the whole county for the lord-deputy's provision. There was also an ancient subdivision, peculiar to this county, into polls, each of which contained about 25 acres. Early in the reign of James I., a commission of inquiry was issued concerning all lands in several counties of Ulster, escheated to the Crown by attainder, outlawry, or actual death in rebellion, by which the greater portion of this county was deemed to be vested in the Crown, and its exact state thereupon investigated. Under the consequent project for the new plantation of Ulster, the county was distributed among the undertakers, British planters, servitors, natives, ecclesiastics, &c. The principal English and Scotch families settled in Cavan were the Auchmuties, Bailies, Butlers, Hamiltons, Lamberts, Parsons, and Ridgeways. Some few remains of antiquity remain in the shape of cairns, raths, and the ruins of small castles.

CAVAN, the capital of the above county, and, previous to the Union, a parliamentary borough, but now placed under the Towns Improvement Act, is situated near the centre of the county. It is 68 miles N.W. from Dublin (85½ by rail), on one of the tributary streams of the Annalee River, in a large valley surrounded on every side by elevated ground, with picturesque environs, adorned by the mansions and demesnes of Lord Farnham and the bishop of Kilmore. The town, which in 1871 contained 3380 inhabitants, is of unpretending and rather humble appearance. The court-house, erected at an expense of £11,000, is elegant in its proportions and convenient in its internal arrangements. The parish church, built on an elevated site, is also a graceful structure. The most conspicuous building is the grammar-school, founded by Charles I. It was rebuilt in 1819, at an expense of £9000, on an eminence overlooking one of the main entrances into the town, and is capable of accommodating one hundred resident pupils The other public buildings are the Roman Catholic chapel and Dissenters' meeting-houses, the county jail and infirmary, barracks, and the union workhouse. Cavan has still some linen trade, and a considerable retail business is transacted in the town. It is the seat of a presbytery of the Presbyterian church, but the great majority of the inhabitants are Roman Catholics. A monastery of Dominican friars, founded by O'Reilly, chieftain of the Brenny, formerly existed here, and became the burial-place of the celebrated Irish general, Owen O'Neal, who died as is supposed by poison, in 1649, at Cloughoughter. This monastery, and all the other antiquities of the town, have been swept away during the violent and continuous feuds to which the country has been subjected. Even so late as the year 1690 the chief portion of the town was burned by the Enniskilleners under General Wolsey.

CAVANILLES, ANTONIO JOSE (1745–1804), a Spanish ecclesiastic who devoted himself to botany, was born at Valencia in 1745. He was educated by the Jesuits at the university of that town, and became tutor of the sons of the Duke of Infantado, whom he accompanied to Paris. There he resided twelve years, enjoying the friendship of the famous Jussieu, whose views he adopted. He afterwards became director of the royal garden at Madrid. In 1789 and the following years, he published *Dissertations upon Monadelphous Plants*, and in 1790 he commenced to issue his work on the plants of Spain, and those discovered by Spanish navigators in Mexico, Peru, Chili, New Holland, and the Philippine Islands.

CAVE (Latin *cavea*), a hollow extending beneath the surface of the earth. Caves have excited the awe and wonder of mankind in all ages, and have been the centres round which have clustered many legends and superstitions. They were the abode of the sibyls and the nymphs in Roman mythology, and in Greece they were the temples of Pan, Bacchus, Pluto, and the Moon, as well as the places where the oracles were delivered at Delphi, Corinth, and Mount Cithæron. In Persia they were connected with the obscure worship of Mithras. Their names frequently are survivals of the superstitious ideas of antiquity, as for example, the Fairy, Dragon's, or Devil's Caves of France and Germany. Long after the Fairies and Little Men had forsaken the forests and glens of Germany, they dwelt in their palaces deep in the Hartz Mountains, in the Dwarf-holes, &c., whence they came from time to time into the upper air.

The Seven Sleepers of Ephesus slept their long sleep in a cave. The hills of Granada are still believed by the Moorish children to contain the great Boabdil, and his sleeping host, who will awake, when an adventurous mortal invades their repose, to restore the glory of the Moors in Spain.

Caves have been used in all ages by mankind for habitation, refuge, and burial. In the Old Testament we read that when Lot went up out of Zoar he dwelt in a cave with

his two daughters. The five kings of the Canaanites took refuge from Joshua, and David from Saul, in the caves of Palestine, just as the Aquitani fled from Cæsar to those of Auvergne, and the Arabs of Algeria to those of Dahra, where they were suffocated by Marshal Pelissier in 1845. In Central Africa Dr. Livingstone tells us that there are vast caves in which whole tribes find security with their cattle and household stuff.

The cave of Machpelah may be quoted as an example of their use as sepulchres, and the rock-hewn tombs of Palestine and of Egypt, and the Catacombs of Rome, probably owe their existence to the ancient practice of burial in natural hollows in the rock. We might therefore expect to find in them most important evidence as to the ancient history of mankind, which would reach long beyond written record; and since they have always been used by wild beasts as lairs, we might reasonably believe also that their exploration would throw light upon the animals which have in many cases disappeared from the countries which they formerly inhabited. The labors of Buckland, Pengelly, Falconer, Lartet, and Christy, and Dawkins, carried on during the last fifteen years in the caves, have added an entirely new chapter to the history of man in Europe, as well as established the changes that have taken place in the European fauna. The physical history of caves will be taken first, and we shall then pass on to the discoveries relating to man and the lower animals which have been made in them of late years.

Physical History.—The most obvious agent in hollowing out caves is the sea. The set of the currents, the force of the breakers, the grinding of the shingle inevitably discover the weak places in the cliff, and leave caves as one of the results of their work, modified in each case by the local conditions of the rock. Those formed in this manner are easily recognized from their floors being rarely much out of the horizontal; their entrances are all in the same plane, or in a succession of horizontal and parallel planes, if the land has been elevated at successive times. From their inaccessible position they have been rarely occupied by man. Among them Fingal's Cave, on the island of Staffa, off the south-west coast of Scotland, hollowed out of columnar basalt, is perhaps the most remarkable in Europe. In volcanic regions also there are caves formed by the passage of lava to the surface of the ground, or by the expansion of steam and gases in the lava while it was in a molten state. They have been observed in the regions round Vesuvius and Etna, in Iceland and Teneriffe. We may take as an example the Grotto del Cane (cave of the dog), near Pozzuoli, a few miles to the south-west of Naples, remarkable for the flow of carbonic acid from crevices in the floor, which fills the lower part of the cave and suffocates any small animal, such as a dog, immersed long enough in it.

The most important class of caves, however, and that which immediately demands our notice, is that composed of those which have been cut out of calcareous rocks by the action of carbonic acid in the rain-water, combined with the mechanical friction of the sand and stones set in motion by the streams which have, at one time or another, flowed through them. They occur at various levels, and are to be met with wherever the strata are sufficiently compact to support a roof. Those of Brixham and Torquay, and of the Eifel, are in the Devonian limestone; those of Wales, Somerset, the central and northern counties of Belgium, Saxony, and Westphalia, of Maine and Anjou, of Virginia and Kentucky, are in that of the Carboniferous age. The cave of Kirkdale in Yorkshire, and most of those in Franconia and Bavaria, penetrate Jurassic limestones. The compact Neocomian and cretaceous limestones of Central France contain most of the caverns of Perigord, rendered famous by the discovery of the remains of the Eskimos along with the animals which they hunted; as well as those of Northern Italy, Sicily, Greece, Dalmatia, Carniola, and Palestine. The cave of Lunelviel near Montpellier is the most important of those which have been hollowed in limestones of the Tertiary age. They are also met with in rocks composed of gypsum; in Thuringia, for example, they occur in the saliferous and gypseous strata of the Zechstein, and in the gypseous Tertiary rocks of the neighborhood of Paris, as for example at Montmorency.

Caves formed by the action of carbonic acid and the action of water are distinguished from others by the following characters. They open on the abrupt sides of valleys and ravines at various levels, and are arranged round the main axes of erosion, just as the branches are arranged round the trunk of a tree. In a great many cases the relation of the valley to the ravine, and of the ravine to the cave, is so intimate that it is impossible to deny that all three have been produced by the same causes. The caves themselves ramify in the same irregular fashion as the valleys, and are to be viewed merely as the capillaries in the general valley system through which the rain passes to join the main channels. Sometimes, as in the famous caves of Adelsberg, Kentucky, Wookey Hole in Somersetshire, the Peak in Derbyshire, and in many in the Jura, they are still the passages of subterranean streams; but very frequently the drainage has found an outlet at a lower level, and the ancient watercourses have been deserted. These in every case present unmistakable proof that they have been traversed by water in the sand, gravel, and clay which they contain, as well as in the worn surfaces of the sides and bottom. In all districts where there are caves there are funnel-depressions of various sizes called pot-holes or swallow-holes, or bêtoires, "chaldrons du diable," "marmites des géants," or "katavathra," in which the rain is collected before it disappears into the subterranean passages. They are to be seen in all stages, some being mere hollows which only contain water after excessive rain, while others are profound vertical shafts into which the water is continually falling. That known as Helln Pot in Yorkshire, 300 feet deep, is an example of the latter class. The cirques described by M. Desnoyers belong to the same class as the swallow-holes.

The history of swallow-holes, caves, ravines, and valleys in calcareous strata may be summed up as follows. The calcareous rocks are invariably traversed by joints or lines of shrinkage, which are lines of weakness by which the direction of the drainage is determined; and they are composed to a large extent of carbonate of lime, which is readily exchanged into soluble bicarbonate by the addition of carbonic acid. The rain in its passage through the air takes up carbonic acid, and it is still further charged with it in percolating through the surface soil in which there is decomposing vegetable matter. As the rain drops converge towards some one point, determined by some local accident on the surface, and always in a line of joint, the carbonic acid attacks the carbonate of lime with which it comes into contact, and thus a funnel is gradually formed ending in the vertical joint below. Both funnel and vertical joint below are being continually enlarged by this process. This chemical action goes on until the free carbonic acid is used up. The subterranean passages are enlarged in this manner, and what was originally an insignificant net-work of fissures is developed into a series of halls, sometimes as much as from 80 to 100 feet high. These results are considerably furthered by the mechanical friction of the pebbles and sand hurried along by the current, and by falls of rock from the roof produced by the removal of the underlying strata. In many cases the results of this action have produced a regular subterranean river system. The thick limestones of Kentucky, for example, are traversed by subterranean waters which collect in large rivers, and ultimately appear at the surface in full power. The River Axe, near Wells, the stream flowing out of the Peak Cavern at Castleton, Derbyshire, that at Adelsberg (see ADELSBERG, vol. i. p. 138) in Carniola, flow out of caverns in full volume. The River Styx and the waters of Acheron disappear in a series of caverns which were supposed to lead down to the infernal regions.

If the direction of the drainage in the rock has been altered, either by elevations such as those with which the geologist is familiar, or by the opening out of new passages at a lower level, these watercourses become dry, and present us with the caves which have afforded shelter to man and the wild animals from the remotest ages, sometimes high up on the side of a ravine, at other times close to the level of the stream at the bottom.

Caves, as a general rule, are as little affected by disturbances of the rock as the ravines and valleys, which have been formed, in the main, irrespective of the lines of fault or dislocation.

We must now examine what happens to the bicarbonate of lime which has been formed by the action of the acid on the limestone. If a current of air play upon the surface of the water, the carbonic acid, which floats up the lime, so to speak, is given off and the insoluble carbonate is deposited,

and as a result of this action we have the elaborate and fantastic stony incrustations termed stalactites and stalagmites. The water percolating through the rock covers the sides of the cavern with a stalactitic drapery, and if a line of drops persistently falls from the same point to the floor, the calcareous deposit gradually descends from the roof, forming in some cases stony tassels, and in others long columns which are ultimately united to the calcareous boss, formed by the plash of the water on the floor. The surface also of the pools is sometimes covered over with an ice-like sheet of stalagmite, which shoots from the sides, and sometimes forms a solid and firm floor when the water on which it was supported has disappeared. Sometimes the drops form a little calcareous basin, beautifully polished inside, which contains small pearl-like particles of carbonate of lime, polished by friction, one against the other. The most beautiful stalactitic caves in Great Britain are those of Cheddar in Somerset, Caldy Island, and Poole's Cavern at Buxton. A portion only of the carbonate of lime is thus deposited in the hollows of the rock from which it was taken; the rest is carried into the open air by the streams, in part deposited on the sides and bottom, forming tufa and the so-called petrifactions, and partly being conveyed down to the sea to be ultimately secreted in the tissues of the Mollusca, Echinodermata, and Foraminifera. Through these it is again collected in a solid form, and in the long course of ages it is again lifted up above the level of the water as limestone rock, and again undergoes the same series of changes. Thus the cycle of carbonate of lime is a never-ending one from the land to the ocean, from the ocean to the land, and so it has been ever since the first stratum of limestone was formed out of the exuviæ of the inhabitants of the sea. The rate of the accumulation of stalagmite in caverns is necessarily variable, since it is determined by the presence of varying currents of air. In the Ingleborough cavern a stalagmite, measured in 1839 and in 1873, is growing at the rate of ·2946 inches per annum. It is obvious, therefore, that the vast antiquity of deposits containing remains of man underneath layers of stalagmite cannot be inferred from a thickness of a few inches or even of a few feet.

The intimate relation which exists between caves and ravines renders it extremely probable that many of the latter have been originally subterranean watercourses, which have been unroofed by the degradation of the rock. In all limestone districts ravines are to be found continued in the same direction as the caves, and the process of atmospheric erosion may be seen in the fallen blocks of stone which generally are to be met with at the mouths of the caverns. In illustration of this the valley and caves of Weathercote, in Yorkshire, may be quoted, or the source of the Axe at Wookey; and the ravine formed in this way has very frequently been widened out into a valley by the action of subaërial waste, or by the grinding of glaciers through it during the glacial stage of the Pleistocene period.

Pleistocene Caves in Europe.—The caves which have offered shelter to man and the wild animals are classified according to their contents. 1*st*, Those containing the extinct animals, such as the mammoth, woolly rhinoceros, or Palæolithic man (see ARCHÆOLOGY), are termed Pleistocene. These are sometimes called Quaternary, under the mistaken idea that they belong to an age succeeding the Tertiary period. 2*d*, Those which contain the remains of the domestic animals in association with the remains of man either in the Neolithic, Bronze, or Iron stages of civilization are termed Prehistoric. 3*d*, The third group consists of those which can be brought into relation with the historic period, and are therefore termed Historic.

The search after *ebur fossile* or unicorns' horn, or in other words the fossil bones which ranked high in the materia medica of the 16th and 17th centuries, led to the discovery of the ossiferous caverns of the Hartz Mountains and of Hungary and Franconia. The famous cave of Gailenreuth in the last of these districts was explored by Dr. Goldfuss in 1810. The bones of the hyæna, lion, wolf, fox, and stag, which it contained, were identified by Baron Cuvier, and some of the skulls have been recently proved by Professor Busk to belong to the grizzly bear. They were associated with the bones of the reindeer, horse, and bison, as well as with those of the great cave bear. These discoveries were of very great interest, because they established the fact that the above animals had lived in Germany in ancient times. The first bone cave systematically explored in England was one at Orreston near Plymouth in the year 1816, which proved that an extinct species of rhinoceros (*R. Megarhinus*) lived in that district. Four years later the famous hyæna den at Kirkdale in Yorkshire was explored by Dr. Buckland. He brought forward proof that it had been inhabited by hyænas, and that the broken and gnawed bones of the mammoth, rhinoceros, stag, bison, and horse belonged to animals which had been dragged in for food. He pointed out that all these animals had lived in Yorkshire in ancient times, and that it was impossible for the carcases of the rhinoceros, hyæna, and mammoth to have been floated from tropical regions into the places where he found their bones. He subsequently investigated bone caves in Derbyshire, South Wales, and Somerset, as well as in Germany, and published his *Reliquiæ Deluvianæ* in 1822, a work which laid the foundations of the new science of cave-hunting in this country. The well-known cave of Kent's Hole near Torquay furnished the Rev. J. McEnery, between the years 1825 and 1841, with the first flint implements discovered in intimate association with the bones of extinct animals. He recognized the fact that they proved the existence of man in Devonshire while those animals were alive, but the idea was too novel to be accepted by his contemporaries. His discoveries have since been verified by the subsequent investigations carried on by Mr. Godwin Austen, and ultimately by the committee of the British Association, which has been at work for several years under the guidance of Mr. Pengelly. There are four distinct strata in the cave. 1*st*, The surface is composed of dark earth, and contains mediæval remains, Roman pottery, and articles which prove that it was in use during the Iron, Bronze, and Neolithic ages. 2*d*, Below this is a stalagmite floor, varying in thickness from 1 to 3 feet, and covering (3*d*) the red earth, which contained bones of the hyæna, lion, mammoth, rhinoceros, and other animals, in association with flint implements and an engraved antler, which proved man to have been an inhabitant of the cavern during the time of its deposition. 4*th*, Filling the bottom of the cave is a hard breccia, with the remains of bears and flint implements, in the main ruder than those found above; in some places it was no less than 12 feet thick. The most remarkable animal found in Kent's Hole is the sabre-toothed carnivore, *Machairodus latidens* of Owen. While the value of Mr. McEnery's discoveries was in dispute the exploration of the cave of Brixham near Torquay in 1858 proved that man was coeval with the extinct mammalia, and in the following year additional proof was offered by the implements that were found in Wookey Hole. Similar remains have been met with in the caves of Wales, and in England as far north as Derbyshire (Creswell), proving that over the whole of southern and middle England men, in precisely the same stage of rude civilization, hunted the mammoth and rhinoceros and other extinct animals.

Cave-dwellers allied to Eskimos.—The caves and rock shelters of Perigord, explored by the late M. Lartet and our countryman, Mr. Christy, in 1863–4, have not only afforded accumulative proof of the co-existence of man with the extinct mammalia, but have given us a clue as to the race that so existed. They penetrate the sides of the valleys of the Dordogne and Vezère, and offer as vivid a picture of the life of the period as that revealed of Italian manners in the 1st century by the buried cities of Herculaneum and Pompeii. The old floors of human occupation consist of broken bones of animals killed in the chase, mingled with rude implements and weapons of bone and unpolished stone, and with charcoal and burnt stones, which indicate the position of the hearths. Flakes without number, awls, lance-heads, hammers, and saws made of flint rest *pêle-mêle* with bone needles, sculptured reindeer antlers, arrowheads, and harpoons, and bones of the reindeer, bison, horse, ibex, Saiga antelope, and musk sheep. These singular accumulations of *débris* mark the places where the ancient hunters lived, and are merely the refuse cast aside. The reindeer formed by far the greater portion of the food, and must have lived in enormous herds at that time in the centre of France. From this, as well as from the presence of the most arctic of the herbivores, the musk sheep, we may infer the severe climate of that portion of France at that time. Besides these animals the cave bear and lion have been met with in one, and the mammoth in five localities, and their remains bear marks of cutting or scraping which showed they fell a prey to the hunters. The most remark

able remains left behind in these refuse heaps are the sculptured reindeer antlers and figures engraved on fragments of schist and on ivory. A well-defined outline of an ox stands out boldly from one piece of antler; a second represents a reindeer kneeling down in an easy attitude with his head thrown up in the air so that the antlers rest on the shoulders, and the back forms an even surface for a handle, which is too small to be grasped by an ordinary European hand; in a third a man stands close to a horse's head, and on the other side of the same cylinder are two heads of bisons drawn with sufficient clearness to ensure recognition by any one who has seen that animal. On a fourth the natural curvature of one of the tines has been taken advantage of by the artist to engrave the head and the characteristic recurved horns of the ibex; and on a fifth horses are represented with large heads, upright dishevelled manes, and shaggy ungroomed tails. The most striking figure is that of the mammoth engraved on a fragment of its own tusk; the peculiar spiral curvature of the tusk and the long mane, which are now not to be found in any living elephant, prove that the original was familiar to the eye of the artist. These drawings probably employed the idle hours of the hunter, and hand down to us the scenes which he witnessed in the chase. They are full of artistic feeling and are evidently drawn from life. The mammoth is engraved in its own ivory, and the reindeer and the stag on their respective antlers. The general idea which we are justified in forming of these ancient dwellers in Aquitaine is that they lived by hunting and fishing, and that they were clad with skins sewn together with sinews or strips of intestines. They possessed no domestic animals, nor were they acquainted with spinning or with the potter's art. We have no evidence that they buried their dead,—the interments, such as those of Aurignac, Les Eyzies, Mentone, as well as of Belgium and Germany, most probably belonging to a later age. Caves containing their implements occur throughout these regions as well as in Switzerland.

These traces of the most ancient men as yet discovered in Europe may with a high degree of probability be referred to the Eskimos. The bone needles, and many of the harpoons, as well as the flint spearheads, arrowheads, and scrapers, are of precisely the same form as those now in use amongst the Eskimos. The artistic designs from the caves of France, Belgium, and Switzerland are identical in plan and workmanship with those of the Eskimos, with this difference only, that the hunting scenes familiar to the Palæolithic cave-dwellers were not the same as those familiar to the inhabitants of the shores of the Arctic Ocean. Each represented the animals which he knew, and the whale, walrus, and seal were unknown to the inland dwellers of Aquitaine, just as the mammoth, bison, and wild horse are unknown to the Eskimos. The reindeer, which they both knew, is represented in the same way by both. The practice of accumulating large quantities of the bones of animals round their dwelling-places, and the habit of splitting the bones for the sake of the marrow, are the same in both. The hides were prepared with the same sort of instruments, and the needles with which they were sewn together are of the same pattern. In both there was the same disregard of sepulture. All these facts can hardly be mere coincidences caused by both peoples leading a savage life under similar conditions. The conclusion, therefore, seems inevitable that, so far as we have any evidence of the race to which the cave-dwellers belong, that evidence points only in the direction of the Eskimos. It is to a considerable extent confirmed by a consideration of the animals found in the caves. The reindeer and musk sheep afford food to the Eskimos now in the Arctic Circle, just as they afforded it to the Palæolithic hunters in Europe; and both these animals have been traced by their remains from the Pyrenees to the north-east, through Europe and Asia as far as the very regions in which they now live. The mammoth and bison also have been tracked by their remains in the frozen river gravels and morasses through Siberia as far as the American side of the Straits of Behring. Palæolithic man appeared in Europe with the arctic mammalia, lived in Europe with them, and in all human probability retreated to the north-east along with them.

Ancient Geography of Europe.—The remains of man and the animals described in the preceding paragraphs have been introduced into the caves either by man or the wild beasts, or by streams of water, which may or may not now occupy their ancient courses; and the fact that the same species are to be met with in the caves of France, Switzerland and Britain implies that our island formed part of the Continent, and that there were no physical barriers to prevent their migration from the Alps as far to the north-west as Ireland.

The same conclusion may be gathered from the exploration of caves in the south of Europe, which has resulted in the discovery of African species in Gibraltar, Sicily, and Malta. In the first of these the spotted hyæna, the serval, and Kaffre cat lie side by side with the horse, grizzly bear, and slender rhinoceros (*R. Hemitœchus*),—see Falconer's *Palæontographical Memoirs*. To these African animals inhabiting the Iberian peninsula in the Pleistocene age, M. Lartet has added the African elephant and striped hyæna, found in a stratum of gravel near Madrid, along with flint implements. The hippopotamus, spotted hyæna, and African elephant occur in the caves of Sicily, and imply that in ancient times there was a continuity of land between that spot and Africa, just as the presence of the *Elephas antiquus* proves the non-existence of the Straits of Messina during a portion, to say the least, of the Pleistocene age. A small species of hippopotamus (*H. Pentlandi*) occurs in incredible abundance in the Sicilian caves. It has also been found in those of Malta along with an extinct pigmy elephant species (*E. Melitensis*). It has also been discovered in Candia and in the Peloponnese. For these animals to have found their way to these regions a continuity of land is necessary. The view advanced by Dr. Falconer and Admiral Spratt, that Europe was formerly connected with Africa by a bridge of land extending southwards from Sicily, is fully borne out by these considerations. The present physical geography of the Mediterranean has been produced by a depression of land to the amount of about 400 fathoms, by which the Sicilo-African and Ibero-African barriers have been submerged, and Crete and Malta separated from the South-European continent. It is extremely probable that this submergence took place at the same time that the adjoining sea bottom was elevated to about the same amount to constitute that region now known as the Sahara.

Pleistocene Caves of the Americas and Australia.—The Pleistocene caverns of the Euro-Asiatic continent contain the progenitors of the animals now to be found in some parts of the Old World, the extinct forms being closely allied to those now living in the same geographical provinces. Those of Brazil and of Pennsylvania present us with animals whose nearest analogues are to be found in North and South America, such as sloths, armadillos, and agoutis. Those, again, of Australia present us with marsupials only, allied to, or identical with, those of that singular continent.

The extinct forms in each case are mainly those of the larger animals, which, from their large size, and the fact of their only bearing one at a birth, would be specially liable to be beaten in the battle for life by their smaller and more fertile contemporaries, and less likely to survive those changes in their environment which have undoubtedly taken place in the long lapse of ages. It is, therefore, certain that the mammalian life in the Old, New, and Australian worlds was as well marked out into geographical provinces in the Pleistocene age as at the present time, and that it has been continuous in these areas from that remote time to the present day.

For caves of America see Lund, *Chron. des Sc. Nat.*, 2d ser., xiii. p. 313; *American Journal of Science and Art*, i. 1871. For those of Australia—Owen, *Brit. Ass. Rep.*, 1844; Mitchell, *Three Expeditions into Interior of Australia*, 1838, vol. ii.; Wood's *Geological Observations in South Australia*, 1862.

The fact that no caves contain remains more ancient than the Pleistocene age may be explained by the view that the caverns in which the animals of former periods took shelter have been removed by the process of subaërial denudation operating through long periods of time.

Prehistoric Caves of Neolithic Age in Europe.—The prehistoric caves are distinguished from Pleistocene by their containing the remains of domestic animals, and by the wild animals to which they have afforded shelter belonging to living species. They are divisible into three groups according to the traces of man which occur in them,—into Neolithic, Bronze, and Iron ages.

The Neolithic caves are widely spread throughout Europe, and have been used as the habitations and tombs of the early races who invaded Europe from the East with their flocks and herds. The first of these systematically explored was at Perthi Chwareu, near the village of Llandegla, Denbighshire, in 1869. In the following years five others were discovered close by, as well as a second group in the neighborhood of Cefn on the banks of the Elwy. They contained polished celts, flint flakes, rude pottery, and human skeletons, along with the broken bones of the pig, dog, horse, Celtic shorthorn, and goat. The remains of the wild animals belong to the wolf, fox, badger, bear, wild boar, stag, roe, hare, and rabbit. Most of the bones were broken or cut, and the whole group was obviously an accumulation which resulted from these caves having been used as dwellings. They had subsequently been used for burial. The human skeletons in them were of all ages, from infancy to old age; and the interments had been successive until each became filled. The bodies were buried in the contracted posture which is so characteristic of Neolithic interments generally. The men to whom these skeletons belonged were a short race, the tallest being about 5 feet 6 inches, and the shortest 4 feet 10 inches; their skulls are orthognathic, or not presenting jaws advancing beyond a vertical line dropped from the forehead, in shape long or oval, and of fair average capacity. The face was oval, and the cheek bones were not prominent. Some of the individuals were characterized by a peculiar flattening of the shinbone (platycnemism), which probably stood in relation to the free action of the foot that was not hampered by the use of a rigid sole or sandal. This, however, cannot be looked upon as a race-character, or as a tendency towards a simian type of leg. These Neolithic cave-dwellers have been proved to be identical in physique with the builders of the cairns and tumuli which lie scattered over the face of Great Britain and Ireland. (See Thurnam, *Crania Britannica.*) They have also been met with abundantly in France. In the Caverne de l'Homme Mort, for example, in the department of Lozère, explored in 1871, the association of remains was of precisely the same nature as those mentioned above, and the human skeletons were of the same small type. The same class of remains has also been discovered in Gibraltar, in the caves of Windmill Hill, and some others. The human remains examined by Professor Busk are of precisely the same type as those of Denbighshire. In the work of Don Manuel Gongora J. Martinez (*Antiguedades Prehistoricas de Andalusia*, 1868), several interments are described in the cave of Murcielagos, which penetrates the limestone out of which the grand scenery of the southern Sierra Nevada has been to a great extent carved. In one place a group of three skeletons was met with, one of which was adorned with a plain coronet of gold, and clad in a tunic made of esparto grass finely plaited, so as to form a pattern like that on some of the gold ornaments in Etruscan tombs. In a second spot further within, twelve skeletons formed a semicircle round one covered with a tunic of skin, and wearing a necklace of esparto grass, earrings of black stone, and ornaments of shell and wild-boar tusk. There were other articles of plaited esparto grass, such as baskets and sandals. There were also flint flakes, polished-stone axes, implements of bone and wood, together with pottery of the same type as that from Gibraltar. The same class of remains have been discovered in the Woman's Cave, near Alhama in Granada. From the physical identity of the human remains in all these cases it may be inferred that in the Neolithic age, a long-headed, small race inhabited the Iberian peninsula, extending through France, as far north as Britain, and to the north-west as far as Ireland,—a race considered by Professor Busk "to be at the present day represented by at any rate a part of the population now inhabiting the Basque provinces." This identification of the ancient Neolithic cave-dwellers with the modern Basque-speaking inhabitants of the Western Pyrenees is corroborated by the elaborate researches of M. Brocas, Professor Virchow, and Dr. Thurnam into modern Basque skulls. It may therefore be concluded that in the Neolithic age an Iberian population occupied the whole of the area mentioned above, inhabiting caves and burying their dead in caves and chambered tombs, and possessed of the same habits of life. The remains of the same small, oval-featured, long-headed race have been found in Belgium in the cave of Chauvaux.

There is no evidence that any other race except the Iberic buried their dead in the caves of Britain. In Belgium, however, the exploration of the cave of Sclaigneaux by M. Soreil proves that broad-headed men of the type defined by Professor Huxley and Dr. Thurnam as brachycephalic, and characterized by high cheek bones, projecting muzzles, and large stature, the average height being 5·84 inches (Thurnam), inhabited and buried their dead in the caves of that region. In France they occur in the sepulchral cave of Orrouy (Oise) in association with those of the Iberic type. They have also been met with in Gibraltar. This type is undistinguishable from the Celtic or Gaulish, found so abundantly in the chambered tombs of the Neolithic age in France. Both these ancient races are represented at the present day by the Basques and Aquitanians of France and Spain, and by the Celts or Gauls of France, Britain, and the Mediterranean border of Spain, their relative antiquity being proved by an appeal to their history and geographical distribution. For just as the earliest records show that the Iberic power extended as far north as the Loire, and as far east as the Rhone, so we have proof of the gradual retrocession of the Iberic frontier southwards, under the attacks of the successive Celtic hordes, until ultimately we find the latter in possession of a considerable part of Southern Spain, forming by their union with the conquered the powerful nation of Celt-Iberi. The Iberians were in possession of the Continent before they were dispossessed by the Celts; they are recognized by Tacitus in Britain in the Silures of Wales; and they are still to be seen in the small, dark, lithe inhabitants of North Wales (see Dawkins, *Fortnightly Review*, October, 1874). From the present distribution of this non-Aryan race it is obvious that they were gradually pushed back westward by the advance of tribes coming from the East, and following those routes which were subsequently taken by the Low and High Germans.

The exploration of the Grotta dei Colombi, in the island of Palmaria, overlooking the Gulf of Spezzia, in 1873, proves that the stories scattered through the classical writers, that the caves on the Mediterranean shores were inhabited by cannibals, are not altogether without foundation. In it broken and cut bones of children and young adults were found along with those of the goat, hog, fox, wolf, wild-cat, flint flakes, bone implements, and shells perforated for suspension.

Prehistoric Caves of Bronze and Iron Ages.—The extreme rarity of articles of bronze in the European caves implies that they were rarely used by the Bronze folk for habitation or burial. Bronze weapons mingled with gold ornaments have, however, been discovered in the Heatheryburn Cave near Stanhope, Durham, as well as in those of Kirkhead in Cartmell, in Thor's Cave in Staffordshire, and the Cat Hole in Gower in Glamorganshire. In the Iberian peninsula the Cave of Cesareda, explored by Signor Delgado, in the valley of the Tagus, contained bronze articles, associated with broken and cut human bones, as well as those of domestic animals, rendering it probable that cannibalism was practised in early times in that region. Professor Busk believes, however, that the facts are insufficient to support the charge of cannibalism against the ancient Portuguese.

Caves containing articles of iron, and therefore belonging to that division of the prehistoric age, are so unimportant that they do not deserve notice in this place. As man increased in civilization he preferred to live in houses of his own building, and he no longer buried his dead in the natural sepulchres provided for him in the rock.

Prehistoric caves have been rarely explored in extra-European areas. Among those which abound in Palestine, one in Mount Lebanon, examined by the Rev. Canon Tristram, contained flint implements along with charcoal and broken bones and teeth, some of which may be referred to a small ox, undistinguishable from the small shorthorn, *Bos longifrons*. In North America the remains found by Mr. F. W. Putnam in the caves of Kentucky, consisting of moccasins, rudely plaited cloth, and other articles, may be referred to the same division.

Historic Caves in Britain.—The historic caves have only attracted notice during the last few years, and in Britain alone, principally through the labors of the Settle Cave Committee from the year 1869 to the present day. To them is due the exploration of the Victoria Cave, which had been discovered and partially investigated as early as the year 1838. It consists of three large ill-defined cham-

bers opening on the face of the cliff 1450 feet above the sea, and filled with *débris* very nearly up to the roof. It presented three distinct eras of occupation,—one by hyænas, which dragged into it rhinoceroses, bisons, mammoths, horses, reindeer, and bears. This was defined from the next occupation, which is probably of the Neolithic age, by a layer of gray clay, on the surface of which rested a bone harpoon, and a few flint flakes and bones. Then after an interval of *débris* at the entrance was a layer of charcoal, broken bones, fragments of old hearths, and numerous instruments of savage life associated with broken pottery, Roman coins, and the rude British imitations of them, various articles of iron, and elaborate personal ornaments, which implied a considerable development of the arts. The evidence of the coins stamps the date of the occupation of the cave to be between the first half of the 5th century and the English invasion. Some of the brooches present a peculiar flamboyant and spiral pattern in relief, of the same character as the art of some of the illuminated manuscripts, as for example one of the Anglo-Saxon gospels at Stockholm, and of the gospels of St. Columban in Trinity College, Dublin. It is mostly allied to that work which is termed by Mr. Franks late Celtic. From its localization in Britain and Ireland, it seems to be probable that it is of Celtic derivation; and if this view be accepted, there is nothing at all extraordinary in its being recognized in the illuminated Irish gospels. Ireland, in the 6th and 7th centuries, was the great centre of art, civilization, and literature; and it is only reasonable to suppose that there would be intercourse between the Irish Christians and those of the west of Britain, during the time that the Romano-Celts, or Brit-Welsh, were being slowly pushed westwards by the heathen English invader. Proof of such an intercourse we find in the brief notice of the *Annales Cambriæ*, in which Gildas, the Brit-Welsh historian, is stated to have sailed over to Ireland in the year 565 A.D. It is by no means improbable that about this time there was a Brit-Welsh migration into Ireland, as well as into Brittany. Objects with these designs found in Germany are probably directly or indirectly due to the Irish missionaries, who spread Christianity through those regions. The early Christian art in Ireland grew out of the late Celtic, and is to a great extent free from the influence of Rome, which is stamped on the Brit-Welsh art of the same age in this country.

Several other ornaments with enamel deserve especial notice. The enamel composed of red, blue, and yellow has been inserted into the hollows in the bronze, and then heated so as to form a close union with it. They are of the same design as those which have been met with in late Roman tumuli in this country, and in places which are mainly in the north. They all belong to a class named late Celtic by Mr. Franks, and are considered by him to be of British manufacture. This view is supported by the only reference to the art of enamelling furnished by the classical writers. Philostratus, a Greek sophist in the court of Julia Domna, the wife of the Emperor Severus, writes, "It is said that the barbarians living in the ocean pour these colors (those of horse-trappings) on heated bronze, and that these adhere, grow as hard as stone, and preserve the designs that are made in them." It is worthy of remark that, since the Emperor Severus built the wall which bears his name, marched in person against the Caledonians, and died at York, the account of the enamels may have reached Philostratus from the very district in which the Victoria Cave is situated.

Associated with these were bronze ornaments inlaid with silver, and miscellaneous iron articles, among which was a Roman key. Remains of this kind have been met with in the Albert and Kelko caves in the neighborhood, in that of Dowkerbottom near Arncliffe, in that of Kirkhead on the northern shore of Morecomb Bay, in Poole's Cavern near Buxton, and in Thor's Cave near Ashbourne.

It is obvious in all these cases that men accustomed to luxury and refinement were compelled, by the pressure of some great calamity, to flee for refuge to caves with whatever they could transport thither of their property. The number of spindle-whorls and personal ornaments implies that they were accompanied by their families. We may also infer that they were cut off from the civilization to which they had been accustomed, because in some cases they extemporized spindle-whorls out of fragments of Samian ware, instead of using those which were expressly manufactured for the purpose. Why the caves were inhabited is satisfactorily explained by an appeal to contemporary history. In the pages of Gildas, in the *Anglo-Saxon Chronicle*, and in the *Annales Cambriæ*, we have a graphic picture of that long war of invasion by which the inhabitants of the old Roman province of Britannia were driven back by the Jutes, Angles, and Saxons, who crossed over with their families and household stuff. Slowly, and in the chances of a war which extended through three centuries, they were gradually pushed back into Cumberland, Wales, and West Somerset, Devon, and Cornwall. While this war was going on the coinage became debased, and Roman coins afforded the patterns for the small bronze minimi, which are to be met with equally in these caves and in the ruins of Roman cities. As the tide of war rolled to the west, the English tongue and, until towards the close of the struggle, the worship of Thor and Odin supplanted the British tongue and the Christian faith, and a rude barbarism replaced what was left of the Roman civilization in the island. It is to this period that relics of this kind in the caves must be assigned. They are traces of the anarchy of those times, and complete the picture of the desolation of Britain, revealed by the ashes of the cities and villas that were burnt by the invader. They prove that the vivid account given by Gildas of the straits to which his countrymen were reduced were literally true. The historic caves of the Continent have not as yet been explored.

List of Principal Animals and Objects found in Brit-Welsh strata in Caves.

Animals.	Victoria.	Kelko.	Dowker-bottom.	Kirk-head.	Poole's Cavern.	Thor's Cave.
DOMESTIC—						
Canis familiaris. Dog	×	×	×	×	×	?
Sus scrofa. Pig	×	×	×	×	×	?
Equus caballus. Horse	×	×	×	×	×	?
Bos longifrons. Celtic short-horn.	×	×	×	×	×	?
Capra hircus. Goat	×	×	×	×	×	?
WILD—						
Canis vulpes. Fox	×	...	×	×	×	?
Meles taxus. Badger	×	...	×	...	...	×
Cervus elaphus. Stag	×	...	×	×	×	?
Cervus capreolus. Roe.	×	...	×	×	...	?
Roman coins, or imitations	×	×	×	×	×	×
Enamelled ornaments, in bronze.	×	×	×	×	...	...
Bronze ornaments, inlaid with silver.	×	×	×		×	...
Iron articles	×	×	×	...	×	×
Samian ware	×	...	×	...	×	×
Black wear	×	×	×	...	×	×
Bone spoon fibulæ	×	×	×	...	...	...
Bone combs.	×	×	×	...	...	×

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CAVE, EDWARD (1691–1754), an English printer, was born at Newton in Warwickshire, in 1691. He was placed by his father, who was a shoemaker at Rugby, at the famous school of that town, but being accused of robbing the hen-roost he was forced to leave. He became clerk to a collector of the excise; but the drudgery and insolence to which he was subjected by his master's wife caused him to try his fortunes in London, and after having been engaged for some time by a timber-merchant, he was finally bound apprentice in the printing-office of Mr. Collins. In two years he attained so much skill in his art, that he was sent to conduct a printing-house at Norwich, and publish a weekly paper. In this undertaking he met with some opposition, which produced a public controversy and procured young Cave the reputation of a writer. The only

work of any size, however, which he left was *An Account of the Criminals*. He held for a short time the office of clerk of the franks, but his rigor in checking abuses soon caused his dismissal. He now embarked the capital which he had acquired in the publication of the *Gentleman's Magazine*, a periodical which procured a fortune for the projector, and survived almost all its competitors. It is as the founder of this magazine, and as the first to give literary employment to Samuel Johnson, that Cave's name has been remembered. He died on the 10th January, 1754. Dr. Samuel Johnson wrote a short biography of Cave.

CAVE, Dr. William (1637–1713), an English divine, was born at Pickwell in Leicestershire. He was educated at St. John's College, Cambridge, and became successively minister of Hasely in Oxfordshire, of All-Hallows the Great of Islington in London, and of Isleworth in Middlesex. He was chaplain to Charles II., and in 1684 was installed as a canon of Windsor. The two works on which his reputation principally rests are the *Apostolici*, or History of Apostles and Fathers in the three first centuries of the church (1677), and *Scriptorum Ecclesiasticorum Historia Literaria* (1688). The best edition of the latter is the Clarendon Press, 1740–3, which contains additions by the author and others. In both works he was drawn into controversy with Leclerc, who was then writing his *Bibliotheque Universelle*, and who accused him of partiality.

Besides these, he wrote *Primitive Christianity, or Religion of the Ancient Christians, &c.; Tabulæ Ecclesiasticæ; Antiquitates Apostolicæ; A Dissertation concerning the Government of the Ancient Church, &c.; Ecclesiastici, or History of the Fathers of the 4th century;* and a work entitled *Chartophylax Ecclesiasticus*, which is an abridgment of the *Historia Literaria*.

CAVEDONE, Jacopo (1577–1660), an Italian painter, born at Sassuolo in the Modenese, was educated in the school of the Caracci, and under them painted in the churches of Bologna. His principal works are the Adoration of the Magi, the Four Doctors, and the Last Supper; and more especially the Virgin and Child in Glory, with San Petronio and other saints, painted in 1614, and now in the Bolognese Academy. Cavedone became an assistant to Guido in Rome; his art was generally of a subdued undemonstrative character, with rich Titianesque coloring. In his declining years his energies broke down after the death of a cherished son; and he died in extreme poverty, in a stable in Bologna.

CAVENDISH, Henry (1731–1810), a chemist and natural philosopher, was the son of Lord Charles Cavendish, brother of the third duke of Devonshire, and of Lady Anne Grey, daughter of the duke of Kent. He was born at Nice on the 10th October, 1731. Little is known about his early education. He was for some time at Newcombe's school at Hackney, and afterwards went to Cambridge. Probably his taste for experimental research was mainly acquired from his father, who gave some attention to meteorological observations, and whose very accurate determination of the depression of mercury in barometrical tubes has formed the basis of some of the most refined investigations of modern times. The morbid sensibility of his nature, which led him to shrink from society, would also have an influence in determining his choice of a scientific life; and he was free to follow his bent, as his allowance from his father was amply sufficient for his wants, and a large inheritance left him by one of his uncles put him in possession of abundant means for prosecuting his scientific investigations. In the latter part of his life, indeed, he was not less famed in his country for the great accumulation of his property than for his intellectual and scientific treasures. His merits in science were more generally understood on the Continent; and he was made, though not till he had passed the age of seventy, one of the eight foreign associates of the Institute of France. He resided principally at Clapham Common, but his library was latterly at his house in Bedford Square; and after the death of his librarian, he appointed a day on which he attended in person to lend any work to such men of letters as were either personally known to him or recommended by his friends. So methodical was he that he never took down a book for his own use without entering it in the loan book. In 1760 he became a member of the Royal Society. He was constantly present at the meetings of the society, as well as at the conversations held at the house of the president; and he dined every Thursday with the club composed of its members. Otherwise he had little intercourse with society, even with his own family. He saw only once a year the person whom he had made his principal heir. His dinner was ordered daily by a note placed on the hall table, and his female domestics had orders to keep out of his sight on pain of dismissal. His person was tall and rather thin; his dress was singularly uniform, although sometimes a little neglected. He had a slight hesitation in his speech, and an air of timidity and reserve that was almost ludicrous. He died unmarried on the 24th of February, 1810, leaving a property in the funds of about £700,000, and a landed estate of £6000 a year. Some of his warmest admirers have expressed regret that no portion of that vast wealth was appropriated to scientific objects.

For almost fifty years after Cavendish became a member of the Royal Society, he continued to contribute to the *Philosophical Transactions* some of the most interesting and important papers that have appeared in that collection; in which the precision of experimental demonstration, no less than the important scientific facts communicated, has been thought to have aided the further progress of chemical discovery. He may almost be called the founder of pneumatic chemistry, which had barely an existence when he began his researches. In a series of "Three papers, containing Experiments on Factitious Air," *Phil. Trans.*, 1766, p. 141, he describes the apparatus used in processes of this kind, which he had improved by the occasional employment of mercury. By weighing a bladder filled with a known bulk of inflammable air (hydrogen), and then in a state of collapse, and by examining the loss of weight during the solution of zinc in an acid, he found the specific gravity of inflammable air to be about $\frac{1}{11}$th of that of common air, a discovery which led to balloon experiments and projects for aërial navigation. He also observed that the gas obtained during the solution of copper in muriatic acid was rapidly absorbed by water, but did not inquire further into its nature. The second paper refers to fixed air (carbonic acid), which was found to undergo no alteration in its elasticity when kept a year over mercury, to be absorbed by an equal bulk of water or of olive oil, and by less than half its bulk of spirit of wine, to exceed the atmospheric air in specific gravity by more than one-half, and to render it unfit for supporting combustion even when added to it in the proportion of only 1 to 9. In the third part, the air produced by fermentation and putrefaction is examined, and is shown to be identical with the fixed air obtained from marble. It is also shown that the inflammable air emitted during putrefaction resembles that which is procured from zinc, although it appears to be a little heavier.

A paper on "Experiments on Air," *Phil. Trans.*, 1784, p. 119, contains an account of two of the greatest discoveries that have ever been made in chemistry,—the composition of water, and that of nitric acid. Cavendish first establishes the radical difference of hydrogen from nitrogen, and then relates his experiments on the combustion of hydrogen with oxygen, which had partly been suggested by an observation of Mr. Waltire, a lecturer on natural philosophy, and which prove that pure water is the result of the process, provided that no nitrogen be present. The second series of experiments shows that when phlogisticated air (nitrogen) is present in the process, some nitric acid is produced, and that this acid may be obtained from atmospheric air, by the repeated operation of the electrical spark. In another paper on "Experiments on Air," *Phil. Trans.*, 1785, p. 372, the composition of nitric acid is further established, and it is shown that nearly the whole of the irrespirable part of the atmosphere is convertible into this acid, when it is mixed with oxygen and an electric spark is passed through the mixture,—the fixed air sometimes obtained being due to the presence of organic substances.

Besides the above, Cavendish contributed a number of other papers to the *Philosophical Transactions*. In an "Account of a New Eudiometer," *Phil. Trans.*, 1783, p. 106, he attributes the great difference in the results of eudiometrical experiments with nitrous gas, or nitric oxide, to the different degrees of oxygenization of the acid that is formed. But he found that when the method employed was the same, there was no sensible difference in the constituent parts of the atmosphere under circumstances the most dissimilar,—the air of London, with all its fires burning in the winter, appearing as pure as the freshest breezes

of the country. In "An Attempt to explain some of the principal Phenomena of Electricity by means of an Elastic Fluid," *Phil. Trans.*, 1771, p. 584, his theory of electricity agrees with that which had been published a few years before by Æpinus, but he has entered more minutely into the details of calculation. The law of electric attraction and repulsion had not at that time been fully ascertained, but Cavendish inclines to the true supposition, of forces varying inversely as the square of the distance. In his "Observations on Mr. Hutchin's Experiments for determining the degree of cold at which quicksilver freezes," *Phil. Trans.*, 1783, p. 303, he denied to heat the character of a substance, and thought "Sir Isaac Newton's opinion, that heat consists in the internal motion of the particles of bodies, much the most probable,"—a view which it was one of the first of Sir Humphrey Davy's objects to confirm. The apparatus which Cavendish employed in his "Experiments to determine the density of the Earth," *Phil. Trans.*, 1798, p. 469, had been invented and constructed many years before by the Rev. John Michell, who did not live to perform the experiments for which he intended it. The method employed was to suspend by a vertical wire a horizontal bar, having a leaden weight at each end; to determine the magnitude of the force of torsion by the time occupied in the lateral vibrations of the bar; and to measure the extent of the change produced in its situation by the attraction of two large masses of lead placed on opposite sides of the case containing the apparatus, so that this attraction might be compared with the weight of the balls, or, in other words, with the attraction of the earth. In this manner the mean density of the earth was found to be five and a half times as great as that of water.

There has been some difference of opinion as to the attitude of Cavendish towards the antiphlogistic theory of Lavoisier. Cavendish by no means dissented from the whole of that theory. In the "Experiments on Air," *Phil. Trans.*, 1784, he quotes Lavoisier and Scheele with approbation, as having suggested the opinion "that dephlogisticated air and phlogisticated air are quite distinct substances, and that common air is a mixture of the two." Afterwards he says that "not only the foregoing experiments, but most other phenomena of nature, seem explicable as well, or nearly as well, upon this as upon the commonly believed principle of phlogiston." M. Cuvier has even asserted that the antiphlogistic theory derived its first origin from one great discovery of Cavendish, that of the nature of hydrogen, and owed its complete establishment to another, that of the composition of water.

Cavendish possessed a clearness of comprehension, and an acuteness of reasoning, which had been the lot of very few of his predecessors from the days of Newton. The splendid career of chemical investigation, which has since been pursued with a degree of success unprecedented in history, may be said to have been first laid open to mankind by his labors.

CAVENDISH, Margaret. See Newcastle, Duchess of.

CAVENDISH, Thomas (1560–1592), the third circumnavigator of the globe, was born at Trimley St. Mary, in Suffolk, in 1560. For a short time he studied at Corpus Christi College, Cambridge, but quitting the university without a degree, he followed the court, and in a few years squandered away nearly all his inheritance. Turning his attention to maritime adventure with a view to repairing his fortune, he fitted out a ship in which he accompanied the expedition sent to Virginia in 1585 under the command of Sir Richard Grenville. On his return he resolved upon a predatory expedition against the Spaniards in the New World. Accordingly, on July 21, 1586, he sailed from Plymouth with three small vessels, passed through the Straits of Magellan, cruised along the coasts of Chili, Peru, and Mexico, and burnt and sunk nineteen ships, including the "Santa Anna," a vessel belonging to the king of Spain, with a cargo of immense value, which he captured off the coast of California. Returning home with his plunder by the Cape of Good Hope he reached Plymouth, September 9, 1588, having circumnavigated the globe in two years and fifty days. It is said that his sailors were clothed in silk, his sails were damask, and his topmast covered with cloth of gold. His hastily-acquired riches did not last long, for in 1591 he had reduced himself to the necessity of undertaking another expedition with five vessels. This voyage was a most disastrous one. His crews were mutinous, and after leaving the Straits of Magellan they obliged him to steer for England. At this he became dispirited, and died of grief on the homeward voyage in 1592. The only geographical discovery of any importance which can be attributed to Cavendish is that of the harbor named by him Port Desire, on the east coast of Patagonia.

CAVENDISH, Sir William, the second son of Thomas Cavendish of Cavendish in Suffolk, clerk of the pipe in the reign of Henry VIII., was born about the year 1505. Having received a liberal education, he was taken into the family of Cardinal Wolsey, whom he served in the capacity of gentleman-usher of the chamber. Cavendish was with Wolsey when he died, and delayed going to court till he had seen his remains decently interred. The king was so far from disapproving of his conduct that he immediately took him into his household, made him treasurer of his chamber and a privy-councillor, and afterwards conferred on him the order of knighthood. He was also appointed one of the commissioners for receiving the surrender of religious houses. In 1540 he was nominated one of the auditors of the court of augmentations, and soon afterwards obtained a grant of several considerable lordships in Hertfordshire. In the reign of Edward VI. his estates were much increased by royal grants in seven different counties; and he appears to have continued in high favor at court during the reign of Queen Mary. He died in 1557. Sir William was the founder of Chatsworth, and of the vast fortunes of his descendants, the dukes of Devonshire. He wrote *The Life and Death of Cardinal Wolsey*, of which a mutilated copy appeared in 1641. It was first correctly printed in Dr. Wordsworth's *Ecclesiastical Biography*.

CAVENDISH, William, first duke of Devonshire. See Devonshire, Duke of.

CAVITE, a fortified seaport town of the Philippines, capital of a province of the same name in the Island of Luzon, nine miles south of the city of Manila, on a tongue of land in the bay. It was formerly the head naval depôt of the Spanish possessions in the East, and has an arsenal, a hospital, two churches, and three convents.

CAVORE, or Cavour, a town of Italy in the province of Turin, 25 miles south-west of the city of that name. It carries on silk-spinning and linen-weaving, as well as a trade in grain. In 1433 it was bestowed by Amadeus VIII. of Savoy on the lords of Raconis, and in the 16th and 17th centuries it appears from time to time in the various wars and revolutions. In more recent days it has given its name to the great statesman of Italy whose family were raised to the marquisate of Cavour in the middle of the last century. An earthquake did considerable damage to the town in 1808. Population, 7380.

CAVOUR, Count (1810–1861). Camillo Benso di Cavour, the regenerator of Italy, and one of the greatest of modern statesmen, was born at Turin on the 1st of August, 1810. The family of the Bensi was a very ancient one. The founder of it, a Saxon warrior named Hubert, after following Barbarossa in his Italian wars, and making a pilgrimage to the Holy Land, married a Piedmontese heiress about the middle of the 12th century, and settled on the very estate of Santena where the remains of his great descendant were lately laid. In the early part of their history, the Bensi seem to have been connected with the small neighboring republic of Chieri, later with the House of Savoy, which gradually gained the upper hand in those parts of Northern Italy. Their life, like that of other feudal barons, was stirring, rough-handed, and adventurous. Members of the family are frequently to be met with in history, but none of them eminent enough to deserve mention here. In the middle of last century the head of the Bensi was raised to the dignity of marquis, under the name of Cavour. Accordingly, at the beginning of this century we find the father of the great statesman in possession of the title of marquis. He had married a Genevese lady of rank, and both held offices in the household of the Prince Borghese, husband of the Princess Pauline, the beautiful sister of Napoleon, who was governor of Piedmont in those days when Europe lay at the feet of the French conqueror. Under these circumstances was the future deliverer of Italy born, the second son of this Piedmontese nobleman and of his Genevese wife. The Princess Pauline, the sister of one Napoleon, and aunt of another, who have so powerfully influenced the destinies of Italy, presented the infant Camillo at the font.

Cavour spent the first ten years of his life in his father's house at Turin, enjoying all the advantages which favor the full and genial development of both mind and body. The old marquis, who became a decided conservative after the Revolution, was a wise and benevolent father, and an upright man. He enjoyed the care, too, of an accomplished mother, of a grandmother still more accomplished, and of two aunts, who, having no children of their own, naturally bestowed all their affection on him and his elder brother. For some time he had no love for his lessons; in fact, he had a perfect horror of them. The probability is that the buoyancy and energy of his nature made him averse to such restraint. He was an active, energetic boy, full of animal spirits and never tired of play, strong of will, yet genial and good-natured. In a little time he became a voracious reader, but as full of frolic as ever. At ten years of age Camillo, being intended for the army, left home to enter the military academy. There he studied hard, especially mathematics. As he afterwards regretted, the literary side of his education had been neglected,—perhaps because he had never been attracted to literature by any of those circumstances which call forth a dormant power, perhaps because the original bent of his mind was too strong towards the clear and the utilitarian. Mathematics satisfied his love for definite statement and clear demonstrative argument. He had no inclination towards metaphysics, had little imagination, and was never tempted to run after vague ideals. The only speculations he indulged in were social, political, or industrial, those, in fact, which are closely connected with tangible and positive interests. But his after career as plainly shows that he was capable of a deep and absorbing enthusiasm, which was all the more powerful and effective, because disciplined by a sure judgment and a wise patience.

Anyhow, he was a very successful student in the subjects taught at the military academy. This is proved by the fact, that he was appointed to a commission in the engineers at the age of sixteen, though by the rules of the service it was not under twenty such a post could be granted.

At the military academy an incident occurred which is a clear indication of his character, and helped greatly to determine his future career. Being the son of a noble family, he was honored with the dignity of page in the royal household. An ordinary boy would have been highly delighted with this introduction to court life; but to Cavour its restraints, its etiquette, and its livery were a galling load, and, as he was by no means ready to learn the lessons of what is called a wise reticence, he was soon relieved of the honor, and marked as a dangerous fellow. During his brief military career he seems to have been stationed mostly at Genoa. This was a more independent life than he had hitherto led; and at Genoa, where the liberal element was naturally stronger than at the court and capital, young Cavour felt himself more at his ease than ever he had been at Turin. But when the shock of the French Revolution of the year 1830 began to be felt in Italy, and when men thought themselves at liberty once more to express their opinions on the state of their native country, Cavour was soon caught offending by the same excessive freedom of speech. He was sent, therefore, in a kind of honorable banishment to Fort Bard in the Val d'Aosta, nominally to superintend some mason-work there, but really as a chastisement for his imprudence, and in the hope of a course of solitary reflection leading him at last to acquiesce in the existing state of things. Here Cavour was reduced to great straits for want of society, being obliged to while away his time at a certain game of tarots with the contractors. After six months he grew weary of it and sent in his resignation (1831).

He had now reached a most important turning-point in his career. Set adrift from the profession for which he had been educated, and suspected at court, there were three courses open to him,—to retire into private life in Piedmont, or to go abroad and quietly await a favorable opportunity for taking part in the deliverance of his country, or to join in the frequent conspiracies of the Carbonari and others for its immediate emancipation. The state of Italy was such as to justify the most extreme methods. He was now arrived at a time of life at which he could realize the full measure of the sufferings and humiliations his country had undergone. Endowed with the all too fatal gift of beauty, and covered with a population which has excelled in every department of human activity, in arts and literature, in commerce and navigation, but was too disunited and far too demoralized to defend her, Italy had for centuries been the prey of every spoiler, of the Saracen and the German, the Frenchman and the Spaniard. Her national life had been repressed, her commerce ruined, her intellectual growth stifled, and the very soul of her people debased and perverted by priestcraft and foreign despotism. To most other nations their native land was an object of pride and affection, to the Italians Italy was the theme of shame and burning tears. The entrance of the armies of Republican France into Italy had been greeted as the dawn of deliverance, but in a little time their deliverers proved themselves to be only new masters. Yet the French occupation had the good effect of diffusing the liberal ideas of the French thinkers, and of accustoming the Italians to a comparatively just and well-ordered government, so that the desire for national regeneration became more ardent than ever. Then came the Peace of Vienna, which gave Austria direct or indirect rule over the whole of Italy, and in 1820 the rising in Naples and Piedmont, which furnished that power with the pretext of armed intervention, and the excuse for riveting still faster the chains of the enslaved. At this period, then, the prospects of Italian liberty seemed darker than ever. Even Sardinia, though preserved from the worst reactionary extreme by the hatred of Austria, had been compelled to yield to the prevailing current. Charles Albert himself, the leader of the rising in Piedmont in 1821, was fain to atone for his liberal courses by joining in the worst measures of the reaction, and, when he ascended the throne in 1831, was instructed that he held his place only on his good behavior. In fact, from the beginning of his reign to 1847, when the revolution recommenced, he was only the nominal ruler of Sardinia; his ministers were the creatures of Austria, and received their instructions from Metternich. It is necessary to remember these circumstances if we are to appreciate rightly the services of Cavour. We must compare the Italy he has made, not with countries which have for centuries had a free development of their national life, but with Italy of 1820 or 1830, with Italy oppressed, demoralized, and disunited, while the noblest of her sons languished in Austrian prisons, or fretted their lives away in exile or in vain conspiracy. In these circumstances, Cavour, a youth of twenty, might have been led to join the secret societies which, under the direction chiefly of Mazzini, waged ceaseless war against the oppressors of Italy. From this his good sense happily saved him Though prophetically aware of the near advent of democracy as the ruling power in the world, he saw that conspiracies could not deliver Italy, that fitful plots backed by irregular bands were useless against a regular Government supported by veteran armies, and that fretful outbreaks would only irritate Austria and excuse further oppression without doing her any real injury. Being, therefore, unable to tolerate the policy of the clerical and aristocratic party of the time, and entirely disapproving of the methods of the Carbonari and "Young Italy," he saw that the best course in politics was a watchful inactivity. For sixteen years he was obliged to wait in private life, a keen and patient observer, acquiring that ripe and comprehensive wisdom which should fit him to be an effective servant of his country. During these long years we find him active in three special ways,—as the skilful promoter of the material interests of his country, especially in agriculture, as a keen student and observer of foreign countries, especially France and England, and as the author of papers in which he embodied some of the results of his observations.

Though, at first, it is said, he could scarcely distinguish between a cabbage and a turnip, he soon made himself complete master of the theory and practice of agriculture, introduced vast improvements on the family estates, and was one of the founders of the Agricultural Society of Piedmont in 1841. So in the application of steam to material and social improvement, in establishing steamers on the Lake Maggiore, in the erection of steam-mills and chemical works, and in the furtherance of railways, as well as in founding the Bank of Turin, he took a leading part. These were good in themselves, but Cavour had a patriotic end in view; he knew that they were the sure basis of national and social improvement, and the best possible introduction to it. In his study of foreign countries, though he had an open, penetrating eye for all phases of

their national life, it was with the same continual reference to the good of Italy that he observed and meditated. He was several times at Paris, and at least twice in England, and was perfectly familiar with the language and economic and political condition both of England and of France. Such French statesmen as Guizot and the Duc de Broglie he highly esteemed; and he was always an ardent, though by no means unqualified, admirer of England. In the early part of his public career, when his opposition to the revolutionary fanaticism made him unpopular, the charge of Anglomania was frequently brought against him. During these years, too, he wrote various reviews, all of which give the results of studies, bearing on the economic or political questions of the time, and bear, all of them, the impress of that practical moderation and penetration which were such essential elements in his character. These sixteen years were in every sense the training time of Cavour. Under the combined influence of practical experience in the conduct of business, and of philosophic insight into the principles of free government, as exhibited especially in England, he grew into that capable man who should guide Italy through the troubles of a very trying struggle to the honorable place she now occupies among the free nations of the earth. The years of waiting at length came to an end. Towards the end of 1847 all the provinces of Italy were in a highly-wrought state of revolutionary excitement. Pius IX., the new Pope, had put himself at the head of the movement, and, the clerical and liberal parties being thus united, the most extravagant hopes were entertained. The revolution carried everything before it, threatening only by its growing violence to defeat its own ends. Cavour saw the time for action was come, and, along with his friends Balbo and Santa Rosa, instituted at Turin a newspaper called the *Risorgimento*, as the organ of their common opinions, while, on the promulgation of the new constitution for Sardinia, which he was the first to suggest, he took his seat in the Chamber as one of the members for the capital. Having long meditated on the political situation of Italy, and being perfectly at home on all political questions, he took a decided attitude from the beginning. As a conscientious adherent of the principles of the *juste milieu*, he opposed in the firmest way the irregular fervor of the revolution; and as a practical man, he was ready so far to yield to its fury, in order, by thus yielding, to command it and utilize its strength. In the same way he desired to restrain the violence of the war party; but after the example of Paris had encouraged the people of Milan and Venice to rise against Austria, he saw that the time for politic hesitation had gone by, and with all ardor sounded the call to arms. Again, when the reaction had regained the upper hand at Naples, and Radetzki had defeated the Sardinian forces at Custozza, he was convinced that there was no more hope of success, and counselled peace. Still more so after Novara. In the Sardinian Chamber parties rose and fell without changing the attitude of Cavour; resolved on advocating the measures which were for the time most conducive to the good of Piedmont and of Italy, he supported the party that he deemed most likely to carry them out, without regard to its colors. For some time he was one of the most unpopular men in Turin; the advanced party hated him for his moderation, and the conservatives for his liberalism; as a moderate liberal he often stood almost alone. But gradually the real greatness of his character began to appear above the contending elements which surrounded and obscured it. Passing on from those years of excitement and despair, when the hopes of Italy seemed again indefinitely deferred, to the beginning of 1853, when the elections after his first elevation to the premiership took place, we find the extreme left almost annihilated, and the extreme right greatly reduced in members. How had this change taken place? Five years of hard, adverse experience had taught his countrymen that he was right. Opposed to the excesses of the revolution, when the revolution was at its height, and to the pretensions of clericalism, when the revolution was for a time discredited, he was the real fixed point in the ever-shifting chaos, and the elements of confusion gradually gathered round him. Time, that tests all opinion and all character, had proved the soundness of his.

From 1850 to 1852 Cavour was an active member of Azeglio's administration; from 1852 to his death in 1861, he was, except for a short interval, the prime minister and virtual ruler of his country. From 1850 to 1855, when Sardinia began to take part in the Crimean War, the most conspicuous feature in his career was his relation to the church. With his usual penetration he soon perceived that the pretensions of the party now dominant at Rome were utterly incompatible with the rights of a free modern society, and that the only solution of the difficulty was, that the state, while recognizing the right of the church to perfect freedom within the spiritual sphere, should assert for itself the same freedom within the civil sphere; in his own words, he desired a free church in a free state. While an extreme party counselled the confiscation of the church property, Cavour merely asserted the right of the state to secure a more equitable distribution of it among the clergy. On the question of civil marriage, and of the immunity of the clergy from the civil jurisdiction, he asserted the principle that the state should be absolute master within its own domain; with the spiritual rights of the church he never interfered. Those years were marked, too, by many energetic measures for the material improvement of Sardinia. The principles of free trade were introduced as far as possible, and a more judicious taxation.

Cavour's proposal to join the alliance of the Western powers against Russia met with the most violent opposition from both the extreme parties in the Sardinian Chamber, and even some of the most influential members of his own cabinet threatened to resign. But the king supported him; the country, as a whole, trusted him; and in the spring of 1855 the Sardinian army was on its way to the East. This audacious step of the Sardinian minister, which engaged one of the smallest kingdoms of Europe in a conflict among the greatest empires, caused some doubtful reflections at the various courts. It was understood by all as a bold assertion of Italy; and an Austrian minister declared it a pistol-shot fired at the head of Austria. At first, too, the Sardinian army experienced a hard fortune. It was attacked by cholera, and, for a long time, no opportunity occurred for distinguishing itself on the field of battle. The worst auguries of the opposition seemed destined to be fulfilled, and their fiercest denunciations of an expensive and Quixotic expedition justified, when tidings came of the battle of the Tchernaya. The enthusiasm was universal, the opposition was silenced, and Cavour rose higher than ever in the national estimation.

Then came the peace, considerably to the disappointment of Cavour, who had expected a prolonged war, and perhaps a general state of confusion, in which an adventurous state like Piedmont, that had everything to gain and little to lose, might greatly profit. It was not without great hesitation that he resolved to be present at the Congress of Paris. Yet, when there, he maintained the cause of Italy not less effectively than the Sardinian army had done in the Crimea. In all the questions that turned up he bore himself with such tact, knowing well how far the modesty of his position imposed upon him the duty of silence, and so skilfully brought forward the astonishing resources of a mind deeply versed in European questions, that he was immediately recognized as one of the ablest living diplomatists, and took a place altogether out of proportion to the strength of the kingdom he represented. His most ardent wish was to see the grievances of Italy brought before the Congress. Accordingly, near the end of its sittings, Count Walewski, as president, introduced the subject, pointing out the danger to the European peace of the existing state of things, and suggested that a note should be addressed to the sovereigns of Italy counselling reform. This step took the members by surprise, and as Count Buol, the representative of Austria, protested against the discussion of the question, the matter ended, but not before Cavour had time to plead the cause of Italy. Afterwards, he followed up the advantage he had gained by a memorandum to the same effect addressed to the cabinets of London and Paris. Thus the gains of the war were not slight. The *morale* of the Piedmontese army had been restored, and the name of Italy, not as a geographical idea, but as a nationality, brought before assembled Europe. Above all, enlightened Italians now felt that they had found a *man;* no sentimental dreamer of liberty, nor a fanatical conspirator, but a wise statesman, deeply read in the secrets of European politics, capable of commanding at once the confidence of Italy and the respect of Europe.

What was scarcely less important was, that Napoleon

and France had become interested in Italy. Certainly, if Cavour had been free to choose, he would have preferred to inaugurate the regeneration of his country under the auspices of England. Her moral weight was greater, and she was less likely to exact painful sacrifices as the price of her support. His participation in the Crimean struggle had been above all advantageous to England; her liberal traditions and her feelings of gratitude alike led him to hope for her support. But to his chagrin, he found at the Congress that the state of European politics had made England the friend of Austria; and that his advocacy of the union of the Danubian Principalities in opposition to her views had alienated her, he soon found out in the coldness of the English ministers. Still he did not allow himself to be discouraged. He could count on Napoleon; Russia was estranged from Austria, Prussia was her rival in Germany, Hungary was discontented. To isolate Austria, to make friends of her enemies and rivals, to regain the good-will of England,—this was now the policy of Cavour. The hostility of Sardinia to Austria became every day more apparent and more provoking. The armaments of Sardinia, far too great for the resources or the ordinary requirements of the country, pointed to war as the only solution of standing difficulties. Accordingly, at Plombières, in the autumn of 1858, the programme of the war of 1859 was made out by the French Emperor and Cavour.

These were times of almost preternatural activity for Cavour. At one period or other he had filled almost every office in the administration; but in a crisis like the present, the constitution was suspended, and the prime minister became a kind of dictator, taking upon himself the entire government of the country, home and foreign affairs, and the ministry at war, as well as finance. The crisis was worthy of such a supreme effort, for bitterly disappointed as Cavour and the Italians were at the peace of Villafranca, the power of Austria in the peninsula had been broken, and Italy thenceforward had her destiny in her own hands.

On the conclusion of peace Cavour had resigned, but he returned to his post in January, 1860, to resume under different conditions the work interrupted at Villafranca. The task was a tortuous and delicate one, and required skilful managing. The possession of Lombardy and the overthrow of Austria were the tangible results of the late campaign. With regard to the rest of Italy, and in the further development of events, four influences had to be considered:—France, which was bound by the treaty of Villafranca to the restoration of the old rulers of Central Italy; Austria, which insisted on the fulfilment of this and other conditions of the treaty; England, where in obedience to public opinion, which now began to understand the real issues at stake in Italy, the Government inclined to let the people have their own way; and the people of Italy itself, decidedly anxious for Italian unity, but in danger of falling into the ruinous excesses of 1848. It was now the business of Cavour so to manage the course of diplomacy, as to prevent a collision with France or Austria, to gain time for the public opinion of Central and Southern Italy to declare itself, and to avoid everything like disunion or uproar in bringing the various provinces under the government of Victor Emmanuel. First, then, in early spring, the population of Tuscany and Emilia all but unanimously declared in favor of annexation, though this result was embittered by the consequent cession of Nice and Savoy to France, which claimed these districts as compensation and security. Cavour was severely reproached by many, and above all by Garibaldi, for this concession. But there are three considerations, which seem entirely to clear him from any appearance of want of patriotism,—the necessities of his position as regarded France, and the facts that the Savoyards are far more French than Italian, and from a geographical and military point of view belong more naturally to France than to Italy. In the south, where the Pope and the king of Naples still maintained a settled government, the unification of Italy seemed to meet with greater difficulties, when Garibaldi stepped forward to cut the knot. It was certainly not against the will of Cavour that the hero set out on his adventurous enterprise. He could evidently do nothing else than carefully watch the progress of the expedition, ready to own or disown it, according to the event. Accordingly, on Garibaldi's triumphant arrival at Naples, the Piedmontese army occupied the Marches and Umbria, crossed the Apennines, and on the plains of Campania shook hands with the volunteers of Garibaldi. The hero saluted Victor Emmanuel king of Italy. Next spring the first Italian Parliament met at Turin; and Cavour saw the dream of his youth realized. He had seen a new Italy spring from the ashes of the old, an Italy of representative government and of enlightened progress, the mistress of her own destinies, and a worthy member of the commonwealth of nations. Still much remained to be done, the sores caused by centuries of misgovernment required to be healed, the finances arranged, a navy created, the relations with the church regulated, and a thousand other matters attended to, ere the new Italy could answer to the ideal in the mind of Cavour. And now he was to be taken away in the very midst of his task. For many years, and especially during the slippery and delicate events of the last year, and during the harassing debates with the Garibaldian party as to the cession of Savoy and Nice, and the treatment of the volunteers, he had been doing an amount of work which no human strength could bear. There were premonitory symptoms enough; but the keen sense of the responsibilities weighing upon him seemed to increase as his strength declined. Medical men differed as to the precise form his disease took; but that overwork was the cause of it, no one doubted. After some days' illness, during which his feverish talk ran ever on Italy, he died on the 6th of June, 1861.

It is needless to describe the sensation caused by his death, and the passionate grief of every Italian patriot. It was felt by every enlightened man that a great and beneficent worker had passed away from the earth. The worthy countryman of Dante and Michelangelo, he had been privileged to achieve a mightier task than they; the one had written a great poem, and the other had executed certain noble works of art; Cavour recalled to life the nation they all loved so well.

Victor Emmanuel and Garibaldi did their part in the consummation of the great work, while without the help of France it clearly would have been impossible; but it must be admitted that Cavour was the indispensable person who brought all the other agencies into wise and effective action. To him it is chiefly due that Italy anticipated Germany in the recovery of her national rights, and led the way in two of the most salutary revolutions that have taken place in the history of the world. He, therefore, deserves to be gratefully remembered, not only as a true patriot, but as one of the benefactors of mankind.

Cavour was not eloquent in the ordinary acceptation of the word; but if the force of words is to be measured by their influence on the will of men, he was one of the most powerful speakers that ever lived; for he achieved what he did, not only as the adviser of the king, but as the leader in the Sardinian Chambers. In private life he was upright, genial, and forgiving. In public life, as we have seen, his one passion was the regeneration of Italy. In fact, few statesmen have left a more stainless name behind them. He was never married, and left his property to the children of his elder brother, who, it may be added, was a staunch adherent of the reactionary party.

See De la Rive, *Le Comte de Cavour: récits et Souvenirs*, 1862 (translated into English, same date); and a memoir by E. Dicey, 1861. (T. K.)

CAVY, a name common to several species of Rodents belonging to the family *Caviдæ*, all of which, at least in the wild state, are confined to the South American continent. They are small creatures, seldom exceeding a foot in length, burrowing in the ground, and feeding entirely on fruits and herbs. There are several species. (1.) The Patagonian Cavy (*Dolichotis patagonica*), larger than a hare, but somewhat resembling that rodent in external appearance, inhabits the dry sterile districts of Patagonia and La Plata, disappearing wherever the country becomes more humid. It is a shy creature, forming burrows in the earth, although in districts where the bizcacha is found, it is said to avail itself of the subterranean works of the latter. It feeds by day, roaming in search of food in small companies, "hopping," says Darwin, "one after the other in a straight line over the gravelly plain." Unlike other cavies, its eyes, like those of the kangaroo, are protected from the glare of the sun by prominent eyelashes. It is covered with a long

dense fur of a rusty color, and has a short tail. It produces two young at a birth. (2.) The Restless Cavy (*Cavia aperea*), found throughout Uruguay and Brazil, is supposed to be the wild form of the Guinea-pig of Europe. It is about 10 inches long, is destitute of a tail, and weighs a little over 1 lb; its fur is long and of a nearly uniform greyish-brown color. The aperea is rarely found in dry sandy localities, preferring marshes covered with aquatic plants, among which it lies concealed, feeding in the early morning and after sunset in the evening, but when the soil is dry it forms burrows like the other cavies. It is said to live in societies of from six to eighteen individuals, to breed but once a year, and to have one or at most only two young at a birth. The Guinea-pig (*Cavia cobaya* of some authors) was, according to the zoologists of the 16th century, unknown in Europe previous to the discovery of America, and there is little doubt that it was introduced from the southern division of that continent, the name of Guinea-pig being probably given by mistake for Guiana-pig. It differs, however, in many important respects from the wild aperea. It is somewhat larger, as might be expected in a cultivated form; the color of its fur is white, variegated with irregular patches of red and black. It perishes on the marshy soil which the other prefers; it produces a numerous progeny three times a year; and what is more important still, the two forms do not couple together, a difference which among wild species is usually held as indicating generic distinctness. It appears, from the drawing of Aldrovandus, that the Guinea-pig had already attained its present variegated coloring fifty years after the discovery of America, a fact which has led to the supposition that it had been previously domesticated by the natives of South America. Mr. Waterhouse, however, thinks it more probable "that some pretty variety had attracted the attention of the earliest European settlers in the New World, and given rise to its capture and domestication, more especially as the harmless disposition and pretty coloring of the common Guinea-pig appear to be the only claims of interest which are attached to it" (*Natural History of the Mammalia*, vol. ii.). It is a singularly inoffensive and defenceless creature, of a restless disposition, and greatly wanting in that intelligence which usually characterizes domestic pets, although it is said to show some discrimination. It is of no particular service to man, neither its flesh nor its fur being put to use, while the statement that its presence is sufficient to drive off rats and mice appears to be without foundation. It is exceedingly prolific, beginning to breed at the age of two months; the number of young varies, according to the age of the parent, from four to twelve. It has been calculated that a single pair of Guinea-pigs may prove the parent stock of a thousand individuals in a single year. (3.) The Bolivian Cavy (*Cavia bolivensis*), found throughout the higher regions of Bolivia, usually at an elevation of 10,000 or 12,000 feet, is exceedingly shy, and lives in burrows, these in some districts being so numerous as to have completely undermined the soil. (4.) The Rock Cavy (*Cavia rupestris*), distinguished by its short, blunt nails, is found in rocky situations throughout Brazil, and is much sought after for its flesh, which is considered a dainty by the Indians. (5.) The Southern Cavy (*Cavia australis*), common along the coast of Patagonia, forms deep burrows, with several outlets, in sandy declivities, and is said to climb trees in search of the fruit on which it feeds.

CAWNPUR [Cawnpore], a district of British India within the jurisdiction of the Lieutenant-Governor of the North-Western Provinces, lies in 25° and 26° N. lat., and 79° and 80° E. long. It is bounded on the N. by the province of Oudh, the Ganges River forming the boundary line; on the E. by Fathípur district, on the S. by the Jamná, separating it from Hamirpur and Jalaun districts, and on the W. by Etawah and Farrakhábád districts. The district is situated between the Ganges and Jamná rivers, and is a portion of the well-watered and fertile tract known as the Duáb. The general inclination of the country is from north to south. Besides the two great rivers, the principal streams are the Arand or Rhind, the Karan or Singar, the Isan, and the Pandu. An extension of the great Ganges Canal also passes through the district. The total area is 2336·53 square miles. The census of 1872 returned the total population of Cawnpur district at 1,156,055, made up as follows:—Hindus, 1,065,786, or 92·20 per cent. of the total population; Muhammadans, 89,215, or 7·72 per cent.; Christians (*i.e.*, Europeans, Eurasians, and native Christians), 1054, or ·08 per cent. Total number of villages and townships, 1985; total number of houses, 272,232. Only two towns in the district contain a population of upwards of 5000 souls, namely Cawnpur town and cantonments, population 122,778, and Bilhaur, population 5954. Of the total area of the district, viz., 2336·53 square miles, 1351·42 square miles are cultivated, and 236·15 cultivable, the remainder being uncultivable waste. The staple crop is wheat, but cotton of an excellent quality has of late years been much cultivated. The principal industry is leather work, which is very extensively carried on throughout the district,—Cawnpur saddlery and harness being exported to all parts of India. The trading towns of importance besides Cawnpur are,—Bilhaur, population 5954; Akbarpur, population 4911; and Kashipur, population 4663. Most of the towns and large villages have markets once or twice a week for the sale of local produce and cattle. The only regularly-constituted municipality in the district is Cawnpur, but ten small towns have a municipal committee, and carry out conservancy and sanitary arrangements, &c., by means of taxes assessed on the householders. The last settlement of the land revenue of the district expired in 1872, and a new one is in progress.

The district revenue in 1872–73 was £576,587, of which £212,276 was derived from land, £12,163 from opium, and £15,882 from stamps. The district police force in 1873 numbered 555, costing £9165, 8s.; the village watchmen, or rural police (maintained by the villagers), 2985, estimated cost £10,746; municipal police for eleven towns, 414 officers and men, costing £3183, 12s. At the charitable dispensaries 2634 patients received treatment during 1873, at a cost of £1131, 5d., of which Government contributed two-thirds. The Government and aided schools in the district in 1873 numbered 391, attended by 10,731 pupils.

Cawnpur City, the administrative headquarters of the district of the same name, and a large military cantonment, situated on the right or south bank of the Ganges, in 26° 29′ N. lat. and 80° 25′ E. long. The river here is about 500 yards wide in summer, but when swollen by the rains increases to about a mile in breadth, with a strong and rapid current. It is navigable southwards to the sea, a distance of 1000 miles; and upwards as far as Sukertál, 300 miles to the north-west. A bridge of boats crosses the Ganges at Cawnpur, and the *ghâts*, or landing-places, on the bank present a busy scene of commerce. The city is built on a sandy plain; and, together with the cantonments, contained in 1872 a total population of 122,778 souls, classified as follows:—Hindus, 90,582; Muhammadans, 31,888; Christians, 300. This classification apparently excludes the European soldiers. The cantonment forms one of the large military stations of Northern India, and has accommodation for 7000 fighting men. Excluding the cantonment, the population within the limits of the Cawnpur municipality amounted to 98,476 in 1872. The municipal income in 1871–72 amounted to £19,323, and the expenditure to £15,639. Cawnpur is a station on the East India Railway, and also a terminus of the Oudh and Rohilkhand Railway. The principal thoroughfare in the native town is the Chandni Chauk, or "street of silver," upwards of 100 feet in width. Cawnpur is noted for the excellence and cheapness of its leather manufactures, such as saddlery, harness, boots and shoes, &c.

History.—The importance of Cawnpur city dates from its selection as a military post, when the Ceded Provinces were acquired by the East India Company in 1801. The one great event in its history is the siege of the British position by the rebel Sepoys during the mutiny of 1857, and the treacherous massacre which followed on the surrender of the garrison. The story of the mutiny and massacre of Cawnpur has been fully chronicled by Sir J. W. Kaye, Colonel Mowbray Thomson, and Mr. G. O. Trevelyan. On the deposition of Máhárájá Báji Rao, the last Marhattá Peshwá, or sovereign of Puná, by the East India Company, he received an annuity of £80,000 a year, and had a princely residence assigned to him at Bithur, a short distance from Cawnpur. Here he lived in great state until his death in 1851. His heir was an adopted son, named Sirík Dandhu Panth, more commonly known as the Náná Sáhib, who succeeded to the late Peshwá's estate at Bithur, and to the great accumulations of wealth which he had left behind him. An application of Náná Sáhib for a continuance of the annuity or pension granted to his adoptive

father was, however, disallowed by the Indian Government; and on appeal, this decision was upheld by the Board of Control and by the Privy Council in England. For this refusal to grant what he looked upon as his right, Náná Sáhib cherished a bitter grudge against the English, which, however, he carefully concealed until the outbreak of the mutiny afforded him his opportunity for revenge.

In May, 1857, the European force in the Cawnpur cantonment consisted of a handful of artillery and infantry, making about 300 fighting men, including the English officers of the Sepoy regiments. The native force comprised the 1st, 53d, and 65th regiments of native infantry, and the 2d regiment of Bengal cavalry, about 3000 men in all. The division was commanded by General Sir Hugh Wheeler. The native troops began to manifest, early in 1857, the same symptoms of disquiet as other native regiments stationed in Bengal and Upper India. When the news of the outbreak at Meerut and Delhi reached Cawnpur, the excitement among the native soldiery, camp followers, and city population increased to such a degree that General Wheeler deemed it expodient to throw up defensive works, within which the whole Christian population might gather in the event of a rising. Unfortunately, the site chosen for the entrenchment proved unsuitable in almost every respect. "The fortifications," writes Sir John W. Kaye, "were so paltry, that an English subaltern could have ridden over them on a cast horse from the company's stud. The earthworks were little more than 4 feet high, and were not even bullet-proof at the crest. The apertures for the artillery exposed both our guns and our gunners, whilst an enemy in adjacent buildings might find cover on all sides." Towards the end of May it became evident that the rising of the Sepoys was only a question of time, and accordingly all women, children, and non-combatants were gathered within the improvised entrenchments. On the night of the 4th Jnne the crisis arrived. The 2d cavalry set the example of open rebellion, and were immediately followed by the 1st regiment of foot. The treasury was robbed, and the magazine, with its enormous supplies of ammunition and artillery, was taken possession of by the mntineers. The following morning the 53d and 56th native regiments joincd their comrades.

The Náná's opportunity had now come. He placed himself at the head of the rebels, and was proclaimed Peshwá of the Marhattás, in feudatory allegiance to the Delhi emperor. On the 6th June he sent notice to General Wheeler that he was about to attack the position. Within this slight fortification upwards of a thousand sonls had taken refuge, of whom 465 were men of all ages and professions. Every one able to bear arms was told off to the defence. At noon began the siege, "the miseries of which to the besieged," says Sir J. W. Kaye, "have never been exceeded in the history of the world. All the wonted terrors of a multitudinous enemy without, of a feeble garrison and scant shelter within, of the burden of women and children and sick people, with little to appease their wants or to allay their sufferings, were aggravated by the burning heat of the climate. The June sky was little less than a great canopy of fire; the summer breeze was as the blast of a furnace; to touch the barrel of a gun was to recoil as from red-hot iron. It was the season when European strength and energy are ever at their lowest point of depression; when military duty in its mildest form taxes the powers of Englishmen to the utmost, and English women can do little more than sustain life in a state of languid repose, in shaded apartments, with all appliances at command to moderate the temperature and mitigate the suffering. But now, even under the fierce meridian sun, this little band of English fighting men were ever straining to sustain the strenuous activity of constant battle against fearful odds, whilst delicate women and fragile children were suddenly called to endure discomforts and privations which it would have been hard to battle with in strong health under their native skies."

The deficiencies of the position as a place of defence soon became apparent. It was exposed to a continuous cannonade from heavy siege guns, taken from the magazine, and to a ceaseless hail-storm of musketry fire from a range of buildings just outside the entrenchments. All attempts of the mutineers to push forward were fiercely driven back, and a general attack upon the British position was defeated with heavy loss to the assailants. But the contest was too unequal to last long. By the end of the first week our fifty-nine artillerymen were all wonnded or killed at their posts. On the eighth day of the siege a great calamity befel the garrison. The building assigned as a shelter for the women and children was burned down, and the sick and wounded had henceforth neither roof over head to shelter them by day, nor any bedding between them and the bare earth at night. The miseries of hunger and thirst and disease were now added to the fire of the enemy and the exposure to the burning sun. During the three weeks which the siege lasted, 250 of the little garrison were interred in the well within the entrenchment.

Fearfully reduced in numbers, with their guns almost nnserviceable, their ammunition nearly expended, and starvation staring them in the face, they found it impossible to hold out much longer. When thus almost at the last extremity of despair, a written message came from the Náná, offering to provide a safe passage to Allahábád to all who laid down their arms. The question of capitulation was long and anxiously discussed before the measure was decided on; but the consideration of the women and children, and of the sick and wounded, led to the acceptance of the Náná's terms on the 26th June, and it was arranged to evacuate the entrenchment next morning, the Náná engaging to provide safe conduct for the garrison to the river side, and sufficient boats to convey them to Allahábád.

Accordingly, on the following morning, the remnant of the little garrison left the entrenchment and feebly dragged themselves to the river-stairs appointed as the place of embarkation. Here ensued the act of treachery which was destined for long years to embitter the feelings between the English nation and the Indian races. The boats were in waiting as arranged, and the embarkation was accomplished. No sooner, however, were all on board than on a signal the native boatmen deserted their vessels and clambered to shore. A murderous fire was opened on the boats from both sides of the river, and presently the thatched roofs of the vessels burst into flames, having been ignited by hot cinders. The boats were aground at the time of their abandonment by their crews. On the opening of the fire every attempt was made to get them afloat in mid-channel, but most of them remained immovable. "The sick and wounded," says Sir J. W. Kaye, "were burnt to death or more mercifully suffocated by the smoke; whilst the stronger women with children in their arms took to the river, to be shot down in the water, to be sabred in the stream by mounted troopers who rode in after them, to be bayoneted on reaching land, or to be made captives and reserved for a later and more cruel immolation." The male prisoners were immediately killed, but of women and children it is computed that 200 were spared for the time by order of the Náná, and conveyed back to Cawnpur. Of the boats which got afloat only one succeeded in forcing its way through the swarms of enemies on both banks of the river, and of its occupants only four men, two officers and two privates, survived to relate the story of Cawnpur. The rest of the tale is soon told. English troops were being hurried forward by forced marches to the relief of Cawnpur under Major Renaud and General Havelock. On the 12th July they came up with the rebel army at Fathípur, and after a short encounter—it could not be oalled a fight—utterly routed it. Another engagement with a like rosult took place at Aoung on the 15th July, 22 miles from Cawnpur. On this day, the 15th, the Náná heard of the defeat at Fathípur, and learned that Havelock's little army was in full maroh upon Cawnpur. Fnrious at the news, he resolved upon a great final act of butchery. Orders went forth for the massacre of the women and children, the survivors of the dreadful day at the river side. Four or five men who were among the prisoners were first shot in the presence of the Náná, and then the women and children were slashed to death in their prison by Muhammadan butchers from the bazar, and one or two of the Náná's followers. Their bodies (some, it is said, with life not quite extinot) were thrown into the well which had served as an improvised cemetery during the siege. After this crowning act of infamy Náná Sáhib resolved upon making one last stand for Cawnpur, and gave battle to Havelock a few miles south of the city on the 16th July. The fight was more hotly contested than those which had preceded it, but ended in the same result. During the night Náná Sáhib fled with the remnant of his army, and the next morning Havelock entered Cawnpur, but too late to save the captives whom he had hoped to rescue. A marble shrine with a statue of the Angel of Peace by Marochetti now covers the well, and the sad scene has been surrounded by a lovely garden. The spot is one of the most pathetio in India, and, to quote the words of the legend round the shrine, will for ever be "Sacred to the perpetual memory of a great company of Christian people, chiefly women and children," who lie beneath. A memorial church has also been built in commemoration of the events of the siege.

(W. W. H.)

CAXAMARCA, or CAJAMARCA, a city of Peru, capital of a province of the same name, in the department of Truxillo, in 7° 7′ S. lat. and 78° 31′ W. long. It is situated on the east side of the Western Andes, in a fertile valley on the Eriznejas, at an elevation of about 9060 feet above sea-level, 72 miles N.N.E. of Truxillo. The streets are regular and wide; but the houses are mostly built of clay. The principal buildings are the fine parish church, erected at the expense of Charles II. of Spain, the church of San Antonio, the Franciscan monastery, a nunnery, and the remains of the palace of Atahualpa, the last of the Incas of Peru, who was put to death there by the Spaniards in 1533. At a short distance to the east of the town are the deep sulphur springs of Pultamarca, called the Baños del Inca, or Inca's Baths, which have a temperature of 156° Fahr., and are still much frequented. The manufac

tures of Caxamarca are woollen and linen goods, and steel and silver articles; also biscuits, which are much esteemed. Much trade is carried on with Truxillo; and a railway connects the town with the port of Pacasmayo. Population, about 12,000.

CAXATAMBO, a town of North Peru, 120 miles N.N.E. of Lima, on the western declivity of the Andes, in 9° 53′ S. lat. and 76° 57′ W. long. The inhabitants, numbering 6000, are occupied in rearing sheep and cattle, in the cultivation of corn and cochineal and the manufacture of woollen yarn, and in working the silver mines near the town.

CAXTON, William (1422–*c.* 1491), the introducer of printing into England, was born, as he tells us himself, in "Kent in the Welde." The date of his birth is uncertain; Oldys places it in 1412, while his most recent biographer, Mr. Blades, shows that it could not have been much later than 1423. The latter, however, fixes upon 1422–3 as the approximate date; and this appears to be as near correctness as we are likely to attain. 1412 seems too early; for, by the records of the Mercers' Company we find that in 1438 William Caxton was apprenticed to Robert Large; and it is far more likely that he was apprenticed at sixteen than at twenty-six. Robert Large was a man of great wealth and of high position; in 1430 he was sheriff, and in 1439 he celebrated his election to the office of Lord Mayor with extraordinary splendor; and the fact that Caxton was apprenticed to a merchant of such distinction makes it nearly certain that he belonged to a family of considerable influence. In 1449 his master died; and it became the duty of his executors to place Caxton where he could fulfil the term of his apprenticeship. They sent him to Bruges; at least, we know that he was there soon after. In this town he entered into business on his own account, and prospered so well that before 1450 he was considered substantial security for £110, which would be equivalent to £1000 at the present time; and eight years later he had become governor of the Company of Merchant Adventurers. Caxton appears to have been a man of considerable polish, and to have had a high reputation for sagacity; for in 1465, the treaty with the duke of Burgundy concerning the wool trade being about to expire, he was appointed by the king, along with Sir Richard Whitehill, to negotiate its renewal; and this attempt having failed, he was again sent on a similar mission three years later by the Mercers' Company, after the marriage of the duke to the sister of King Edward IV. In the next year, which is worthy of note as that in which he commenced his *Recuyell des Histoires de Troye*, he was considered worthy to share in the gift of the "vin d'honneur," which was presented by the authorities of Bruges only to the most important men in the city. In the autumn of 1470 Caxton obtained, and availed himself of, an excellent opportunity for acquiring favor and influence in the English court; for Edward IV. had, with his supporters, been driven into exile, and had taken refuge in Bruges, at the court of his brother-in-law, the duke of Burgundy.

In 1471 Caxton, perhaps because he was beginning to find the duties of the office which he held too severe for his declining strength, or it may be because the interruption in the wool trade to which we have referred had diminished his fortune, entered the service of the duchess of Burgundy, from whom he received a yearly pension. At her command he continued the *Recuyell*, which was finished in September of that year.

About this time Caxton learned the art of printing. Wynkyn de Worde, his disciple, says that he was taught at Cologne by Ulric Zell; but Worde is often inaccurate, and he seems rather to have had Colard Mansion as his master. That printer was at Bruges; what need then for Caxton to go to Cologne? Besides, Caxton's types are more like Mansion's than Zell's; and, indeed, it was long before he adopted the improvements which the latter introduced.

At what date Caxton brought his press to England and set it up at Westminster is quite uncertain. It was probably between 1471 and 1477. 1474 is the date of the *Game and Playe of Chesse;* but the tradition that this work was printed in England may not be correct. He received valuable patronage, being employed by Edward IV., Richard III., and Henry VII., by the duchess of Somerset, the earl of Arundel, Sir John Fastolf, and other nobles; and he appears to have been busy writing and printing up to his death, which occurred about 1492.

Of Caxton's private life and character we know very little. His temper seems to have been strongly conservative; he delighted in the glories of chivalry, and declared that he would rejoice in a new crusade which should prevent its decay. This disposition was also displayed in his great slowness to adopt reforms in typography. He appears to have been a shrewd and courtly man of business, and a scholar of considerable attainments, for he was acquainted with French, Latin, and Dutch, and was master of an English style which is both pleasant and vigorous.

For an account of his typography, see Typography. His life has been written by Oldys in the *Biographia Britannica*, by Lewis (1738), by Charles Knight, and by Mr. Blades.

CAYENNE, an island of South America. See Guiana.

CAYENNE, a seaport town, and the capital of French Guiana, on the north-west extremity of the island of Cayenne, and near the mouth of the river of that name, in 4° 56′ 5″ N. lat. and 52° 20′ W. long. The town forms an almost perfect square, and has clean and well-macadamized streets. The houses, mostly of two stories, are of wood, strengthened on the first and ground floors by brickwork. In the old town, which contains the Government-house and Jesuits' College, the streets are not so regularly and well built as in the new. The Place d'Armes, a fine quadrangular space, lies between them. The streets are lighted with oil lamps, which burn for nearly twelve hours. Cayenne has a parish church, three Roman Catholic chapels, a nunnery, and two schools; also a bank and savings bank under Government supervision, military and civil hospitals, and a hospital for leprosy; but it has no hotel, theatre, club, reading-room, or any place of amusement. To the right of the governor's house is Mount Cépéron, on which stand Fort St. Michell, the marine barracks, the signal station, and the light-house. Here, too, are the capacious reservoirs for the water-supply of the town, the source of which is a lake to the south of the island. The harbor is shallow at its entrance, but sufficiently deep within to float vessels of 800 tons' burden; craft drawing much water are obliged to load and unload at a distance of seven or eight miles from the town. There is no dock for the repair of vessels; and the quay is small, though of sufficient size to meet requirements. The principal exports of Cayenne are native gold, raw sugar, arnotto, cocoa, coffee, limes (in brine), rum, molasses, isinglass, cotton, hides, woods, and spices. In 1873 the gold which paid export duty weighed 2206 lb troy. The imports are French wines, spirits, and liqueurs; vinegar, silk and cotton stuffs, tobacco, hardware, glass, earthenware, clothing, preserved meat, fish, and vegetables, maize, flour, hay, bran, oils, and cattle. The value of the total exports in 1873 was £120,014, of the imports £282,808,—the import trade having increased and the export trade sensibly diminished during the preceding thirty-five years. In 1872 the vessels cleared were 90, tonnage 19,688; the vessels entered, 87, tonnage, 18,530. There is a regular mail service between Cayenne, the West Indies, and Europe, once a month. The ports trading with Cayenne are Martinique, Nantes, Bordeaux, and Marseilles, and Salem in the United States. Cayenne is the seat of the Government of French Guiana, and a penal settlement for political offenders. It is provided with an efficient police force, and is well governed. Food as well as clothing is exorbitantly dear, the only cheap articles of consumption being bread and French wines. The temperature of Cayenne is between 76° and 88° Fahr. throughout the year; but the heat is tempered by easterly winds. Between December and March a north wind blows, unfavorable to weak constitutions. Yellow and other fevers often attack the inhabitants of the town, which, owing apparently to the vast swamp that flanks one side of it, is far from healthy. The death-rate amongst the coolies is especially high. Population, about 7000.

CAYENNE PEPPER, Guinea Pepper, Spanish Pepper, Chilly, a preparation from the dried fruit of various species of Capsicum, a genus of the Natural Order *Solanaceæ*, to which belong also the potato, tomato, and bittersweet. The true peppers are members of a totally distinct order, the *Piperaceæ*. The fruits of plants of the genus Capsicum have all a strong pungent flavor. The capsicums bear a greenish-white or violaceous flower, with a wheel-shaped corolla, five anthers (connivent and dehiscing lengthwise), and an obtuse stigma. The ovary becomes a pod, consisting of an envelope at first fleshy and afterwards leathery, within which are the spongy pulp and

several seeds. The leaves are entire and alternate, or in pairs near one another; the peduncles are extra-axillary. There are many kinds of capsicums, ranked by botanists either as distinct species or as varieties. Don, in his *General System of Gardening and Botany*, gives a list of thirty-three species. They are chiefly natives of Brazil, the West and East Indies, and China. They are now grown in various parts of the world, both for the sake of the fruit and for ornament. In England the annual sorts are sown from March to the middle of April, under a frame. They can be planted out when 2 or 3 inches high, and in June may be transferred to a light rich soil in the open garden. They flower in July or August, and produce pods from August till the end of September. The perennial and shrubby kinds may be wintered in a conservatory. Several species or varieties are used to make Cayenne pepper. The annual or common capsicum (*C. annuum*), the Guinea Pepper plant, was brought to Europe by the Spaniards, and was grown in England in 1548. It is indigenous to South America, but is now cultivated in India, Hungary, Italy, Spain, and Turkey, with the other species of capsicum. It is a hardy herbaceous plant, which attains a height of 2 or 3 feet, and bears a pod usually of an ovate shape, and yellow, red, or black in color. The Spur or Goat Pepper (*C. frutescens*) has been an inmate of English gardens since 1656. It is a dwarf shrub, a native of the East Indies, which produces a small pod, having very pungent properties. *C. tetragonum*, or Bonnet Pepper, is a species much esteemed in Jamaica; it bears very fleshy fruits. Other well-known kinds of capsicum are the Cherry Pepper (*C. cerasiforme*); Bell Pepper (*C. grossum*), which has thick and pulpy fruit, well adapted for pickling; and Berry or Bird Pepper (*C. baccatum*). The last mentioned has been grown in England since 1731; its fruit is globular, and about the size of a cherry. The West Indian stomachic *Man-dram* is prepared by mashing a few pods of bird pepper and mixing them with sliced cucumber and shallots, to which have been added a little lime-juice and Madeira wine. Chillies, the dried ripe or unripe fruit of capsicums, are used to make chilly-vinegar, as well as for pickles. Cayenne pepper is manufactured from the ripe fruits, which are dried, ground, mixed with wheat flour, and made into cakes with yeast; the cakes are baked till hard like a biscuit, and then ground and sifted. The pepper is sometimes prepared by simply drying the pods and pounding them fine in a mortar. Cayenne pepper is occasionally adulterated with red lead, vermilion, ochre, salt, ground-rice, and turmeric. The taste of the pepper is impaired by exposure to damp and the heat of the sun. Chillies have been in use from time immemorial; they are eaten in great quantity by the people of Guiana and other warm countries, and in Europe are largely consumed both as a spice and as medicine. Their hot and biting taste is due to the presence of the alkaloid *Capsicine*, a reddish body, having a balsamic and extremely acrid and irritating odor. The Cayenne pepper plants, with the rest of the Solanaceæ, have not the narcotic properties of the genera of the most nearly allied order Atropaceæ, unless, as has been affirmed, these are resident in the pulp of certain species of capsicums. Medicinally, Cayenne pepper is used with cinchona in lethargic affections, also in atonic gout accompanied by flatulence, and in tympanites and paralysis. It is employed as a stimulant in those forms of dyspepsia which are due to faulty chymification and defective secretion of gastric juice. In malignant scarlatina it is used either in the form of a tincture or as a gargle. To make the tincture, a pint of vinegar is boiled with two tablespoonfuls of powdered chillies and a teaspoonful of salt, and then strained. Cayenne pepper taken in large quantities acts as an irritant poison. A dose of powdered capsicum is from 1 to 5 grs., and of the tincture from 5 to 15 drops.

CAYLUS, Anne Claude Philippe de Tubières, Comte de, Marquis d'Esternay, Baron de Bransac (1692–1765), was born at Paris in October, 1692. He was the eldest son of Lieutenant-General Count de Caylus, and while a young man he distinguished himself in the campaigns of the French army, from 1709 to 1714. After the peace of Rastadt, he spent some time in travelling in Italy, Greece, the East, England, and Germany, and devoted much attention to the study and collection of antiquities, publishing several works on the subject, among which are the *Recueil des Antiquités égyptiennes, étrusques, grecques, romaines, et gauloises* (Paris, 1752–5), *Numismata Aurea Imperatorum Romanorum*, and a description of the method of encaustic painting with wax mentioned by Pliny, which he had rediscovered. He was also an admirable engraver, and he copied many of the paintings of the great masters. He did his best to assist the cause of art, by writing the lives of the most celebrated painters, by causing engravings to be made, at his own expense, of Bartoli's copies from ancient pictures, and by publishing his *Nouveaux sujets de peinture et de sculpture* (1755) and *Tableaux tirés de l'Iliade, de l'Odysse, et de l'Enéide* (1757). Caylus is besides known as the author of a number of romances, humorous pieces, and fairy tales. He was a man of singular simplicity, generosity, and kindliness.

CAZALLA de la Sierra, a town of Spain, in the province of Seville, 36 miles north of the city of that name, on the Sierra Morena. The town is well laid out, and contains numerous churches, and there are Roman and Moorish antiquities in its suburbs. The neighboring mountains are well wooded, and yield ores of iron, copper, silver, and antimony, pyrites, and variegated marble. Tanning, weaving, the making of oil, brandy, and wine, and the smelting and working of metals, are the chief employments of the inhabitants. Population, 6850.

CAZEMBE is properly the hereditary name of an African chief, whose territory is situated to the south of Lake Moero and the north of Bangweolo, between 11° and 9° S. lat. In the end of the last century the authority of the Cazembe was recognized over a very extensive district, but the prestige of the dynasty has greatly diminished, and the present representative does not even rank first among the tributaries of the Muatiyanvo of the Rua or Moluwa kingdom, The country, which has no more distinctive title than the land of the Cazembe, is estimated to have an area of 120,000 square miles and a population of 500,000. It forms a kind of hollow plain, and is richly watered by numerous rivers. Of these the most important is the Luapula, which flows from Bangweolo to Moero, and forms, according to the conjecture of Cameron, one of the head waters of the Congo. The population consists mainly of two races, the Messiras and the Campolólas,—of whom the former are native and subjugated, and the latter intrusive and dominant. The Campolólas alone are eligible to public offices, and their language is that spoken at court. Considerable attention is paid throughout the country to agriculture; and millet, maize, manioc, sugar-cane, yams, gourds, and bananas are grown. The ass and horse are both totally unknown; sheep are very scarce, but cattle are fairly abundant. Salt is obtained in various places, and forms an important source of wealth. Coarse cotton cloth, earthenware, and iron goods are the chief manufactures; and slaves, ivory, and copper-ore are almost the only exports. The Cazembe has despotic power, and uses it in a most barbarous fashion. He has 600 wives, and his nobles imitate his example according to their means. On his accession every new Cazembe chooses a new site for his residence, and thus the country cannot be said to have a permanent capital. The residence at the time of Dr. Livingstone's journey in 1868 was situated about a mile to the north of the small lake of Mofwe; and the town occupied, with its cassava grounds and cotton fields, about an English square mile, and had a population of about 1000. It is sometimes called Usemba or Lunda, and Magyar heard it mentioned as Tambalameba; but none of these seems to be its native name. In 1796 the Cazembe was visited by Manoel Caetano Pereira, a Portuguese merchant; and in 1798 a more important journey was undertaken by Dr. Francesco Jose Maria de Lacerda, a native of São Paulo in Brazil. He died at Tschungu on the 18th of October, but left behind him a valuable journal. In 1802 Honorato da Costa, superintendent of the Cassange factory, sent two native traders or *pombeiros*, Pedro João Baptista and Anastacio José, on a visit to the Cazembe; and in 1831 a more extensive mission was despatched by the Portuguese governor of Rios de Sena. It consisted of Major José Monteiro and Antonio Gamitto, with an escort of 20 soldiers and 120 negro slaves as porters; but its reception by the Cazembe was not altogether satisfactory. Another expedition is said to have been undertaken in 1853 by a Mr. Freitas; and a few notes of a Moorish traveller are given in the *Geographical Journal* for 1854. Livingstone's visit in 1868 has already been mentioned.

See the account of Pereira's journey in *Annales Maritimos y Coloniales*, 1844, and the *Consideraciones politicas sobre los descubrimientos de los Portuguezes en Africa*, by José Accursio das Neves, 1830; of Lacerda's in *Annaes* for 1844, 1845, and 1846; of Baptista's in 1843; Monteiro and Gamitto, *O Muata Cazembe*, Lisbon, 1854; *The Lands of the Cazembe*, published by the Royal Geographical Society in 1873, containing Lacerda and Baptista's Journals, and a résumé of Monteiro and Gamitto; "Livingstone's Reisen in Inner Afrika," 1866–1873, in Petermann's *Mittheilungen*, 1875; and Livingstone's *Last Journals*, 1874.

CAZORLA, a town of Spain, in the province of Jaen, on the Vega. It is generally well built, and contains two ancient castles (one of them Arabic), several hospitals, a spacious theatre, a very ancient church, and several convents. It was an important military station under the Moors, and has suffered frequently during the civil wars in Spain. In 1811 it was captured and partly burned by the French, and in 1837 it was distinguished in the Carlist contest. Population, 4980.

CAZOTTE, Jacques (1720–1792), a French author, was born at Dijon in 1720. He was educated by the Jesuits, and at twenty-seven he obtained a public office at Martinique, but it was not till some years after, on his return to Paris, that he appeared as an author. His first attempts, a mock romance and a coarse song, gained so much popularity, both in the court and among the people, that he was encouraged to essay something more ambitious. He accordingly produced his *Roman d'Olivier*. He also wrote a number of sportive effusions, such as *Diable Amoureux*, among which was a continuation of Voltaire's *Guerre Civile de Genève*, the verisimilitude of which was such that no one had the least suspicion of the deception. From all this gayety and license Cazotte rushed into the opposite extreme, embracing the views of the Illuminati, and declaring himself possessed of the power of prophecy. It was upon this fact that La Harpe based his famous jeu d'esprit, in which he represents Cazotte prophesying the most minute events of the revolution. Cazotte was attached to the royal cause, and, on the discovery of some of his letters in August, 1792, was arrested; and, though he escaped for a time, through the love and courage of his daughter, he was executed on the 25th of the following month. A complete edition of his works was published in 1817.

CEARÁ, or Fortaleza, or Villa do Forte, a town of Brazil, in a province of the same name, situated at the mouth of the River Ceará, on an open bay between the promontory of Mararanguape and Cape Mocoripe, in 3° 42′ S. lat. and 38° 30′ W. long. It consists of a new and old town, and has regular and well-paved streets. Opened to general trade in the present century, it exports a considerable quantity of coffee, cotton, and sugar; but it has recently suffered somewhat by the formation of the new port of Aracaty, about ninety miles distant. In 1871 the number of British vessels engaged in the trade was 45, with a tonnage of 28,784. Population about 20,000.

CEBES of Thebes, a disciple of Socrates, mentioned by Plato in the *Phædo*, and by Xenophon as distinguished both for his virtue and for his love of truth, was the author of a once popular didactic dialogue, the Πίναξ or *Tabula Cebetis*. This work, which professes to be an explanation of an allegorical picture, commences with the Platonic doctrine that men enter the earth from a pre-existent state. There they have been taught how to guide their course in this world; but the draught of oblivion of which all must drink—though not all in equal degree—causes them to forget the instruction. Many allurements entice them to vice, but by patience and endurance they may attain virtue and happiness. The sciences—grammar, geography, arithmetic, geometry, and music—are declared not to be the true discipline, but yet to be useful, especially as a kind of restraining bridle for the young. From certain passages, which are probably interpolations, some have supposed the work to be the production of a Stoic of the same name, who lived under M. Aurelius. The *Tabula Cebetis* has been translated into all the European languages. An Arabic version, with the Greek text, and a Latin translation, was published by Salmasius in 1640. It is usually printed together with Epictetus, as at Strasburg, 1806, and Paris, 1826. Cebes was also, according to Suidas and Laertius, the author of the Ἐβδόμη and the Φρύνικος, which have been entirely lost.

CEBU, a city of the Philippine Islands, on the eastern side of an island of the same name, about 400 miles S.E. of Manila. It is the oldest provincial town in the archipelago, and still ranks as one of the best built; while its position renders it the chief commercial centre for the Southern Philippines. It is the residence of a military governor and an alcalde, as well as of the governor-general of the Vissagas; and its public buildings comprise a cathedral, an episcopal palace, and a lazaretto. It exports sugar, hemp, tobacco, and sapan-wood, the quantity of the first two in 1870 being 114,806 and 40,756 piculs respectively. Its foreign goods are obtained *via* Manila. There is an old fort built of coral, and in the island of Matan opposite the town is situated the grave of Magellan. The population, inclusive of the suburb of St. Nicholas, is reckoned at 34,000.

CECCO D'ASCOLI (1257–1327) is the popular name of Francesco degli Stabili, a famous mediæval encyclopædist and poet,—Cecco being the diminutive of Francesco, and Ascoli, in the marshes of Ancona, the place of the philosopher's birth. He devoted himself to the study of mathematics and astrology, and in 1322 was made professor of the latter science at the university of Bologna. It is alleged that he entered the service of Pope John XXII. at Avignon, and that he cultivated the acquaintance of Dante Alighieri, only to quarrel with the great poet afterwards; but of this there is no evidence. It is certain, however, that, having published a commentary on the sphere of John de Sacrobosco, in which he propounded audacious theories concerning the employment and agency of demons, he got into difficulties with the clerical party, and was condemned in 1324 to certain fasts and prayers, and to the payment of a fine of seventy crowns. To elude this sentence he betook himself to Florence, where he was attached to the household of Carlo di Calabria. But his freethinking and plain-speaking had got him many enemies; he had attacked the *Commedia* of Dante, and the *Canzone d'Amore* of Guido Cavalcanti; and his fate was sealed. Dino di Garbo, the physician, was indefatigable in pursuit of him; and the old accusation of impiety being renewed, Cecco was again tried and sentenced, this time to the stake. He was burned at Florence the day after sentence, in the seventieth year of his age.

Cecco d'Ascoli left many works in manuscript, most of which have never been given to the world. The book by which he achieved his renown and which led to his death was the *Acerba* (from *acervus*), an encyclopædic poem, of which in 1546, the date of the last reprint, more than twenty editions had been issued. It is unfinished, and consists of four books in *sesta rima*. The first book treats of astronomy and meteorology; the second of stellar influences, of physiognomy, and of the vices and virtues; the third of minerals and of the love of animals; while the fourth propounds and solves a number of moral and physical problems. Of a fifth book, on theology, the initial chapter alone was completed. A man of immense erudition and of great and varied abilities, Cecco, whose knowledge was based on experiment and observation (a fact that of itself is enough to distinguish him from the crowd of savants of that age), had outstripped his contemporaries in many things. He knew of metallic aërolites and shooting-stars; the mystery of the dew was plain to him; fossil plants were accounted for by him through terrene revolutions which had resulted in the formation of mountains; he is even said to have divined the circulation of the blood. Altogether a remarkable man, he may be described as one of the many Cassandras of the Middle Ages, one of the many prophets who spoke of coming light, and were listened to but to have their words cast back at them in accusations of impiety and sentences of death.

The least faulty of the many editions of the *Acerba* is that of Venice, dated 1510. The earliest known, which has become excessively rare, is that of Brescia, which has no date, but is ascribed to 1473 or thereabouts.

CECIL, Robert, Earl of Salisbury (1550–1612), was the son of Lord Burghley, whose character and ability he inherited, and by whom he was carefully educated for political life. After residing at Cambridge and representing Westminster in parliament, he received a post in the French embassy, and was next made Secretary of State under Walsingham. He was also appointed Chancellor of the Duchy of Lancaster, and Lord Privy Seal, and he succeeded his father as Master of the Court of Wards and Walsingham

as chief Secretary of State. It is noteworthy that, though his health was delicate and his person deformed, he served as a volunteer against the Armada. His career was simply a continuation of his father's. He toiled as laboriously and as carefully, and carried out the same system of espionage with equal success. The interest which he took in the domestic affairs of the country and in the state of Ireland was as great; and the object of his foreign diplomacy was the same,—to prevent Spain from gaining a mastery which would be fatal to England. But he followed the wisdom of his father too well; his policy was wanting in originality and depth of insight; and he has left no mark upon history.

During the reign of the queen he had entered into correspondence with James, upon whose accession he was reappointed to the post of Secretary of State and was raised, in successive years, to the dignities of baron of Essenden, Viscount Cranborne, and earl of Salisbury. In 1608, on the death of the earl of Dorset, he added the office of Lord High Treasurer to that of Secretary. Thus he was now at once chief adviser of the king as to home and foreign affairs, mediator between him and the parliament, and also the responsible manager of the finances of the kingdom. In the last capacity his work was by no means easy. It was vain to hope to moderate the royal extravagance; his attempt to obtain from the Commons an increase of £200,000 to the royal income was unsuccessful; and the chief financial measure which he carried out was an addition to the duties on imports. As secretary, Cecil followed his father's example with regard to the Catholics, and wrote a *Treatise against the Papists*. His opposition to the growth of Spanish power was consistent, though he accepted a pension from the Spanish king, and refused to unite with France and the United Provinces to effect its utter overthrow.

Cecil has been much blamed for his conduct towards three of the greatest of his contemporaries. Of his cousin, Francis Bacon, he appears to have been jealous; in the noble qualities of the earl of Essex he saw nothing but a dangerous hotheadedness; and probably his opinion was similar about Raleigh, who, though more of a politician, was usually as little inclined to be cautious or conciliatory. But all this argues no extraordinary baseness; he was merely wanting, by nature and through education, in breadth of sympathy. The assertion that he was the sole cause of all Raleigh's troubles is unfounded, and is, indeed, contradicted by two facts:—first, that on his trial Cecil more than once insisted that he should meet with all consideration, and should be allowed to urge all he could in his own defence; and, secondly, that it was after Cecil's death that the bitterest feeling against him was displayed, and that he was offered as a sacrifice to Spain. Besides his *Treatise against the Papists*, Cecil published an interesting work on *The State and Dignity of a Secretary of State*. His correspondence with James I. was published by Lord Hailes in 1766.

CECIL, William, Lord Burghley or Burleigh (1520–1598), an English statesman, born in 1520, was the son of Richard Cecil, Master of the Robes to Henry VIII. After distinguishing himself at Cambridge, he entered Gray's Inn at twenty-one, and soon after obtained the reversion of the office of *custos brevium* at the Court of Common Pleas. He increased his political influence by marriage, first with the sister of Sir John Cheke, and then with the daughter of Sir Anthony Cook; and, at length, through friendship with the protector, Somerset, he became Secretary of State in 1548. After sharing the imprisonment of Somerset, his prudence and sagacity enabled him to regain his office under Northumberland. Yet, when Edward died, he contrived to escape the danger which threatened him on every side. He signed the instrument making over the crown to Lady Jane Grey, but only as a witness; and he kept clear of religious difficulties by displaying no dislike to Catholicism. Indeed it is probable that he really felt little or none. He confessed, attended mass, took a priest into his house; he escorted Cardinal Pole from Brussels, and cultivated his friendship. And, though he opposed the court party in parliament, and thus kept up his connection with his old friends, his opposition was so moderate as to be perfectly safe. He maintained a constant correspondence with the princess Elizabeth, and on the death of her sister at once prepared a proclamation declaring her queen. He was immediately appointed Secretary of State, and member of the Privy Council; and from this time he was the foremost minister of the Crown. Foreign ambassadors often regarded him as the possessor of unbounded power, and as practically head of the Government and ruler of the queen, but, in fact, his influence was not so supreme, nor his favor with Elizabeth so uniform. No man, indeed, could always guide that strong-willed monarch; and Cecil had no ambition to be a mere favorite and tool. Though not an enthusiast, and though he never fought for a hopeless cause, he had far nobler aims than personal advancement. Though his statesmanship lay not so much in a power of deep and rapid insight as in the possession of a mind patient to take account of the minutest points, and able to weigh all considerations impartially, he was capable of independent thought and firm decision, and his plans often conflicted with the inconstant intrigues of the queen. On such occasions he did not shrink from telling her that she was wrong; he rebuked her stinginess and treachery, and he several times braved her passionate resentment. From her accession he was Secretary of State, and from 1572 he was Lord High Treasurer; but his services brought him pecuniary loss, and he received no honors but the Mastership of the Court of Wards, the order of the Garter, and the barony conferred upon him in 1571, after thirteen years of service. He was absolutely incorruptible. He refused to use or to sell the office of Royal Exchanger, though it would have brought him several hundred thousand pounds. Mendoza in vain tried to bribe him; to Catherine of Medici's splendid offers he replied that he served none but his God, his mistress, and his country; and he refused to share in the gold of which Drake had robbed the Spaniards. Into the deeper passions of his time he did not enter. It is true that as his life advanced he grew more and more attached to the Protestant cause. He saw that his country had identified herself with that cause, and he was, besides, firmly opposed on political grounds to the pretensions of the Papacy. He appears, however, to have had no special devotion to any form of doctrine; and he opposed the persecution of loyal Puritans and of loyal Catholics. When, indeed, either Catholic or Puritan became disloyal or otherwise dangerous he lost all compunction. He hated and persecuted the Jesuits because they placed the Pope above the laws, but he twice took the trouble to explain to the world that this was the sole reason. He was affected with no inconvenient weakness of sympathy; he could ruthlessly crush any one who seemed dangerous to the state. Essentially honest as he was, he scrupled at no espionage or treachery to gain the secrets of his enemies. His emissaries were everywhere. He kept Herle in the Marshalsea, examined him before the council, and threatened him with torture that the Catholic prisoners might believe him to be a martyr to their cause, and might intrust him with their plans; and he made Bishop Parker appear in the guise of the Catholic Dr. Story to take the confessions of a prisoner whom torture could not move. When his policy was opposed to Spain he did not scruple to get up demonstrations against the Spanish ambassador, and to cast into prison all the Spanish merchants in London. Plots against his own life never deprived him of his calmness; he watched De Quadra's conspirators quietly, day after day, though every day he knew they might attempt to murder him, and let them alone till he had gained all the information to be got. Day after day Norfolk and Arundel came to the council intending to arrest him; and day after day his cool sagacity defeated them. Yet when occasion required he knew how to act with prompt and vigorous decision. He was always struggling against the queen's variability. Being eager that she should marry, he urged her again and again to decide at once; and a paper is extant which he presented to the queen when the last marriage proposal was finally cast aside. In it he sketches a great and able policy. Preparations were to be made for war by land and sea; honors and wealth were to be applied to attach the hearts of the foremost men of the nation, and no longer wasted on useless favorites; Ireland was to be ruled with attentive care and in a conciliatory spirit; and, lastly, there was to be a grand alliance of all Protestants—of England, Sweden, Denmark, Scotland, and the Protestants in Germany, France, and Flanders. With regard to the Queen of Scots he pressed for the most vigorous action. Undeterred by the anger which Elizabeth showed in striking his name from the list of lords-lieu-

tenant, he appeared at Mary's trial to meet her denial of the charges made against her with a stern contradiction. When, at last, Elizabeth signed the warrant, he ventured to oppose her express wish by calling the council to his own house to discuss the matter; and he dared to intercede for Davison when, in a torrent of passion, she sent him to the Tower. The result was that he was fiercely ordered out of her presence, and for two months the queen refused to see him.

In the industry of the country Cecil took the greatest interest. He entertained the serious apprehensions which were commonly felt on account of the increase of importation, the exportation of gold, and the falling off of agriculture; and he protested against the growing use of wine, silk, and other foreign commodities. To make up for the loss to the shipping which the downfall of Catholicism had caused by diminishing the demand for fish, he obtained the passing of a curious law which made the eating of flesh on Friday and Saturday, and on Wednesday unless fish dishes were also placed on the table, a misdemeanor. In short, Cecil devoted himself to the service of his country with the most painstaking and disinterested laboriousness. From the peculiarity of his method of working we have more complete information concerning the details of his career than is usually the case with statesmen; for it was his practice not only to draw up papers of advice to the queen, but also before deciding on any question to set out on paper all the considerations on both sides; and many of these documents, together with many of the letters which he either received or wrote, can still be consulted (see *Scrinia Ceciliana*, 1663, the state papers published in 1740 and 1759, and Tytler's *Ancient Letters*, 1839). Cecil died in office in August, 1598.

Among his writings are characteristic *Precepts for the well-ordering of a man's life* (1637), and *The Execution of Justice in England for the Maintenance of Public and Christian Peace* (1581 and 1583; Latin version, 1584). The latter is a defence of the queen's commissioners appointed to examine Papists, with special reference to the use of torture, and a declaration that purely religious belief was never the cause of punishment. An interesting paper of advice to the Queen (1583) is to be found in the *Somers Tracts*. A voluminous life by Nares appeared in 1828–31. See Froude's *History*.

CECILIA, Saint. A passing word in the very apocryphal legend of this saint has caused her name to be one of the best known in the calendar, and oftenest in the mouths of men. It is related, among other circumstances purely legendary, that Cecilia often united instrumental music to that of her voice in singing the praises of the Lord. On this all her fame has been founded, and she has become the special patroness of music and musicians all the world over. Half the musical societies in Europe are named after her, and her supposed musical acquirements have led the votaries of a sister art to find subjects for their works in episodes of her life. The grand painting by Raphael, at Bologna, in which the saint is represented wrapped in an ecstacy of devotion, with a small "organ," as it was called,—an instrument resembling a large kind of Pandean pipes,—in her hand, is well known, as is also Dryden's beautiful ode.

Her legend relates that, about the year 230, which would be in the time of the Emperor Alexander Severus, Cecilia, a Roman lady, born of a noble and rich family, who in her early youth had been converted to Christianity, and had made a vow of perpetual virginity, was constrained by her parents to marry a certain Valerian, a pagan, whom she succeeded in converting to Christianity without infringing the vow she had made. She also converted her brother-in-law Tiburtius, and a friend called Maximus, all of whom were martyred in consequence of their faith. This is stated to have happened at Rome when one Almacus was prefect; but no such name is known to history. It is unfortunate also for Cecilia's claim to a footing on the solid soil of history, that the earliest writer who makes mention of her, Fortunatus, bishop of Poitiers, represents her to have died in Sicily between the years 176 and 180. It is absurdly stated in the *Biographie Universelle* that Cecilia's name is found in the most ancient martyrologies; whereas, as may be seen from Baronius, the earliest of these documents was compiled by Pope Clement I., who died in the year 100. The French writer maintains that her body must have been transported from Sicily to Rome subsequently to the 4th century, because the saint's name is not found in the Roman calendar compiled in the time of Pope Liberius (ob. 363), from which fact no such conclusion can be drawn. The Roman tradition is that the church dedicated to St. Cecilia was built on the site of the house inhabited by her, at her request, by Urban I. about the year 230. We do not reach any ground of certainty, till we come to the councils celebrated by Pope Symmachus in the year 499 (of which, however, some doubt the authenticity), in whose records this church is mentioned, two priests qualifying themselves in their subscription as priests of the church of St. Cecilia.

This church was in a ruinous condition in the 9th century; and Pope Paschal I. (ob. 824) built it anew with much splendor. In the course of the work he was, we are told, visited by the saint in a vision, who informed him where her body was to be found in the cemetery of Callistus. Following her indications he found not only her body but those of her husband Valerian, her brother-in-law Tiburtius, their friend Maximus, the Popes Urban I. and Lucius I., and 900 other martyrs! All these Paschal transported with much solemnity and ceremonial to the new church of St. Cecilia, which he dedicated to God, to the Virgin, to Saints Peter and Paul, and to Saints Cecilia and Agatha. Cardinal Sfondrati, nephew of Gregory XIV. (ob. 1591), who had his *title* as cardinal from this church, almost entirely rebuilt it; in the course of which operation the bodies of the saints were found, and were on the 22d of November, the day dedicated to St. Cecilia, in the year 1599, deposited in a silver reliquary, and placed by Clement VIII., assisted by twenty-two cardinals, in a small crypt under the high altar. The silver urn was stolen by the French, as their custom was, at the period of their first occupation. One of the best known and most admired modern statues in Rome is that executed by Stefano Maderno in the 17th century, which represents the saint recumbent in her grave-clothes, and in the attitude in which she is described to have been found when her tomb was opened. The church was subsequently "redecorated,"—that is to say destroyed as regards architectural beauty,—in 1725 by Cardinal Doria, who built heavy piers around the columns of the nave, and enclosed with gratings an upper gallery, which must have been beautiful, in order to make accommodation for the nuns of the adjoining Benedictine monastery to hear, unseen, the services. Still, especially in the tribune at the east end of the church, some interesting relics of the old 9th century church may yet be seen there. The curious mosaics representing St. Cecilia, and the other saints to whom Pope Paschal dedicated the church, belong to that period.

The church of St. Cecilia is situated at the further end of that part of the city called Trastevere, near the quay of the Ripa Grande, a region which tradition declares to have been the earlier "Foro degli Ebrei," or quarters assigned to the Jews,—a "ghetto," as the part of the city so destined was subsequently called. Here it is said that St. Peter, as a Hebrew, was lodged on his first arrival in Rome, and hence began to preach the gospel.

This church has from its first foundation given his "title" to a cardinal priest. For many generations it was the custom for the popes, accompanied by all their cardinals, to celebrate a "Capella papale" here on certain days in the year. And down to the present time, on the 22d of November in each year, the best church music still to be met with in Rome (which is not, however, saying much) may be heard in the church of St. Cecilia.

CECROPS, probably a Pelasgian hero, was, according to Athenian tradition, the first king of Attica, and the founder of its political life. He was said to have divided Attica into twelve parts, to have instituted marriage, and introduced a new form of worship. Some late Greek writers held that he came from Egypt. He is represented as human as regards the upper part of his body, while the lower is shaped like a dragon.

CEDAR, a name applied to several members of the Natural Order *Coniferæ*. The word *Cedar* (the Greek κέδρος) is probably derived from the Arabic *Kedr*, worth or value, or from *Kedrat*, strong. The name has been supposed by some to have taken its origin from the brook Cedron, in Judæa.

The *Abies Cedrus* or *Cedrus Libani*, the far-famed Cedar of Lebanon, is a tree which, on account of its beauty, stateliness, and strength, has always been a favorite with

poets and painters; and which, in the figurative language of prophecy, is frequently employed in the Scriptures as a symbol of power, prosperity, and longevity. It grows to a vertical height of from 50 to 80 feet—"exalted above all trees of the field," and at an elévation of about 6000 feet above sea-level. In the young tree, the bole is straight and upright, and one or two leading branches rise above the rest. As the tree increases in size, however, the upper branches become mingled together, and the tree is then clump-headed. Numerous lateral ramifying branches spread out from the main trunk in a horizontal direction, tier upon tier, covering a compass of ground the diameter of which is often greater than the height of the tree. Gilpin, in his *Forest Scenery*, describes a cedar which, at an age of about 118 years, had attained to a height of 53 feet, and had a horizontal expanse of 96 feet. The branchlets of the cedar take the same direction as the branches, and the foliage is very dense and close-woven. The tree, as with the rest of the fir-tribe, except the larch, is evergreen; the leaves are renewed every spring, but their fall is gradual. In shape the leaves are straight, tapering, cylindrical, and pointed; they are about an inch long, and of a dark green color, and grow in alternate tufts of about thirty in number. The male and female flowers grow on the same tree, but are separate. The cones, which are on the upper side of the branches, are flattened at the ends, and are 4 or 5 inches in length, and 2 inches wide; they take two years to come to perfection, and while growing exude much resin. The scales are close pressed to one another, and are reddish in color. The seeds are provided with a long membranous wing. The root of the tree is very strong, and ramifying. The cedar flourishes best on sandy loamy soils. It still grows on Lebanon, eleven groves having been described by the American missionary Jessup; and probably is to be found over the whole group of mountains lying between Damascus and Tripoli in Syria, which comprehends, besides Lebanon, the Mounts Taurus and Amanus of the ancients. Lamartine tells us that the Arabs regard the trees as endowed with the principles of continual existence, and with reasoning and prescient powers, which enable them to prepare for the changes of the seasons. The best known group in the Lebanon range consists of twelve very ancient trees amidst a grove of about 400 younger ones—apparently the yellow cedars spoken of by Lamartine. They occupy little knolls in the Jebel-el-Arz, a recess or hollow near the highest point of the mountains, about 15 miles from the sea. One tree on the southern side has a circumference of 42 feet at its base. Lord Lindsay mentions two other cedars on the northern edge of the grove, one 63, and another 49 feet in girth. The number of the trees has been slowly decreasing since 1550, when Belon counted twenty-eight of them; nearly 200 years later, when Dr. Pococke visited Syria, only 15 were to be seen. The wood of the cedar of Lebanon is fragrant, though not so strongly scented as that of the juniper or red-cedar of America. It appears that the wood may be hard in portions, and sufficiently close-grained and compact to be carved,—the fibre in mountain-cedars being finer than in those grown on plains. The wood is, however, generally described as a reddish-white light material, of a coarse grain and spongy texture, easy to work, but liable to shrink and warp. Dr. Pococke affirms that it does not differ in appearance from white deal, nor does it seem to be harder. As a firewood, it is said to be inferior, burning quickly and evolving but little heat.

The cedar of Lebanon is cultivated in Europe for ornament only. It can be grown in parks and gardens, and thrives well; but the young plants are unable to bear great variations of temperature. According to Gilpin, the English cedar in its maturer age becomes shrivelled and deformed, the body increasing, whilst the limbs shrink. In the Botanic Gardens at Chelsea are two cedars, planted there in 1683, which have probably lived upwards of 200 years. At Caen Wood, Hampshire, are four trees which have been growing since 1756, and are as much as 100 feet in height. The first cedars in Scotland were planted at Hopetoun House in 1740; and the first one said to have been introduced into France was brought from England by Bernard de Jussieu in 1734, and placed in the Jardin des Plantes. Cedar-wood is earliest noticed in Leviticus xiv. 4, 6, where it is prescribed among the materials to be used for the cleansing of leprosy; but the wood there spoken of was probably that of the juniper. The term *Eres* (cedar) of Scripture does not apply strictly to one kind of plant, but was used indefinitely in ancient times, as is the word cedar at present. The term *arz* is applied by the Arabs to the cedar of Lebanon, to the common pine-tree, and to the juniper; and certainly the "cedars" for masts, mentioned in Ezek. xxvii. 5, must have been pine-trees. It seems very probable that the fourscore thousand hewers employed by Solomon for cutting timber did not confine their operations simply to what would now be termed cedars and fir-trees. Dr. Lindley considers that some of the cedar-trees sent by Hiram, king of Tyre, to Jerusalem may have been procured from Mount Atlas, and have been identical with the *Callitris quadrivalvis*, or arar-tree, the wood of which is hard and durable, and was much in request in former times for the building of temples. The timber-work of the roof of Cordova Cathedral, built eleven centuries ago, is composed of it. In the time of Vitruvius "cedars" were growing in Crete, Africa, and Syria. Pliny says that their wood was everlasting, and therefore images of the gods were made of it; he makes mention also of the oil of cedar, or *cedrium*, distilled from the wood, and used by the ancients for preserving their books from moths and damp; papyri anointed or rubbed with cedrium were on this account called *cedrati libri*. Drawers of cedar or chips of the wood are now employed to protect furs and woollen stuffs from injury by moths. Cedar-wood, however, is said by Dr. Fleming to be injurious to natural history objects and to instruments placed in cabinets made of it, as the resinous matter of the wood becomes deposited upon them. *Cedria*, or cedar resin, is a substance similar to mastic, that flows from incisions in the tree; and cedar manna is a sweet exudation from its branches.

There are two sub-species or varieties of *Abies Cedrus*—*A. Deodara*, the deodar, or "god tree" of the Himalayas, and *A. atlantica*, of the Atlas range, North Africa. The deodar flourishes in all the higher mountains from Nepal up to Kashmir, at an elevation of from 5500 to 12,000 feet; on the peaks to the northern side of the Boorung Pass, it grows to a height of 60 to 70 feet before branching. The wood is close-grained, long-fibred, perfumed, and highly resinous, and resists the action of water. The foliage is of a grey-green, the leaves are slender, and the twigs are thinner than those of *A. Cedrus*. The tree is employed for a variety of useful purposes, especially in building. It is now much cultivated in England as an ornamental plant. *A. atlantica* has shorter and denser leaves than *A. Cedrus;* its wood also is hard, and more rapid in growth than is that of the ordinary cedar. It is found at an altitude above the sea of from 7000 to 9000 feet.

The name cedar is applied to a variety of trees. The Bermuda cedar (*Juniperus bermudiana*) and the red or American cedar (*J. virginiana*) are both much used in joinery and in the manufacture of pencils; though other woods are now superseding them for pencil-making. The Japanese cedar (*Cryptomeria japonica*) is a kind of cypress, the wood of which is very durable. Another species of cypress (*Cupressus thyoides*), found in swamps in the south of Ohio and Massachusetts, is known as the American white cedar. It has small leaves and fibrous bark, and is much used for making fences and coopers' staves. The Spanish cedar is a name applied to the *Juniperus thurifera*, and also to another species, *J. oxycedrus*. The latter was much used by the Greeks for making images; and its empyreumatic oil, Huile de Cade, is used medicinally for skin-diseases. A species of cypress which has been naturalized in the neighborhood of Cintra is known as the cedar of Goa. The order *Cedrelaceæ* (which is entirely distinct from the Conifers) includes, along with the mahoganies and other valuable timber trees, the Jamaica and the Australian red cedars. The cedar-wood of Guiana, used for making canoes, is a species of the Natural Order *Amyridaceæ*, *Icica altissima*.

The importation of woods classed as cedars into Great Britain has been free from duty since 1866, when the imports were 5647 tons, valued at £59,224.

See Gordon's *Pinetum;* Loiseleur-Deslongchamps, *Histoire du cèdre du Liban*, Paris, 1838; Loudon, *Arboretum Britannicum*, vol. iv. pp. 2404–2432, London, 1839; Marquis de Chambray, *Traité pratique des arbres résineux conifères*, Paris, 1845; Dr. J. D. Hunter, *Nat. Hist. Review*, Jan., 1862, pp. 11–18; Brandis, *Forest Flora of N.W. and Central India*, pp. 516–525, Lond., 1874.

CEFALU, a seaport town on the north coast of Sicily, in the province of Palermo, and 39 miles E.S.E. of the town of that name, in 38° 0′ N. lat. and 14° 4′ E. long. The new town, founded by Roger I. of Sicily in 1131, is situated at the base of a steep promontory 1191 feet in height which overlooks the magnificent Bay of Cefalu. The houses are tolerably well built; and the cathedral, commenced in 1132, is distinguished for the beauty of its façade, with antique pillars and mosaics. Near it are the bishop's palace and the seminary. The harbor is good, but small; and the trade, which is chiefly in oil, manna, and sardines, is inconsiderable. The inhabitants, who number about 10,200, are actively engaged in sea-fishery. The old town derived its name of *Cephalœdium* or *Cephalœdis* from the projecting headland mentioned above, on which it stood. On the original site are to be seen a fine Saracenic castle and an ancient temple. The latter is constructed of massive stones, and part of its walls is formed by the side of the hill. At first Cephalœdium was possibly only a fortress of the Himeræans. In 396 B.C. it entered into friendly relations with Himilco; and after the defeat of the Carthaginian fleet, it was betrayed into the hands of Dionysius of Syracuse. In 307 B.C. it was taken by Agathocles, and in 254, in the first Punic war, by the Romans. In 858 A.D. the town was captured by the Saracens.

CEHEGIN, perhaps the ancient *Segisa*, a town of Murcia in Spain, four miles east from Caravaca. Its houses are generally built of marble from the neighboring quarries. Its civil, religious, and educational establishments are in a comparatively prosperous condition. It possesses a considerable trade in agricultural produce, especially wine, hemp, and oil, and has several manufactories of paper and coarse linen. Population, 6200.

CELANO, a town of Italy, in the province of Abruzzo Ulteriore and district of Avezzano, about seven miles east of the town of that name. It is finely situated on a hill about four miles from the former bed of Lake Celano, and has an interesting mediæval castle of the 15th century, celebrated for its connection with the unfortunate Countess Covella. Though the town never recovered from the vengeance inflicted on it in 1223 by Frederick II., it continued to be the centre of a countship which was bestowed in 1463 on Antonio Piccolomini. The chapel of this family, in the Convent of Valle Verde, not far from the town, is worthy of notice for the paintings of Giulio Romano; and the town itself has the honor of being the birthplace of Beato Tommaso, the probable author of the *Dies Iræ*. The population of the commune is 6673.

The neighboring lake, known to the ancients as *Lacus Fucinus*, had till the beginning of this century an area of 37,990 acres, and was remarkable for its frequent changes of level. As early as the 1st century, the Emperor Claudius constructed a subterranean passage by which the surplus waters found an outlet to the Liris or Garigliano. No fewer than 30,000 workmen were employed for a space of eleven years; and the undertaking seems to have been as successful as it was bold. But in the following reign the passage was allowed to fall into disrepair; and it has been reserved to the present generation to see the old Roman works not only restored but surpassed. From 1793 to 1810 the lake had been gradually rising till it was 30 feet above its former level; and the attention of the Neapolitan Government was directed to the danger. Little, however, was effected till 1852, when the necessary works were undertaken by a company, under the direction of Mr. C. Hutton Gregory, who proceeded to widen the emissarium and support the walls with arched work. The shares of the company were gradually bought up by Prince Giulio Torlonia of Rome, who successfully carried on the operations at his own expense till his death in 1871. About 36,000 acres of rich arable land have been reclaimed, and the corn-crops yield a profit of from 30 to 36 per cent. The new tunnel is about four miles long, and has a cross section of 21 square yards. The honor of the engineering has been shared by Montricher, who died in 1858, Bermont, and Brisse. See Kramer, *Der Fuciner See*, Berlin, 1839.

CELEBES, an island of the East Indian Archipelago, separated from Borneo on the W. by the Strait of Macassar and bounded on the E. by the Strait of Molucca. It stretches from 118° 30′ to 125° 40′ E. long., and from 5° 45′ S. to 1° 45′ N. lat., and its area is approximately estimated at about 70,000 square miles. Its general outline is extremely irregular, and has been compared to that of a starfish with the rays torn off from the west side. It consists of four great peninsulas, extending from a comparatively small nucleus towards the N.E., E., S.E., and S., and separated by the three large bays of Gorontalo or Tomini, Tolo or Tomaiki, and Boni. Of these bays the first is by far the largest, the other two having much wider entrances and not extending so far inwards. Most important among the smaller inlets are the bays of Amurang, Kwansang, and Tontoli on the north coast, Palos and Parre-Parre on the west, and Kendari or Vosmaer on the east. A large part of the island is but partially explored, but the general character of the whole seems to be more or less mountain-

Map of Celebes (580 miles by 530).

ous. Well-defined ranges prolong themselves through each of the peninsulas, rising in many places to a considerable elevation. Naturally there are no great river basins or extensive plains, but one of the features of the island is the frequent occurrence, not only along the coasts, but at various heights inland, of beautiful stretches of level ground often covered with the richest pastures. The substructural rocks are mainly of igneous origin, the most frequent being basalt in a state of decomposition; but in many districts the Carboniferous strata are well developed, and give a character to the landscape. The northern peninsula differs from the others in being still highly volcanic and subject to not unfrequent earthquakes. Within the province of Minahassa alone as many as eleven distinct volcanoes have been counted; and hot springs, mud fountains, and similar phenomena occur in several other districts. Few of the rivers are navigable for any distance, and the entrance to almost all of them is obstructed by bars. Lakes, on the other hand, are both numerous and extensive. Of these the most important is the Tamparang-Labaya or Tempe, situated in the south-eastern peninsula in 3° 37′ S. lat. It has a depth of about 30 feet, and is richly stocked with wild-fowl and fish. The scenery throughout the island is of the most varied and picturesque description. "Nowhere in the archipelago," says Mr. Wallace, "have I seen such gorges, chasms, and precipices as abound in the district of Maros; in many parts there are vertical or even overhanging precipices five or six hundred feet high, yet completely clothed with a tapestry of vegetation." Much of the country, especially round the Bay of Tolo, is still covered with primeval forest and thickets, traversed here and there by scarcely

perceptible paths, or broken with a few clearings and villages.

In spite of its situation in the centre of the archipelago, Celebes possesses a fauna of a very distinctive kind. The number of species is small; but in many cases they are peculiar to the island. Of the birds, for example, about 200 species are known; and of these no fewer than 80 are peculiar. The mammalian species number only 14, and of these 11 belong almost entirely to the Celebesian area. Most remarkable are the *Macacus niger*, an ape found nowhere else but in Batchian; the *Anoa depressicornis*, a small ox-like quadruped, which inhabits the mountainous districts; and the babirusa or pig-deer of the Malays. There are no large beasts of prey, and neither the elephant, the rhinoceros, nor the tapir is represented. Wild-buffaloes, swine, and goats are pretty common; and most of the usual domestic animals are kept in greater or smaller numbers. Though they receive but little attention, the cattle are good. The horses are in high repute in the archipelago; formerly about 700 were yearly exported to Java, but the supply has considerably diminished.

The same peculiarity of species holds in regard to the insects of Celebes as to the mammals and birds. Out of 118 species of butterflies, belonging to four important classes, no fewer than 86 are peculiar; while among the rose-chafers or *Cetoniadæ* the same is the case in 19 out of 30. Equally remarkable with this presence of peculiar species is the absence of many kinds that are common in the rest of the archipelago; and the fact that similarities are often to be traced with species belonging to Africa and other remote regions is highly suggestive.

Vegetation is, it need hardly be said, extremely rich; but there are fewer large trees than in the other islands of the archipelago. Of plants that furnish food for man the most important are rice, maize, and millet, coffee, the cocoa-nut tree, the sago-palm, the obi or native potato, the bread-fruit, and the tamarind; with lemons, oranges, mangosteens, wild-plums, Spanish pepper, beans, melons, and sugar-cane. The shaddock is to be found only in the lower plains. Indigo, cotton, and tobacco are grown; the bamboo and the ratan-palm are common in the woods; and among the larger trees are sandal-wood, ebony, sapan, and teak. The gemnti palm furnishes fibres for ropes; the juice of the *Arenga saccharifera* is manufactured into sugar and a beverage called sagueir; and intoxicating drinks are prepared from several other palms.

Except where Dutch influence has made itself felt, very little attention has been paid by the native races to any agricultural pursuit; and their manufacturing industries are few and limited. The weaving of cotton cloth is principally carried on by women; and the process, at least for the finer description, is tedious in the extreme. The cheap introduction of European goods is gradually lessening the amount of native stuffs. The houses are built of wood and bamboo; and as the use of diagonal struts has not been introduced, the walls soon lean over from the force of the winds. The most important of the mineral products of the island are gold and salt; excellent iron is also found, which is utilized by the natives; and coal of rather poor quality has been met with in various places, as in the district of Maros. The gold-mines are mainly in the northern peninsula; but even there the amount actually obtained is not so great as it was formerly. The various chiefs, bound by contract to bring yearly a fixed quantity of the metal to the Dutch authorities, frequently fail in their engagements, and many of them have been of necessity exempted. The gold is usually found at a depth of from 12 to 75 feet; but there are some mines in Bwool and Tontoli that reach 90 feet. In many, such as those of Ankahulu, Pagiama, and Popasatu, it is very cold, and the miners have to sit all day in nitrous water.

The whole island is practically in the hands of the Dutch Government, though a comparatively small portion is under their direct administration, and a large number of petty princes are still permitted to do very much as they please in the internal management of their territories. For administrative purposes it is distributed among the residencies of Celebes, Manado, and Ternate, of which the two former belong solely to the island, while the third includes a large part of the Moluccas.

Residency of Celebes.

The residency of Celebes, formerly known as the Government of Macassar, comprises all the various states that surround the Gulf of Boni, and is divided into the following departments:—(1) Macassar, (2) the Northern Districts, (3) the Southern Districts, (4) Bulecomba and Bonthain, and (5) Saleyer and the subordinate islands, Buton, Sumbawa, and Bima.

The department of Macassar, or Mangkasara as it is called in the native language, is one of the oldest parts of the Dutch possessions. It contains Macassar, the capital of the residency, which is situated on the west coast of the southern peninsula in 5° 7′ 45″ S. lat., forms one of the principal ports in the archipelago, and has a population of from 15,000 to 20,000. The inhabitants of the department consist mainly of Macassars and Malays proper, Endinese from the island of Flores, and immigrants from the neighboring kingdom of Wadjo. The foreign colonies are each under the management of a separate captain, and the Malays are also under the care of a head priest. The Macassars proper are one of the most important peoples in the island. They belong to the Malay race, are well built and muscular, and have in general a "dark-brown complexion, a broad and expressive face, black and sparkling eyes, a high forehead, a flattish nose with large alæ, a large mouth, and black soft hair, which they let fall over their shoulders." The women are sprightly, clever, and amiable, and in former times were bought for large prices. The men are brave and not treacherous, but ambitious, jealous, and extremely revengeful. Drunkenness is rare, but to gambling and cock-fighting they are passionately addicted; and so frequent among them is the running amuck that the Dutch authorities had to dismiss the Macassar soldiers from their service. In all sorts of bodily exercises, as swinging, wrestling, dancing, riding, and hunting, they take great pleasure. Though they call themselves Mahometans, their religion is largely mingled with pagan superstitions; they worship animals, and a certain divinity called Keraeng Lové, who has power over their fortune and health. Their language, which belongs to the Malayo-Javanese group, is spoken by about 300,000 persons, in Macassar proper, Goa, Tello, Sanraboni, Turateya, Bulecomba, Tanralili, and a great many parts of the southern peninsula; but it has a much smaller area than the Buginese, which is the language of Boni. It is very deficient in generalizations; thus, for example, it has words for the idea of carrying in the hand, carrying on the head, carrying on the shoulder, and so on, but has no word for the notion of simply carrying. It has adopted a certain number of vocables from Sanskrit, Malay, Javanese, and Portuguese, but on the whole is remarkably pure, and has undergone comparatively few changes in the course of the last two or three centuries. It is written in a peculiar character, which has displaced, and probably been corrupted from, an old form employed as late as the 17th century. Neither bears any trace of derivation from the Sanskrit alphabet. The priests affect the use of the Arabic letters. The literature is very poor, and consists largely of romantic stories from the Malay, and religious treatises from the Arabic. Of the few original pieces the most important are the early histories of Goa, Tello, and some other states of Celebes, and the *Rapang*, or collection of the decrees and maxims of the old princes and sages. The more modern productions are letters, laws, and poems, many of the last having very considerable beauty. For his knowledge of the Macassar the European scholar is mainly indebted to the labors of B. F. Malthes of the Dutch Bible Society, who was sent out in 1846, and has published *Makassaarsche Spraakkunst* (1858), *Makassaarsch-Hollandsch Woordenboek* (1859), *Ethnographisch Atlas* (1859), *Makassaarsche Chrestomathie* (1860), and various communications to the *Zeitsch. der morgenl. Gesellsch.*

The department of the Northern Districts, called also Maros (properly Marusa), from the chief town, lies to the north of Macassar, and is divided into twenty-six districts. It is watered by the River Maros, which has a channel of great picturesqueness broken by waterfalls and bordered by caves. The mineral products comprise gold, marble, porcelain-clay, and anthracite; but the extensive rice-fields are the principal source of wealth. The river is commanded by the fort of Valkenburg; and a great road, constructed in 1859, leads through the department. About five miles from the town are the warm mineral springs of Amarang and Mageinba. The population is estimated at 120,000. The prevailing language is Buginese, but Macassar is also spoken by a considerable number.

The department of the Southern Districts, or Takalla, lies to the south-west of Macassar, and is divided into two

parts by the interposition of the little independent state of Sanraboni. The population is estimated at 70,000, and the language is Macassar. The people of the district of Glissong or Galesong are remarkable for their attachment to a sea-faring life. In 1863 the department was increased by the annexation of Turateya, which included the three small states of Bintamo, Bankala, and Laikan, previously troublesome by their piracies and raids. The Turateyans speak a mixture of Macassar and Buginese.

Separated from Turateya by the River Tino is the department of Bonthain and Bulecomba, a thinly-peopled and mountainous country, chiefly remarkable for the lofty summit of Lompobattang or Dikbuik, more familiarly known as the Peak of Bonthain, which has a height of about 11,000 feet. The soil is specially adapted for the culture of coffee. The inhabitants are peaceful and well-behaved, but in education and civilization they are less advanced than those of the departments already described. They were formerly subordinate to the Macassar kingdom.

To the north of these two states lies the important kingdom of Boni, of which an account will be found in a separate article (vol. iv. p. 29), and to the north of Boni, and separated from it by the River Chinrana, is the rival kingdom of Wajo or Wadjo, with a coast line of about 50 miles along the Gulf of Boni. It is governed by about forty chiefs or nobles, who are almost independent in their respective districts and maintain their individual bands of followers, but at the same time recognize the overlordship of the prince. The different offices of the state are not unfrequently held by women; and the greatest importance is attached to purity of descent. The inhabitants rather neglect the culture of the soil; and large numbers of them resort to the neighboring states as traders. The capital was formerly Tesora or Tossora, a large straggling city near the River Chinrana, embracing within its fortifications a space of several miles in circuit. For numerous details on this district the reader may consult Mundy's *Narrative of Events in Borneo and Celebes*, vol. i.

To the south-west of Wadjo is the kingdom of Sopeng, which was long connected by intermarriages with Boni. The ground is very fruitful, and large quantities of rice are exported. The capital was formerly a place of the same name on the coast; but the rajah removed his residence to Sengkang on Lake Tempe. Sopeng recognized the Dutch supremacy in 1825. The population is estimated at 18,000.

To the north of Sopeng lies the territory of Adja Tamkarang, under the government of the prince of Lidenring, who takes his title from a small principality of that name. It is traversed by the Sadang River, one of the most important of those that flow into the Strait of Macassar.

Round the head of the Bay of Boni stretches the kingdom of Luvu (Loewoe), a well-peopled district, productive of gold and excellent iron, but greatly depressed by an unsatisfactory government. To the south-west of Luvu lie the districts of Ussu and Lellevau, and south of these the state of Baikonka or Minkoko, with its capital Pansulai on the Gulf of Boni; but the whole of this region is comparatively unexplored. The Minkokos have a considerable resemblance to the Dyaks of Borneo, and maintain a similar custom of head-hunting. Their language is akin to Buginese.

At the very end of the eastern peninsula is situated the district of Polean Rumbia, conterminous on its north-east boundary with the more important territory of Lavui, which stretches along the coast of the Bay of Tolo, and is tributary to the king of Boni. The latter district possesses in Kendari or Vosmaer's Bay one of the finest harbors in the archipelago, and it carries on a certain amount of traffic. The coast is frequented by numbers of the Bajows.

Residency of Ternate.

The rest of the lands that lie round the Bay of Tolo belong to the residency of Ternate. Conterminous with Lavui is the principality of Tombuku, a densely-wooded, and partially-explored territory, governed by an hereditary chief under the sultan of Ternate. The population is mainly settled in the interior, and their numbers were estimated in 1852 at 15,000. They have no regular coin, and strips of cotton cloth are used in exchange. Their language seems to have almost no connection with any other in the archipelago. Among the people along the coast excellent workers in metal are found, and earthenware is also manufactured. The capital was formerly Lanona; but since 1856 this honor belongs to Sabita. At the very head of the bay is the district of Tomore or Tomaiki, with a river of the same name; while along the northern side are situated the territories of Bangay and Balante. From the latter iron and timber are exported.

Residency of Manado.

The country that lies round the Gulf of Gorontalo belongs to the residency of Manado, and is divided into the Minahassa or Confederation of Manado, the department of Gorontalo, and various states, such as Parigi, Bwool, and others that will be mentioned in the course of the article.

Of these the most important is the Minahassa, or properly Ni-mahassa, of Manado, which derives its name from the union of thirty-six states under the Dutch supremacy to resist the claims of the king of Bolang, who had made himself at one time master of the district. It occupies the most eastern part of the northern peninsula, and is divided into the five departments of Manado, Kema, Tondano, Amurang, and Bolang. Of the whole island it is the most distinctly volcanic portion, and contains several mountains that have been in active eruption within modern times. The most important summits are those of Klabat (6560 feet high), Saputan (5960), Engerong (4050), Lokon (5240), Prumangan or Mahabu (4300), Kimavang, and Papelampungan. In 1806 the Mountain Tonkoko threw forth a quantity of ashes and pumice-stone that darkened the air for two days and covered the ground for many miles with a layer an inch thick. There are numerous boiling springs and geysers, the most interesting being Lahendang, where the Count Charles de Vidua de Conzano met with his death in 1830. An interesting account of a visit to several of these volcanic phenomena is given by Mr. Bickmore in his *East Indian Archipelago*. Perhaps in no part of their possessions have greater and happier transformations been effected by the Dutch than in this district. In the beginning of this century the inhabitants were still savages, broken up into numerous tribes that were almost never at peace with each other, and speaking such a variety of dialects that hardly any village was quite intelligible to its neighbors. About 1822 it was discovered that the soil of the mountain sides was fitted for the growth of coffee; the cultivation was introduced and a system established which stimulated the native chiefs to undertake the management of the plantations. The result has been not only to make the Minahassa one of the best coffee districts in the archipelago, but to advance the civilization of the inhabitants in a wonderful manner. Missions have been established by the Dutch Missionary Society, and have met with the most encouraging success. In 1859 the mission schools numbered 102, and were attended by 8996 pupils; while at the same time 12 Government schools had 1049 pupils and 28 village schools had 1610. The various local dialects are rapidly being replaced by Malay, which is the language adopted for educational purposes. The villages, which have grown up in considerable numbers, are neat and tidy, and most of the houses are well built; the country is traversed by good roads, finely shaded with trees and in many cases fit for carriages; and bridges have been erected over the rivers. The trade of the district is in a flourishing condition and promises to become more important. The principal articles are the coffee, cocoa, rice, and trepang. In 1858 the number of households employed in the coffee-culture was 12,909; the number of trees in regular gardens was 3,449,518; and their produce for the year amounted to 22,866 piculs. Since that date the plantations both of the Government and private speculators have very largely increased. The plant succeeds admirably at a height of from 1500 up to 4000 feet above the sea, and produces a fine kernel of a translucent greenish blue color, which is known in the market as Manado coffee, and brings a much higher price than the Java growth. Cocoa was probably introduced by the early Spanish navigators, but it received little attention till about 1822, when some Dutch and Chinese settlers undertook its cultivation. Since that time it has become a pretty important article, and has been introduced into Gorontalo and the Sangir Islands; but the crop is unfortunately a somewhat precarious one. The koffo or Manila-hemp (*Musa textilis*) is largely grown, more especially in the neighborhood of Amurang, where the Government has established a rope factory. The nutmeg, though only introduced in 1853, is now cultivated pretty extensively. Tobacco is also grown, but mainly for home consumption. The best is obtained from the district of Bantek. The population of the Minahassa was, in 1863, 105,514.

The department of Gorontalo comprises the various districts of Gorontalo, Limbotto, Bone, Bintauna, Suvava, Bolango, Attingola, Bualemo, Muton, Parigi, Saussu, Posso, Tongko, Todjo, and the Togian Islands. Gorontalo proper lies on the north of the Tomini Bay. The inhabitants are mainly Mahometan Malays, and they possess about 200 Mahometan priests, most of whom can neither read nor write. The capital is a large and flourishing town with considerable trade; it has a Dutch garrison and fort, and a Christian school. The rivers and lake furnish abundance of fish, and almost every house has a pond attached for keeping those captured alive. Limbotto, a small state of about 6000 inhabitants, since 1865 under Dutch direction, is chiefly noticeable for the Bay of Kwandang and the gold mines of Limbotto, Bulatu, and Sulametta. Muton possesses several gold mines. The village of that name lies in 0° 23′ N. lat. and 121° 30′ 18″ E. long. Along the northern coast to the north of Muton lie the states of Palele, Bwool, and Tontoli, of which the second is the most important, being traversed by one of the largest rivers in the island, and possessing valuable gold mines and great numbers of sago-palms. The composition of its population in 1870 was (according to J. G. F. Riedel in the *Tijdschrift voor Indische Taal-, Land-, en Volkenkunde*, 1874) 4229 natives, 726 from Gorontalo and Limbotto, 466 from Kayeli, 230 Buginese, 84 Tontoli, 38 Mandharese, and 22 Arabs. Tontoli was formerly the resort of pirates, but in 1822 it was cleared by Captain De Man.

Along the south side of the Bay of Gorontalo stretches the country of Parigi from Amphibabu to the River Dulagu. It has a very fertile territory, and a considerable trade is carried on with Palos and Dongala, the districts on Tomini Bay and Singapore. The exports are gold, horses, cocoa-nuts, bananas, and a kind of resin called damar. Parigi recognized the Dutch supremacy in 1850, but has preserved its autonomy, and is governed by a prince and several chiefs. The principal village is Parigi di Atas.

On the west coast of the island, and forming as it were the nucleus from which the peninsulas spring, lie the districts of Dongala, Palos, and Kayeli. Dongala is situated on the Bay of Palos, and is governed by a rajah who recognized Dutch supremacy in 1824. Palos is governed by an independent chief, and is in a flourishing condition. The town is situated in 0° 57′ S. lat. and 119° 34′ E. long., and is connected by road with Parigi and Boni. Its inhabitants carry on an active trade both by sea and land. The kingdom of Kayeli was at one time under the sultan of Ternate, passed by conquest to the people of Macassar, was restored to the sultan by the treaty of Bonga, and was by him presented to the Dutch, whose authority was only recognized in 1854. The soil is well fitted for cultivation, and yields coffee and cocoa-nuts for export. The kingdom of Mandhar lies further south, and is governed by seven chiefs, who take their titles from the seven principal rivers, and till 1854 recognized the supremacy of Boni. The inhabitants speak a distinct language. Those on the coast are nominal Mahometans, those inland are still pagan. They are active traders, and take voyages to Java, Bencoolen, Malacca, Singapore, and Manila. Toradja, which lies further inland, is possessed by a wild pagan race, who keep themselves apart from all intercourse, and are generally regarded as the original inhabitants of the island.

Celebes was first discovered by the Portuguese in the early part of the 16th century, the exact date assigned by some authorities being 1512. The name does not appear to be of native origin, and the plural form is probably due to the belief that the different peninsulas were so many separate islands. At the time of the Portuguese discovery, the Macassars were the most powerful people in the island, having successfully defended themselves against the king of the Moluccas and the sultan of Ternate. In 1609 the English attempted to gain a footing. At what time the Dutch first arrived is not certainly known, but it was very probably in the end of the 16th or beginning of the 17th century, since in 1607 they formed a connection with Macassar. In the year 1611 the Dutch East Indian Company obtained the monopoly of trade on the Island of Buton; and in 1618 an insurrection in Macassar gave them an opportunity of obtaining a definite establishment there. In 1660 the kingdom was finally subjugated by Van Dam and Truitman, with a fleet of 33 ships and a force of 2700 men. In 1666 the war broke out anew; but it was brought to an end by Speelman in the following year, and the treaty of Bonga or Banga was signed, by which the Dutch were recognized as the protectors and mediators of the different states who were parties to the treaty. In 1683 the north-eastern part of the island was conquered by Robert Paddenburg, and placed under the command of the governor of the Moluccas. In 1703 a fort was erected at Manado. The kingdom of Boni was successfully attacked by Van Geen in 1824, and in August of that year the Bonga treaty was renewed in a greatly modified form. Since then the principal military event is the Boni insurrection, which was quelled in 1859. With the exception of Manado, the Dutch settlements in Celebes have not been financially successful; but as the resources of the country are developed it will, doubtless, become a very valuable possession.

In Veth's *Woordenboek van Nederlandsch Indië* there will be found an extensive bibliography of Celebes drawn up by H. C. Millies. Besides the well-known works of Valentyn, Stavorinus, Raffles, and Crawfurd, it will be sufficient to mention Van den Bosch, *Nederlandsche Bezittingen in Azia*, &c., 1818; Vincent, "Notice sur l'île de Celebes," in *Journ. des Voyages*, 1826; Olivier's *Reizen*, 1834; Reinwardt's *Reis naar het Oostelijk gedeelte van den Ned. Archipel. in* 1821, 1858; Van der Hart, *Reize rondom het Eiland Celebes*, 1853; Samuel White, *Account of the last Rebellion at Macassar*, 1687; Stubenvoll's *Translation of History of the Island of Celebes, by Mr. R. Blok, Gov. of Macassar*, 1817; Capt. R. Mundy, *Narrative of Events in Borneo and Celebes*, 1848; Ed. Dulaurier, *Code Maritime des Royaumes Mangkassar et Bougui*, 1845; Wallace, *Malay Archipelago*, 1869; Bickmore, *East Indian Archipelago*, 1868; Veth's *Een Nederlandsch reiziger op Zuid Celebes*, 1875; Riedel's *Het landschap Boeool, Noord Selebes*, 1872; the same writer's "Die landschaften Holontalo, Limoeto," &c., in the *Zeitschr. für Ethnologie*, 1871; Beccari's "Viaggio" in Guido Cora's *Cosmos* for 1874–6. (H. A. W.)

CELERY (*Apium graveolens*), a biennial plant belonging to the Natural Order *Umbelliferæ*, which, in its native condition, is known in England as smallage. In its wild state it is common by the sides of ditches and in marshy places, especially near the sea, producing a furrowed stalk and wedge-shaped leaves, the whole plant having a coarse, rank taste, and a peculiar smell. By cultivation and blanching the stalks lose their acrid qualities and assume the mild sweetish aromatic taste peculiar to celery as a salad plant. The plants are raised from seed, sown either in a hot bed or in the open garden, according to the season of the year, and after one or two thinnings out and transplantings, they are, on attaining a height of 6 or 8 inches, planted out in deep trenches for convenience of blanching, which is effected by earthing up and so excluding the stems from the influence of light. A large number of varieties are cultivated by gardeners, which are ranged under two classes, white and red,—the white varieties being generally the best flavored, and most crisp and tender. As a salad plant, celery, especially if at all "stringy," is difficult of digestion, but it possesses valuable diuretic properties. Both blanched and green it is stewed and used in soups, the seeds also being used as a flavoring ingredient. In the south of Europe celery is seldom blanched, but is much used in its natural condition.

Celeriac is a variety of celery cultivated more on account of its roots than for the stalks, although both are edible and are used for salads and in soups. It is chiefly grown in the north of Europe, and is not in much request in Great Britain.

CELESTINE, the name of five popes.

CELESTINE I. was a Roman, and is supposed to have been a near relative of the Emperor Valentinian. Various portions of the liturgy are attributed to him, but without any certainty on the subject. He held the Council of Ephesus in which the Nestorians were condemned, in 431. Four letters written by him on that occasion, dated all of them 15th March, 431, together with a few others, to the African bishops, to those of Illyria, of Thessalonica, and of Narbonne, are extant in retranslations from the Greek, the Latin originals having been lost. He actively persecuted the Pelagians, and was zealous for Roman orthodoxy. He sent Palladius, a Greek, to Scotland, and Patricius (St. Patrick) to Ireland. He raged against the Novatians in Rome, imprisoning their bishop, and forbidding their wor-

ship. He was zealous in refusing to tolerate the smallest innovation on the constitutions of his predecessors, and is recognized by the church as a saint. He occupied the seat of St. Peter eight years, five months, and three days, and died on the 6th April, 432. He was buried in the cemetery of St. Priscilla in the Via Salaria, but his body, subsequently moved, lies now in the Church of St. Prasside.

CELESTINE II. was elected in 1143, governed the church only five months and thirteen days, died 9th March, 1144, and was buried at the Lateran. His name had been Guido di Castello, from the small town of which he was a native. He had studied under Peter Abelard. The principal act of his Papacy was the absolution of Louis VII. of France at the request of that penitent monarch, and the removal of the interdict under which that country had lain for three years.

CELESTINE III., Giacinto Bobone Orsini, of that noble race, was elected Pope 30th March, 1191, being then only a deacon, received priest's orders on the 13th of April, ruled the church six years, nine months, and nine days (though believed to have been ninety when elected), died 8th January, 1198, and was buried at the Lateran. He crowned the Emperor Henry VI. on the day after his election with a ceremonial symbolizing his absolute supremacy, as described by Roger Hoveden, who is believed (more reasonably as it would seem) by Baronius, but discredited by Natale Alexander. He subsequently excommunicated the same Henry for wrongfully keeping Richard of England in prison. In 1192 he confirmed the statutes of the Teutonic Order of Knights. He would have resigned the Papacy, and recommended a successor shortly before his death, but was not suffered to do so by the cardinals.

CELESTINE IV., Godfrey Castiglioni of Milan, a nephew of Urban III., became a monk at Hautecombe in Savoy, there wrote a history of Scotland, and was elected Pope by seven cardinals only, in the midst of troubles caused by the vicinity and violence of the Emperor Frederick II., on the 22d September, 1241. He occupied the throne only seventeen days, died, before consecration, on the 8th October, 1241, and was buried at the Vatican.

CELESTINE V. was known before his election as Peter di Morone. Born in 1215, the son of a peasant in the Neapolitan district, named Angelario, he became a Benedictine monk at Faifoli in the diocese of Benevento when he was seventeen. He showed from the first an extraordinary disposition to asceticism and solitude, and in 1239 retired to a solitary cavern on the mountain Morone, whence his name. Five years later he left this retreat and betook himself, with two companions, to a similar cave on the Mountain of Majella in the Abruzzi, where he lived as strictly as was possible according to the example of St. John the Baptist. Terrible accounts are given of the severity of his penitential practices. While living in this manner he founded, in 1244, the order subsequently called after him Celestines. (See CELESTINES.) The cardinals assembled at Perugia after the death of Nicholas IV., and after long dissensions and difficulties agreed as a means of escaping from them to elect the hermit Pietro di Morone. When sent for he obstinately refused to accept the Papacy, and even, as Petrarch says,[1] attempted flight, till he was at length persuaded by a deputation of cardinals accompanied by the kings of Naples and Hungary. Elected 7th July, 1294, he was crowned in the city of Aquila in the Abruzzi, 29th August. He issued two decrees,—one confirming that of Gregory X., which orders the shutting of the cardinals in conclave; the second declaring the right of any Pope to abdicate the Papacy,—a right he, at the end of five months and eight days, proceeded himself to exercise at Naples on the 13th December, 1294. He did one other thing which may be noted, because it seems to be the only instance known to the church in which such a thing occurred. He empowered one Francis of Apt, a Franciscan friar, to confer priest's orders on Lodovico, son of Charles, king of Sicily,—a fact which seems to have escaped the notice of Bingham, who says that such a thing was never done.[2] In the formal instrument of his renunciation he recites as the causes moving him to the step, "the desire for humility, for a purer life, for a stainless conscience, the deficiencies of his own physical strength, his ignorance, the perverseness of the people, his longing for the tranquillity of his former life;" and having divested himself of every outward symbol of dignity, he retired to his old solitude. He was not allowed to remain there, however. His successor, Boniface VIII., sent for him, and finally, despite desperate attempts of the late Pope to escape, got him into his hands, and imprisoned him in the castle of Fumone near Ferentino in Campagna, where, after languishing for ten months in that infected air, he died on the 19th May, 1296. He was buried at Ferentino, but his body was subsequently removed to Aquila. Many Dantescan commentators and scholars have thought that the poet stigmatized Celestine V. in the enigmatical verse which speaks of him "Che fece per viltà lo gran rifinto."[3] Recent opinion on the point more reasonably rejects this interpretation. Celestine V., like the first of the name, is recognized by the church as a saint.

CELESTINES, a branch of the great Benedictine monastic order. At the foundation of the new rule, they were called Hermits of St. Damiano, or Moronites (or Murronites), and did not assume the appellation of Celestines till after the election of their founder to the Papacy as Celestine V. The fame of the holy life and the austerities practised by that saintly hermit (as noticed above) in his solitude on the Mountain of Majella, near Sulmona, attracted many visitors, several of whom were moved to remain and share his mode of life. They built, therefore, a small convent on the spot inhabited by the holy hermit, which very shortly became too small for the accommodation of those who thronged thither to share their life of privations. Peter of Morone, their founder, therefore built a number of other small oratories in that neighborhood. This happened about the year 1254. A new religious community was thus formed, and Peter of Morone gave them a rule formed in accordance with his own practices. In 1264 the new institution was approved by Urban IV. But the founder, having heard that it was probable that Pope Gregory X., then holding a council at Lyons, would suppress all such new orders as had been founded since the Lateran Council, having commanded that such institutions should not be further multiplied, betook himself to Lyons, and there succeeded in persuading Gregory to approve his new order, constituting it a branch of the Benedictines, with a rule based on that of St. Benedict, but adding to it many additional severities and privations. Gregory further took it under the Papal protection, assured to it the possession of all property it might acquire, and endowed it with that great and constant, but most pernicious and fatal, object of the ambition of all monastic orders, exemption from the authority of the ordinary. Nothing more was needed to ensure the rapid spread of the new association; and Peter the hermit of Morone lived to see himself "Superior-General" of thirty-six monasteries and more than six hundred monks. Peter, however, cannot be accused of ambition or the lust of power when a monastic superior, any more than when he insisted on divesting himself of the Papacy, to which he was subsequently raised. As soon as he had seen his new order thus consolidated he gave up the government of it to a certain Robert, and retired once again to a still more remote solitude to give himself up more entirely to solitary penance and prayer. Shortly afterwards, in a chapter of the order held in 1293, the original monastery of Majella being judged to be too desolate and exposed to too rigorous a climate, it was decided that the monastery which had been founded in Sulmona should be the headquarters of the order and the residence of the General-Superior, as it has continued to be to the present day. The next year Peter the hermit of Morone, having been, despite his reluctance, elected Pope by the name of Celestine V., the order he had founded took the name of Celestines. The hermit Pope found time in the few short months of his Papacy to confirm the rule of the order, which he had himself composed, and to confer on the society a variety of special graces and privileges. In the only creation of cardinals promoted by him, among the twelve raised to the purple, there were two monks of his order. He found time also to visit personally the great Benedictine monastery on Monte Casino, where he succeeded in persuading the monks to accept his more rigorous rule. He sent fifty monks of his order to introduce it, who remained, however, for only a few months.

After the death of the founder the order was favored and privileged by Benedict XI., and rapidly spread through Italy, Germany, Flanders, and France, where they were

[1] *De Vit. Solit.*, lib. ii. sec. 3, ch. 18. [2] *Orig. Eccl.*, lib. ii. cap. 3, sec. 5.

[3] "Who made from cowardice the great refusal," *Inferno*, canto iii line 60.

received by Philip the Fair in 1300. Subsequently the French Celestines, with the consent of the Italian superiors of the order, and of Pope Martin V. in 1427, obtained the privilege of making new constitutions for themselves, which they did in the 17th century in a series of regulations accepted by the provincial chapter in 1667. At that time the French congregation of the order was composed of twenty-one monasteries, the head of which was that of Paris, and was governed by a Provincial with the authority of General. Paul V. was a notable benefactor of the order. But in consequence of later political changes and events the order has been dissolved.

According to their special constitutions the Celestines were bound to say matins in the choir at two o'clock in the morning, and always to abstain from eating meat, save in illness. The specialties of their rule with regard to fasting would be long and tedious to recount. It cannot be said that they are more severe than those of sundry other congregations, though much more so than is required by the old Benedictine rule. But in reading their minute directions for divers degrees of abstinence on various days, it is impossible to avoid being struck by the conviction that the great object of the framers of these rules, beyond the general purpose of ensuring an ascetic mode of life, was to create a specialty, to make a distinguishing difference between what "our" order does and what others do.

The Celestines wore a white woollen cassock bound with a linen band, and a leathern girdle of the same color, with a scapulary unattached to the body of the dress, and a black hood. It was not permitted to them to wear any shirt save of serge. Their dress in short was very like that of the Cistercians. But it is a tradition in the order that in the time of the founder they wore a coarse brown cloth. The church and monastery of St. Pietro in Montorio originally belonged to the Celestines in Rome; but they were turned out of it by Sixtus IV. to make way for Franciscans, receiving from the Pope in exchange the Church of St. Eusebius with the adjacent mansion for a monastery.

The order of Celestines has had its special historians, as Becquet, author of a history of the Celestines of France (Paris, 1719), and in the great collection of the Bollandists, vol. iii., under the month of May. But the order does not seem to have been fruitful of men of much mark; nor has it ever attained in the annals of Europe, or even of the church, a position of such importance as most of its rival societies have reached.

CELIBACY is the condition of those who are living a single life. The word is derived from *cælebs*, which means, not necessarily, as is very commonly supposed, a bachelor, but one who has no existing wife, whether he be a bachelor or a widower. (For authorities on this point, see Facciolati, *Totius Latinitatis Lexicon.*) Scaliger and Voss derive the word from κοίτη, a bed, and λείπω, to leave. Some more fanciful etymologists, imagining that *cælebs* leads a *celestial* life, have suggested a derivation from *cælum*. The word is sometimes written *cœlebs*, but the better authorities are in favor of the diphthong æ.

From the remotest times, those who have given their attention to the study of the conditions of human life in this world have deemed the married state to be a better thing both for the individual and the society to which he belongs than celibacy; while from an equally early period those who have professed to understand man's destinies in a future world, and the most proper means of preparing for them, have, though in no wise condemning marriage, conceived that celibacy is the better, purer, nobler, and higher condition of life. Lawgivers, sociologists, statesmen, philosophers, and physiologists have held the former view; devotees, ascetics, priests, the latter.

The lawgivers of various countries and ages have striven to discourage celibacy, as far as it was in the power of law to do so. The mention by Dionysius of Halicarnassus of an ancient law by which all persons of mature age were obliged to marry, may be cited. More authentic is the Roman law of the time of Augustus known as the *Lex Julia de maritandis Ordinibus*. It was afterwards called *Papia Poppæa*, or *Julia Papia*, from some new sanctions and amendments under the consuls Papius and Poppæus. Modern legislation has with increased wisdom shrunk from such direct attempts to coerce those subjected to it. But various provisions have in many European countries been enacted or proposed with the view of favoring the prevalence of marriage.

Any endeavor to give a satisfactory account of the investigations of physiologists, as bearing on this subject, would lead us too far afield into the discussion of topics which fall more conveniently and appropriately under other headings. But it appears from recent statistics that married persons,—women in a considerable but men in a much greater degree,—have at all periods of life a greater probability of living than the single.

The ideas which, in the absence of or in opposition to the deductions of social philosophers and legislators, have found expression in the religious or ecclesiastical observances and theories of various ages and creeds, require and are fitted to be treated, though with the utmost brevity, in a somewhat more historical manner. Beausobre, in his *Histoire Critique du Manichéisme*, lib. vii. cap. 3, shows that it was a prevalent opinion among the earliest Christians that if Adam had not fallen by disobedience, he would have lived for ever in a state of virgin purity, and that a race of sinless beings would have peopled Paradise, produced by some less objectionable means than the union of the first pair of mortals. Marriage was considered by them as a consequence of the Fall, the brand of the imperfection it had entailed, and a tolerated admission of an impure and sinful nature. To abstain from it, therefore, was the triumph of sanctity and at the same time the proof and the means of spiritual perfection. The earliest aspirants to this perfection among the Christians were not ecclesiastics as such, but hermits and anchorites, who adopted this among other means of attaining to recognizedly exceptional sanctity. It is not true, as is often stated, that the official expositors of Romanist theology and ecclesiastical law maintain that a vow of perpetual celibacy was required as a condition of ordination in the earliest ages of the church. It is fully admitted by them that, "although celibacy is preferable to matrimony, the divine law does not make it necessary for the reception of holy orders, or forbid either the ordination of married men or the marriage of those already in orders." In fact it would be impossible to maintain the reverse without denying the truth of many portions of ecclesiastical history, which the church cannot afford to spare, as to the conduct and lives of many of the early bishops, confessors, and martyrs, and without running very serious risk of damaging the favorite claim of the church to uninterrupted apostolical succession.

It was proposed in the second Council of Carthage (251) that celibacy should be required in candidates for the priesthood; but it cannot be pretended that even from that time it was always considered necessary. Moroni (*Dict. Storico Eccles.*, vol. ii. p. 58) makes a very much modified statement:—"As regards the usage and laws of the church," he says, "it has never been permitted to priests or to bishops to take wives, *when they had declared* at the time of their ordination that they would persevere in celibacy." It must be observed, however, with regard to the citations of the cases of bishops and priests of the early Greek Church, that Romanist ecclesiastical writers have never pretended that the practice of the Greek Church was not much more lax in this respect than that of the Latin or Western Church. The difference between the discipline of the one and the other was this. In the Greek Church no objection was made to the ordination of married men purposing to continue living with their wives, if these wives were their first wives, and had not before their marriage been widows; whereas, as is claimed by Romanist writers, in the Latin Church neither priests' nor bishops' orders were ever conferred on married men without requiring from them and from their wives reciprocal consent, and a solemn promise, that they would live separately during the remainder of their lives. As regards *bishops*, however, the practice in the Greek Church was the same as in the Latin. The decrees of various councils, however, show that the practice of the Greek Church in this respect was by no means settled and uniform. That of Ancyra in 313 permitted marriage only to such deacons as had protested against accepting the obligation of celibacy at the time of their ordination. The Council of Nice thought that the ancient tradition of the church should be re-established in conformity with the 26th apostolical canon, which permitted marriage only to those who held the office of readers or chanters in the churches.

The principal Papal decrees which have been issued by the popes on the subject of sacerdotal celibacy are the

following: It is said that Calixtus I., who was elected in 221, renewed a constitution forbidding the marriage of priests. It is said, too, that Lucius I., elected in 255, re-enacted the same prohibition. We do not, however, reach any certainty on the subject till we come to the Council of Elvira, the first of those on matters of discipline the decrees of which are extant. It is doubtful whether this council was held in the year 300 or 313. The thirty-third and thirty-sixth canons of this council command bishops, priests, deacons, and subdeacons to live apart from their wives. The council further prohibited ecclesiastics from having any female in their houses save a sister or a daughter, and those only when virgins, who had consecrated their virginity to God. The ecclesiastical writers maintain that these constitutions were but the confirmation by authoritative sanction of the practice which had been immemorially observed, rather as an apostolic tradition than a positive command. From that time to the time of Gregory VII. (the great Hildebrand, elected 1073), a series of popes issued decrees commanding bishops, priests, and deacons to observe celibacy. But all of them are couched in terms, and put forth under circumstances, which indicate that the regulation was by no means universally, perhaps even it may be said generally, observed. Gregory VII., in the council held at Rome in the year 1074, determined more decisively and vigorously that, according to the sacred canons and the decrees of his predecessors, no ecclesiastic could be a married man, that the sacrament of ordination should be conferred on none except those who professed perpetual celibacy, and that no wived priest should celebrate or even assist at the Mass.

Upon the whole it is clear that the pretension advanced by the Church of Rome to insist on the celibacy of its clergy was at first put forward tentatively and gradually, as a thing desirable and tending to higher perfection, rather than as a thing absolutely necessary; that, like so much else in that church, it was an encroachment on Christian liberty, originating in a mystic idea of the greater purity of a state of celibacy, which was a natural product of the working of the human intellect in the earliest centuries of Christianity, and became fixed and consolidated into a rigid law, as the rulers of the church, and especially Gregory VII., came to perceive that it was a potent engine of ecclesiastical power. It is probable that Hildebrand, the nature of whose intellect and temper was such as eminently to qualify him for perceiving, appreciating at its true value, and utilizing the doctrine of the universal celibacy of the clergy, was the first ruler of the church who clearly saw the incalculably enormous power which this rule placed in the hands of the hierarchy as a body, yet more notably that it tended to increase that of each individual priest. To this and to this alone it has been and is due that a Catholic priest is the citizen of no country, and acknowledges or at least feels no allegiance, unless perhaps a subordinate and secondary one, save to his church, and that to him his order is in the place of family and country; and the greatness, the power, the glory, and the supremacy of the church constitutes that for which the best minds among the priesthood labor and live. But while churchmen were becoming more and more alive to the vast importance of celibacy as a *sine qua non* of the priesthood, minds which were fitted to estimate that institution with a larger view to its ultimate results and consequences became at an early period aware of its veritable consequences. Erasmus, in his 19th Epistle (lib. 29), gives us at once his own and Augustine's views of the subject in the following remarkable passage:—"Mirum vero si procus amans laudat nuptias, dicitque castum conjugium non multum abesse a laude virginitatis, quum Augustinus patriarcharum polygamiam anteponat nostro cælibatui."

But when the church stood at the diverging of the ways, fabled in the apologue, and at the Council of Trent decided once and for ever which of the two paths open before her she should follow, whether that of progressive reformation and amelioration, or that of a *sint-ut-sunt-aut-non-sint* persistence in her old ways and policies, the abolition of the celibacy of the clergy was discussed among other proposed measures of reform, and more peremptorily rejected than almost any other suggestion brought forward. The church understood too well what was around her, and too little what was ahead of her; was too clear-sighted, yet too shortsighted; and determined to retain the terrible engine of her power, which makes of her a caste, with a gulf between her ministers and the rest of humanity.

CELLINI, Benvenuto (1500–1569), was born at Florence, where his family, originally landowners in the Val d'Ambra, had for three generations been settled. His father, Giovanni Cellini, was a musician, and artificer of musical instruments; he married Maria Lisabetta Granacci, and eighteen years elapsed before they had any progeny. The father designed Benvenuto for the same profession with himself, and endeavored to thwart his inclination for design and metal work. When he had reached the age of fifteen, his youthful predilection had become too strong to be resisted, and his father reluctantly gave consent to his becoming apprenticed to a goldsmith, Antonio di Sandro, named Marcone. He had already attracted some notice in his native place, when, being implicated in a fray with some of his companions, he was banished for six months to Siena. After visiting Bologna and Pisa, and after twice resettling for a while in Florence, he decamped to Rome. On his next return to Florence, his violent temper again embroiled him in a quarrel, which again compelled him to retreat in disguise to Rome. Here he produced a vase for the bishop of Salamanca, which introduced him to the favorable notice of Pope Clement VII., —likewise at a later date one of his celebrated works, the medallion of Leda and the Swan; he also reverted to music, practised flute-playing, and was appointed one of the Pope's court-musicians. In the attack upon Rome by the Constable de Bourbon, which occurred immediately after, in 1527, the bravery and address of Cellini proved of signal service to the pontiff; if we may believe his own accounts, his was the very hand which shot the Bourbon dead, and he afterwards wounded the Prince of Orange. His exploits paved the way for a reconciliation with the Florentine magistrates, and his return shortly after to his native place. Here he assiduously devoted himself to the execution of medals, the most famous of which (executed a short while later) are Hercules and the Nemean Lion, and Atlas supporting the Sphere. From Florence he went to the court of the duke of Mantua, and thence again to Florence and to Rome. Here he avenged a brother's death by slaying the slayer; and shortly afterwards he had to flee to Naples to shelter himself from the consequences of an affray with a notary, Ser Benedetto, whom he wounded. Through the influence of several of the cardinals he obtained a pardon; and on the elevation of Paul III. to the pontifical throne he was reinstated in his former position of favor, notwithstanding a fresh homicide of a goldsmith which he had committed in the interregnum. Once more the plots of Pier Luigi, a natural son of Paul III., led to his retreat from Rome to Florence and Venice, and once more he was restored with greater honor than before. On returning from a visit to the court of Francis I., being now aged thirty-seven, he was imprisoned on a charge (apparently false) of having embezzled during the war the gems of the pontifical tiara; he remained some while confined in the castle of Sant' Angelo, escaped, was recaptured, and was in daily expectation of death on the scaffold. At last, however, he was released at the intercession of Pier Luigi's wife, and of the cardinal of Ferrara, to whom he presented a splendid cup. For a while after this he wrought at the court of Francis I. at Fontainebleau and in Paris; but the intrigues of the king's favorites, whom he would not stoop to conciliate and could not venture to silence by the sword, as he had silenced his enemies at Rome, led him, after about five years of laborious and sumptuous work, and of continually-recurring jealousies and violences, to retire in disgust to Florence, where he employed his time in works of art, and exasperated his temper in rivalries with the uneasy-natured sculptor Baccio Bandinelli. Here, as well as in a previous instance in Paris, he was accused of gross immorality; in his autobiography he rather repels than denies the charge, but he certainly repels it with demonstrative and grotesque vivacity. During the war with Siena, Cellini was appointed to strengthen the defences of his native city, and he continued to gain the admiration of his fellow-citizens by the magnificent works which he produced. He died in Florence on 13th December, 1569, and was buried with great pomp in the church of the Annunziata. Besides the works in gold and silver which have been alluded to, Cellini executed several pieces of sculpture on a grander scale. The most distinguished of these is the bronze group of Perseus

holding the head of Medusa, placed in front of the old Ducal Palace at Florence, a work full of the fire of genius and the grandeur of a terrible beauty, one of the most typical and unforgettable monuments of the Italian Renaissance. The casting of this great work gave Cellini the utmost trouble and anxiety; its completion was hailed with rapturous homage from all parts of Italy. Not less characteristic of its splendidly gifted and barbarically untamable author are the autobiographical memoirs which he composed, beginning them in Florence in 1558,—a production of the utmost energy, directness, and racy animation, setting forth one of the most singular careers in all the annals of fine art. His amours and hatreds, his passions and delights, his love of the sumptuous and the exquisite in art, his self-applause and self-assertion, running now and again into extravagances which it is impossible to credit, and difficult to set down as strictly conscious falsehoods, make this one of the most singular and fascinating books in existence. Here we read, not only of the strange and varied adventures of which we have presented a hasty sketch, but of the devout complacency with which Cellini could contemplate a satisfactorily-achieved homicide; of the legion of devils which he and a conjurer evoked in the Colosseum, after one of his not innumerous mistresses had been spirited away from him by her mother; of the marvellous halo of light which he found surrounding his head at dawn and twilight after his Roman imprisonment, and his supernatural visions and angelic protection during that adversity; and of his being poisoned on two several occasions. The autobiography has been translated into English by Thomas Roscoe. Cellini also wrote treatises on the goldsmith's art, on sculpture, and on design. Among his works of art not already mentioned, and many of which have perished, are a colossal Mars for a fountain at Fontainebleau and the bronzes of the doorway, coins for the Papal and Florentine states, a marble Christ in the Escorial palace, a magnificent button for the pontifical cope of Clement VII., a Jupiter in silver of life size, and a bronze bust of Bindo Altoviti. (W. M. R.)

CELSIUS, Anders (1701–1744), a Swedish astronomer, was born at Upsala in 1701. After travelling in Germany, England, Italy, and France, he took part in the famous expedition which was undertaken in 1736 by Maupertuis, Clairaut, Camus, and others, for the purpose of measuring a degree of the meridian in Lapland. He became member of the academies of Stockholm and Berlin, and of the Royal Society of London, and was appointed secretary of the Royal Society of Upsala. He died in his native town in 1744, leaving several works on astronomical subjects, including *Observations on the Measurement of the Earth* (1738), *A new method of Measuring the Distance of the Sun from the Earth* (1730), and a paper in which he tried to show that the waters of the ocean are decreasing in volume.

CELSUS is the first writer against Christianity of whose objections we have any record. His history is involved in complete uncertainty. Our knowledge of his treatise is derived from Origen's work written against it. We should have expected some information from the Alexandrian in regard to the writer whose book he refutes. But when we examine Origen's statements carefully, we are led to the conclusion that Origen knew nothing about him. Celsus's treatise had been sent to him by Ambrosius with the request that he should grapple with its arguments. Origen had not heard before of the work or of the author. He thought that Christianity did not require a defence, but to please his friend and with the hope of benefiting those who were not Christians, he set about the task assigned. In the performance of this task he could not help making conjectures in regard to the author. He speaks of him in the preface "as long ago dead" (c. iv.). "We have heard," he says in another passage (i. 8), "that there were two Epicurean Celsi, one in the time of Nero and this one [the author] in the time of Hadrian and afterwards." But he could not make up his mind definitely that the Celsus, the author of the treatise, was an Epicurean. He says that he is proved to be an Epicurean from other writings (i. 8). He again and again calls him an Epicurean (i. 10, 21; ii. 60). He allows that Celsus did not state in the treatise that he was an Epicurean (v. 3). He lays before his readers three suppositions in regard to him, either that he concealed his Epicurean opinions, or that he had changed to a better state of mind, or that he had merely the same name as the Epicurean (iv. 54). And he expresses his doubt quite distinctly.—"The Epicurean Celsus, if indeed he is the person that composed the other two books against the Christians" (iv. 36). The "other two books" here mentioned are in all probability, as Neander and Baur have shown, two parts of the book which Origen tries to refute, or that book and another which is mentioned as having been promised by Celsus. Origen expresses a similar doubt as to the authorship of a work ascribed to the Epicurean Celsus. "You see how in these expressions he as it were accepts the reality of magic. I do not know if he is the same as the person who wrote several books against magic" (i. 68).

From these passages the inference may be drawn that Origen was very much in the dark as to who Celsus was and when he lived. The indications in the work itself are not much more satisfactory. But there is at least a clear indication of a period before which it could not have been written. Celsus makes mention of Marcellina (v. 62), who, according to Irenæus (i. 20, 4), came to Rome in the time of Anicetus (154 or 155 to 166 A.D.). In the same passage he mentions Marcion and his followers, and whatever may be the date of Marcion's first arrival in Rome, we may again accept the statement of Irenæus (iii. 4, 3) that he flourished in the time of Anicetus. As the followers of Marcellina and Marcion are spoken of, we may infer that both Marcellina and Marcion had had considerable success in propagating their opinions at the time Celsus wrote. A third clue to the date might be found in the mention of Dionysius, an Egyptian musician with whom Celsus had associated (vi. 41). In all probability this Dionysius was the younger Dionysius of Halicarnassus who was termed *μουσικός*, and who discussed in his books just such points as those to which Celsus alludes. If this were the case, Celsus must have lived in the time of Hadrian, the period in which Suidas says that Dionysius flourished. But there is no conclusive evidence that this Dionysius lived in Egypt, though the epithet "of Halicarnassus" proves nothing to the contrary, as it merely denotes that he was descended from the rhetorician and historian Dionysius of Halicarnassus. Some have found an indication of a date in the circumstance that oftener than once Celsus speaks of "the king" (viii. 68, 73), while in one passage (viii. 71) he speaks of "those who now rule." They infer from this that there were two emperors associated together in the government, but that one of them was far more prominent than the other, in fact that they were Marcus Aurelius and his son Commodus (Keim, p. 265). But the inference is not warranted. The last expression is a general expression, not applicable to the emperors only but to all rulers of the period, and if the other statements were to be pressed they would rather point to a time when only one emperor was on the throne.

In this deficiency of evidence it is not wonderful that critics have varied widely as to the date of Celsus, but most have assigned a date somewhere between 150 and 180. Peter Faidit maintained that he flourished in the time of Nero, and in recent times Volkmar has argued for the opinion that Celsus was a contemporary of Origen (see *Supernatural Religion*, vol. ii. p. 228, *ff.*).

Outside of Origen's work we find no clue to the history of Celsus. The name was very common. Upwards of twenty persons of the name are mentioned within the first three centuries of the Christian era (see Keim for the list, p. 276). But there is only one for whom any one has claimed identity with the Celsus of Origen. This is the Celsus to whom Lucian sent his treatise *Pseudomantis*, giving an account of the imposture of Alexander of Abonoteichos. We think that this identification is a mistake. The Celsus of Origen is unquestionably not an Epicurean. The Celsus of Lucian could scarcely be anything else. The tractate of the satirist is full of extravagant praises of Epicurus. The defence of Epicurus as "a man truly holy and divine in his nature, and who alone with truth ascertained what was beautiful," is said to be specially agreeable to Celsus. The followers of Plato and Chrysippus and Pythagoras are alluded to contemptuously,—an allusion which would have applied pointedly to the Celsus of Origen. If an identity could have been proved, the date of Celsus would have been ascertained; for Lucian mentions the war of Marcus Aurelius with the Quadi and Marcomanni as a contemporaneous event. It is very likely that the Epicurean Celsus mentioned by Origen as living in the time of Hadrian is the same as the Celsus of Lucian.

Happily we are not left in the same doubt in regard to the treatise of Celsus as we are in regard to his life. In refuting it Origen adopted the plan of going through it in regular sequence, taking one passage after another in the order in which he found them in the book. He has not adhered to this rule with absolute fidelity, but his deviations from it are few, and as he generally quotes the exact words, a large portion of the treatise has thus come down to us. The remains of it are so numerous that we can form an accurate notion of the whole work. The treatise was called a "true discourse" (λόγος ἀληθής). Origen states at the end of his work against it (viii. 76) that Celsus intended to write a sequel to it, in which he was to supply rules of practical life for those who wished to embrace his opinions. Whether he ever carried out his intention history does not state.

In the *True Discourse*, Celsus shows great philosophical and critical powers. He takes note of almost every objection which has been brought against Christianity, and his position is substantially that which is assumed by the scientific opponents of Christianity in the present day. The *True Discourse* is divided into two parts. In the first he does not speak in his own person, but introduces a Jew who discusses from the Jewish point of view the credibility of the statements made by Christians in reference to the life of Jesus. There was considerable advantage in this mode of procedure. Celsus himself did not believe in the supernatural. The only possibility of the existence of such a person as the Christian Jesus that he could conceive depended upon his being dæmonic, but Jesus showed nothing of that majesty, that grandeur, that energy of will in worldly affairs which he deemed essential to the dæmon. He therefore rejected his pretensions entirely as inconsistent with his philosophy; but he believed that even on the basis of a philosophy which permitted the supernatural the claims of Jesus must be rejected. And so his arguments are made to come from a Jew. The Jew rejects the miraculous birth of Jesus. Mary was divorced from her husband, and wandering about fell in with a Roman soldier, Panthera, who was the father of Jesus. Jesus being needy went down to Egypt and there learned all the tricks by which he could work apparent miracles, and on the strength of this knowledge he claimed to be God when he returned to Judea. But who could believe the statements made in regard to him,—who heard the voice at his baptism? None but himself and a companion who shared his dream, or rather his imposture. The miracles ascribed to him are absurd. Any one could see such miracles by paying a few obols to an Egyptian juggler. If Jesus was God, would he have chosen such wicked and worthless men as his apostles? If he knew that Judas would betray him, why did he make him his companion? But the story of the resurrection especially seemed absurd. He was condemned publicly before the eyes of all. No one could doubt this. If he rose again, why did he not make his justification as public? Would he not have confronted his judge, his accusers, the general public, and given indubitable evidence that he was not a malefactor? And who saw him after he rose again? A half insane woman and one or two followers who were in the very humor to trust to dreams or to an excited fancy. In this way the Jew discusses many of the statements made in the gospels, and comes to the conclusion that Jesus was an ordinary man.

In the second part Celsus tests the beliefs of the Christians by his philosophical principles. He then shows that the Greeks had all that was true in Christianity, but in a nobler and better form, and he ends with a practical application, urging Christians to give up their separatist tendency, to worship the dæmons, and to join in all civil and military duties imposed on citizens by the state. Before dealing with the principles of the Christians he draws attention to the false position which they occupy. They are, he thinks, essentially rebellious. They wish to separate themselves from the rest of mankind. The Jews show this tendency, but they are so far to be excused in that they adhere to their national beliefs. These beliefs indeed are often silly and puerile, and perversions of what is wiser and better in Greek poets and philosophers. But the Christians belong to no nationality, and separate themselves from the ordinary beliefs without any good cause. They object to the divinity of the Dioscuri, Hercules, and others, in regard to whom the Greeks believe that they became gods from being men. And yet they worship a man who was a prisoner and died. This worship is on a level with that of Zamolxis by the Getæ, of Mopsis by the Cilicians, and of others whom he names. It is unreasonable. Accordingly the Christians do not invite the wise or the good. It is ignorant slaves, women, and children whom they try to influence, not publicly but in corners and private places. And their divisive tendencies are shown in the number of the sects which exist among them.

After this introduction Celsus proceeds with his philosophical argument. God is good and beautiful and blessed. He therefore cannot change. For if he were to change, it could only be for the worse. Therefore God cannot come down to men. He cannot assume a mortal body. He cannot do it in reality, for that would be contrary to his nature; he cannot do it in appearance, for that would be to deceive, and God cannot deceive. Indeed the idea is absurd. What advantage could be gained by his coming? Does he not know all things? Has he not power to do all things without assuming a body? Is he not able as God to do everything that he could do as incarnated God? And no real advantage is got for men; for they do not know God better by seeing him in bodily form. God must be seen by the soul, and men are deceived if they imagine they know him better by seeing him in a corruptible body than when they see him with the pure eye of the soul. Indeed Christianity is in this respect marked by a gross anthropomorphism. Nor can the purpose which Christians assign for this incarnation be regarded as true. The nature of the whole is always one and the same. There is always the same amount of evil in the world. There is nothing evil in God. The evil is in matter. But God is continually making the evil serve for the good of the whole. If this is the case, then, it is absurd to suppose that God would be specially interested in a few of the human race. He works always for the whole. And the Christian notion is peculiarly absurd. Did God at that particular time waken from sleep and resolve to rescue a few from sin? Was he indifferent to all mankind before, to all the nations of the earth? And is he to continue to show the same special favor only for a select number? Not only are the Christians wrong in this, but they are wrong in supposing that the world was made for man. Again it is the whole that is cared for. And we can see signs in nature that animals are equal if not superior to man in many points. If he hunts the deer, the lion hunts him and feeds on him. Bees have cities and rulers. Some animals speak to each other. Some can foretell the future. Some are religious. In fact neither for animals nor man was the universe made, but that the world as God's work might be perfect in every part. In these arguments we have a remarkable anticipation of many of the points which come out in our present Darwinian discussions (see *Teleologie und Naturalismus in der altchristlichen Zeit: Der Kampf des Origenes gegen Celsus um die Stellung des Menschen in der Natur*, dargestellt von Dr. Phil. Aug. Kind: Jena, 1875).

In exhibiting the superiority of the Greek doctrines over the Christian, Celsus points to the circumstance that the Greeks appeal to reason, the Christians cry out, "Believe, believe." The doctrine of the Son of God, he thinks, was borrowed from Plato. The Devil owed his origin to a distortion of a Greek opinion. He compares the prophecies of the Greeks with those of the Christians, and he contrasts Greek and Christian doctrines of a future state, and speaks of the resurrection as a ridiculous belief.

In the practical application he maintains that the dæmons are subordinate ministers of God, and that therefore any worship paid to them is worship also of the Supreme God himself. Especially the Christians have no good reason for objecting to such worship since they already worship a dead man.

Our abstract of this work is necessarily very imperfect, and many important points we have been compelled to omit entirely. From what has been given it will be seen that Celsus was a Platonist. He believed in a Supreme God, the Supreme Good, higher than all existence. This God was everywhere and in everything. Alongside of this God was original uncreated matter, the source of all evil. These two made up the universe, which remained a constant quantity. There could, therefore, be no real redemption from sin. There could be nothing supernatural. There was merely the apparent evolution and involution of the same reason and matter. This mode of

thought is fatal to final causes, fatal to a special aim on God's part, fatal to a special interest in man, and therefore fatal to Christianity.

The writers who have discussed Celsus and his opinions are numerous. Most of them are mentioned in the most recent work on the subject, *Celsus' Wahres Wort: älteste Streitschrift antiker Weltanschauung gegen das Christenthum vom Jahr* 178 *n. Chr.*, von Dr. Theodor Keim, Zürich, 1873. This is a translation of the *True Discourse*, with dissertations on the life, date, arguments, &c., of Celsus. The best expositions of the opinions of Celsus are given in Redepenning's *Origenes* (Bonn, 1841); in Baur's *Die Christliche Kirche der Drei Ersten Jahrhunderte* (Tüb., 1860); and in Kellner's *Hellenismus und Christenthum* (Cologne, 1866). The fragments of Celsus in Greek were collected by Jachmann (1836). (J. D.)

CELTIBERIA, the country of the Celtiberi, was an extensive inland division of Spain, lying between the basin of the Iberus or Ebro and the sources of the Tagus, Douro, and Guadiana, and comprehending the greater portion of the modern provinces of Cuenca and Soria, the south-west half of Aragon, and part of Burgos. By the Romans the name was employed almost as synonymous with Hispania Citerior. It was a hilly and barren region, intersected with valleys of great fertility. Of the chief cities the most famous were Segobriga, the capital; Bilbilis, the birthplace of the poet Martial; and Numantia, besieged ten years by the Romans, and taken and destroyed by Scipio Africanus, 133 B.C. The Celtiberians, as their name imports, were considered to have arisen from the intermarriage of Iberians with the Celts that, having crossed the Pyrenees from Gaul, subdued and settled amongst them. The new race thus formed were a brave and powerful people, whose warlike qualities, improved by conflicts with their neighbors and the Carthaginians, rendered them formidable opponents of the Romans, whom they not unfrequently defeated. After their overthrow by Scipio, and their consequent alliance with their conquerors, they frequently revolted; but, on the assassination of their leader Sertorius in 72 B.C., they were subdued by Pompey, and from that time Celtiberia submitted quietly to Roman influence.

CELTIC LITERATURE. The Greeks gave the collective name *Keltai* to a Western people, and the name *Keltike* to the land which they inhabited. The region to which the latter term was applied varied according to the more or less accurate knowledge of each writer who used the term. The use of the word *Keltai* was equally vague and variable; and this was due as much to the great movements of peoples which took place some centuries before the Christian era as to the want of knowledge of the early Greek writers. One of the displacements of tribes due to these movements has immediate connection with our present subject, the migration of some of the *Keltai* by the valley of the Danube and Northern Greece into Asia Minor; for in the names *Galatai* given to the people, and *Galatia* given to the land wherein they settled, we have forms which connect the Greek *Keltai* and *Keltike* with the Roman *Galli* and *Galliæ*, and both, perhaps, with *Góidil*, *Gaeidil*, or *Gaedhil*, the name of one branch of the descendants of the *Keltai*, or, to use the modern form of the word, Celts. If *Góidil*, or, in the modern Scottish form, *Gael*, be radically connected with *Keltai*, *Galatai*, and *Galli*, these names would represent that by which the original nation, or one of its principal tribes, called itself. We do not know the collective name by which the Germans designated their neighbors. Diefenbach suggests that it may exist in *Halidgastes*, a man's name, which, as frequently happened, from a tribe name became an appellative, and exists now in the modern German word *Held*.

Ancient names of Celts.

When the Romans became first acquainted with the Celts there were two Gauls,—Cisalpine Gaul or Northern Italy, and Transalpine or Greater Gaul, which included not only France but also Belgium, all that part of Germany west of the Rhine, and Western Switzerland. Whether any Celtic tribes lived east of the Rhine since the attack of the Gauls on Rome, and whether the frontier of the Germans and Celts was a fixed one within historic times or a constantly advancing one, are questions which we have not space to discuss, nor, if we had, would it be profitable to do so in the absence of any real facts to work upon. To the Continental Celtic ground above defined we have to add the British Islands.

Celtic ground.

The determination of the limits of the Celtic ground is based chiefly on linguistic evidence. Unfortunately, as regards the Continental part, our materials are scant, and hence a good deal of room is left for the imagination. Thus it has been much discussed whether the language spoken in every part of ancient Gaul was the same. Some have asserted that the Belgians were Germans, and therefore spoke a Teutonic tongue, and that even the Celtic dialect spoken north of the Loire differed considerably from that spoken south of that river in Aquitaine. This opinion was based upon a well-known passage in Cæsar's *History of the Gallic War*, in which he states that Gaul was divided into three parts which differed among themselves in language, institutions, and laws. This may mean either that three distinct languages were spoken, or if but one language, that there were three well-marked dialects. M. Roget de Belloguet has shown from a careful investigation of all ancient authorities, and an analysis of nearly 400 Gaulish words gathered from ancient authors and inscriptions, that the differences in question were dialectic, and that, save, perhaps, in those parts occupied by a Ligurian or Basque people, the same language was spoken in all Gaul.

Celtic language.

Community of language does not, however, necessarily imply community of race. People having no kinship may speak the same language, while others nearly akin may speak widely different languages. This has been found to have been the case in Gaul as elsewhere. One language was spoken by two races which gradually fused into one people—a northern, fair-haired, blue-eyed race, of tall stature, lymphatic temperament, and elongated heads, and a southern race, shorter in stature and dry and nervous in temperament, having brown or black hair and eyes and round heads. The free or dominant class of Gauls belonged to the former race, which was evidently an intrusive one. The inhabitants of the British Islands seem to have been composed of the same two races, and to have spoken the same language as those of Gaul.

Celtic ethnology.

Causes of phonetic change like those which produced the parallel branches of the Teutonic stem (the Germanic and Scandinavian tongues) and of the Windic stem (the Slavonic and Lithuanic tongues) must have existed at an early period in the Celtic language, for the original stem has produced two branches in the British Islands which are wider apart than those of the Teutonic stem, and, according to Zeuss, less widely separated than the two branches of the Windic stem. These branches we shall call, following Zeuss, the Irish and British branches. Each of these branches has again produced three dialects. The Irish or Goidelic dialects are—the Irish proper, the Scottish Gaelic, and the Manx, or dialect of the Irish spoken in the Isle of Man. The British dialects are—the Kymraeg or Welsh, the Cornish, and the Armoric, or language of Brittany. The Cornish is now extinct, having died out about the middle of the last century. We have included Armoric among British dialects on the ground that whatever may be its relation to old Gaulish it was intimately connected during the Middle Ages with the Cornish, if it be not a direct descendant of the language spoken by the southern Britons who emigrated to Brittany during the early Saxon wars.

Branches of Celtic language.

It would be impossible within the limits of such an article as this to point out even the principal distinctions between the two branches of the Celtic, but the following examples will perhaps enable the reader to realize their general character. The Irish has preserved the hard or *k* sound of *c*, while in British it is represented by *p*;—*e.g.*, Irish *cethir*, four, *cland*, posterity, *crann*, tree, with initial guttural, are equal to the Welsh *petguar*, *plant*, *pren*; Irish *nach*, *nech*, person, *macc*, son, with final guttural, and *cach*, each, with initial and final *c*, correspond respectively with Welsh *nep*, *map*, and *paup*. This change from a guttural to a labial, and even in some cases to a dental, is what Professor Curtius calls "labialismus," and is very marked in Greek as compared with Latin; so that as respects this phonetic law Welsh stands to Irish in the same relation as Greek does to Latin. The tendency to labialism is, however, less in Irish than in Latin, *e.g.*, Latin *septem*, seven, Irish *secht*; and perhaps even than in Sanskrit, for Irish drops initial *p*, *e.g.*, *iasg*, fish, Welsh *pysg*, or changes it into *b*, *e.g.*, Welsh

Distinction between branches of Celtic language.

pen, Irish *ben*. The reverse process to labialism even sometimes takes place in the case of borrowed words, *e.g.*, *Pascha*, Easter, Welsh *Pasg*, Irish *Casg;* Latin *purpura*, Irish *corcur*. So great is the contrast in this respect between Irish and Welsh, that the latter labializes borrowed names, as in the case of the Irish Saint *Ciaran*, who became *Piaran* in Wales. If Dr. Windisch, Mr. J. Rhys, and some other philologists are right in thinking that the primitive or true *p* sound when not combined with other consonants has disappeared everywhere from all the Celtic languages, and that when *p* does appear in them, especially in Welsh, it is only the representative of a former *qu*, *mb*, or of a provected *b*, that is a *b* carried forward from the end of one word to the beginning of the next, then the distinction just dwelt upon, though very marked when we compare modern Welsh and Irish, did not exist in ancient times. But whether this be so or not the Irish articulation maintains a good deal of hardness and strength, in illustration of which we may mention that *cn* and *sr* occur as initial sounds—the latter, which is also found in Sanskrit, does not exist perhaps in any other European language. Again, Irish, like Sanskrit, Latin, German, and Slavonian, has preserved the sibilant *s*, while in British, as in Zend, Persian, and Greek, it has been generally changed into *h*, *e.g.*, Irish *sen*, old, Welsh *hen*, Irish *salann*, salt, Welsh *halen;* or the *s* when combined with other consonants has a prefixed *y*, as in Irish *scarad*, separation, Welsh *yscar*. As regards this change of *s* into *h* British also stands to Irish in the same position as Greek does to Latin, *e.g.*, Latin *sal*, Greek ἅλς. Like the labialism above pointed out, this change did not, however, constitute an ancient distinction. Irish words can also end in *s* and *r*, and in *n* probably derived from *m*. Of these, final *s* disappears first, but we have an example of the preservation of a final *r* in so common a word as *athir*, father, when it has lost the initial labial. British has often *v* or *w* for an *m* in Irish, *e.g.*, *louan*, a rope, Irish *loman;* *huvel*, low, Irish *humal*. All the dialects of the British do not do this equally; thus Irish *amail*, *amal*, like, is *auel* in Cornish, and *euel* in Armoric, but *mal* in Welsh. And again the Irish preserves letters where the British loses them; this is especially the case with gutturals, *e.g.*, Irish *tech*, house, Welsh *ti;* Irish *nocht*, night, Welsh *nos;* Irish *teglech*, household, Welsh *teulu*. And, lastly, Irish has preserved the declension of its noun even to this day; and forms closely allied to old Indo-European declensions are found in Old Irish, but with the exception of the genitive in Cornish scarcely a trace of declension is to be found in British. Irish verbal forms are also much better preserved than the British ones, though the latter are in a better state than the nouns.

Irish dialects.

As regards the dialects of each branch, the Irish ones differ less from each other than do the British dialects. Irish proper and Scottish Gaelic are practically the same language, and do not differ greatly more than the dialect of English spoken in the Scotch Lowlands does from common English. Such differences as do exist indicate the modern origin of the Scottish Gaelic. Among those differences the following will bear out this opinion. In the genitive plural the initial consonant is not modified, or, as Irish grammarians say, does not suffer eclipsis in Gaelic as it does in Irish. Thus a Highlander says *nan cos*, of the feet, where an Irishman would say *na g-cos;* the former would, however, use *nam* before a labial, as *e.g.*, *nam fear*, of the men. Again the possessive pronouns *ar*, our, *bhur*, your, do not cause ellipsis in Gaelic as in Irish, *e.g.*, *ar buachaill*, our boy, Irish *ar m-buachaill;* *bhur cosa*, of your feet, Irish *bhar g-cosa*. Again there is the frequent ending of the nominative plural in Gaelic in *an*, as in *slatan*, rods, a peculiarity which it shares with Manx and Welsh, and probably derives from British; writing the personal ending *-aire*, or *-our* as *-air* in Gaelic, *e.g.*, *sealgair*, a huntsman, for *sealgaire*, and the personal ending *-aidh*, as *-aiche* or *-iche*, *e.g.*, *coisiche* for *coisidhe*, a footman; writing the Irish termination *-ugadh* in progressive active nouns as *-uchadh*, *e.g.*, *gradhachadh* for *gradhughadh;* writing the passive participle always hard instead of softening it under certain circumstances, as in Irish, *e.g.*, *ta*, *tha;* *te*, *the*. Among the less marked differences we may point out the use of the negative *cha* in Gaelic for the modern Irish *ni* and old *nocha*, the more frequent use of the auxiliary verb *tá* in conjugation, and the absence of *f* in the future indicative and in subjunctive in Gaelic. Manx differs from Irish much more than Gaelic; but the dissimilarity is not nearly so great as at first sight it appears to be, owing to a kind of phonetic spelling having been adopted in Manx through which the radical letters have often been lost. Manx has been much corrupted, too, in consequence of the connection between Ireland and the Isle of Man having been cut off by the Norse conquest, and also by its having been under the dominion of Wales for some time; add to which that it never received literary cultivation. The chief differences are in orthography,—the ending of the nominative plural in *n* already alluded to, the dropping of a final vowel, the substitution of *d* for *g*, and of *t* or *c* for *g* in the middle or end of words, &c.

British dialects.

Of the British dialects Cornish and Armoric resemble each more than either of them does Welsh. This resemblance is, however, not as great as that of the Irish and Scottish Gaelic, but perhaps as close as that between Spanish and Portuguese, especially if the later borrowings from English and French be excluded. As to the words borrowed by the Cornish from French, which are much more numerous than those taken from English, it is interesting in connection with the history of romance to note that many are borrowed directly from Provençal. The difference between Welsh and Cornish and Armoric is considerable; Mr. Edwin Norris thought it to be as great as that between French and Spanish. Besides the difference in their vocabularies, which is, of course, largely due to the great number of words borrowed by the southern British dialects, especially by Cornish, we may mention the following points in which Cornish differs from Welsh, and these will serve to indicate the general character of the difference between the latter and the southern dialects as a whole:—the retention in Cornish of an initial *s* combined with other consonants without prefixing *y*, *e.g*, *scol*, *scod*, *spyryt*, which in Welsh are weakened to *ysgol*, *ysgwydd*, and *ysprydd;* the diphthongation of vowels in Welsh in cases where Cornish preserves the strong vowel, *e.g.*, Cornish *tron*, *tom*, *scouth*, which are in Welsh *trwyn*, *twym*, and *ysgwyd;* the better preservation of consonants in the middle of words in Cornish than in Welsh, *e.g.*, Cornish *hanter*, *steren*, *valtovat*, *canteuil*, which have been reduced in Welsh to *hanner*, *seren*, *gwallawiad*, *canyll;* and lastly the preservation in Cornish of a genitive case in complete conformity with the Irish.

Age of existing branches and dialects.

The question naturally suggests itself here, when did the original Celtic stem divide into the two branches described? and again, when did each of those branches produce their dialects? The late Mr. Edwin Norris was of opinion that the separation took place after the arrival of the primitive stock in the British Islands. This opinion appears to be in entire conformity with all the facts of the case, ethnological, linguistic, and historical. We have already indicated that the Scottish Gaelic is an essentially modern dialect, which has an existence of only a few centuries. It is probable that pure Irish was spoken in the Isle of Man in the 6th and 7th centuries, that is, Irish exhibiting no greater dialectic variety than existed at the same period between any two provinces of Ireland itself, so that the Manx dialect must have grown up since then. Of the two branches the Irish is the most archaic, that is, it has preserved more of the characteristics of the original stem. Among the British dialects the most archaic, that is, the one which best represents the British branch, is Cornish, which is the descendant of the speech of the un-Romanized Britons of England. This was also the opinion of Mr. Norris, who held that the older the Welsh the more closely would it approximate to Cornish. It is indeed probable that the Welsh dialect originated in the 5th and 6th centuries, when the conquests of the Saxons began to isolate Wales from the other British-speaking people. The separation of Cornish and Armoric is still more recent, a fact which supports the story of the emigration of Britons to Armorica, and of long-continued intercourse during the early Middle Ages.

Gaulish language.

If the preceding view of the origin of the two branches of Celtic and their respective dialects be correct, it disposes once for all of a very vexed question, namely, did old Gaulish belong to the Irish or to the British type, or, to put it more correctly, to which of those types would the dialects belong which would have grown up in France if Gaulish had not been

suppressed by Latin? The usual view has been that the Gaulish belonged to the same type as the British. Grimm's attempt to prove that the medical incantations contained in the book of Marcellus of Bordeaux, a physician of the 4th century, were Celtic of the Irish type led to a modification of this view. Amédée Thierry assumed that the Gauls proper spoke a dialect of the Irish type, while the Belgæ and the Gauls or Galatians of Asia Minor spoke Cymric or British. Such a view implies that Irish and British had already grown out of the original stem before the advent of the Celtic people in the British Islands and Gaul; and further that two distinct waves of Celts had come into Western Europe, the first or oldest being the Goidelic or Irish, and the second the Cymric or British. Edward Lhuyd, the father of Celtic philology, long ago suggested an hypothesis of this kind as an explanation of the occurrence of geographical names in Britain which appeared to him to be Goidelic rather than Cymric. Zeuss threw the weight of his great authority into the scale in favor of the kinship of the old Gaulish and Cymric. The grounds on which he based his opinion have since, however, been altogether explained away, or their force much weakened, especially since the investigations of Gluck and Roget de Belloguet on the Gaulish vocabulary which has been collected from classic authors and inscriptions, and the increased knowledge of the Celtic dialects, the study of which Zeuss himself so powerfully promoted.

Irish ethnic traditions.

Mediæval Irish and Welsh manuscripts contain an extensive body of legendary ethnology, which in the case of the Irish legends has been even fitted with a complete chronology. Setting aside the more fabulous parts of the Irish legends which refer to colonists who arrived a short time before and after the deluge, we find four successive colonies mentioned in the following order:—*Nemedians*, *Firbolgs*, *Tuatha Dé Danann*, and *Milesians*. The *Nemedians* are said to have occupied the country during only two hundred years, when the greater part of them went away in three separate bodies, owing to the harassing attacks made upon them, and their final overthrow, by a people who appear in Irish legends as sea-rovers, called Fomorians. One body took refuge in Britain, another went to Thrace, and the third into the north of Europe. The Thracian party became the ancestors of the second colonizing race, the *Firbolgs*. The *Nemedians* who went to the north of Europe appear afterwards as the *Tuatha Dé Danann;* those who went into Britain became the Britons. According to this legend three of the early tribes which peopled Ireland were of the same race with the Britons. The fourth and latest of the Irish races, the *Milesians*, or followers of *Miled*, are also connected with the others in the genealogies to be found in Irish manuscripts, but the relationship is much more distant than that which is represented to have existed between the other races. All Irish accounts of the early races inhabiting Ireland agree in bringing *Miled* from the north of Spain; but in the early times when the Irish ethnic stories received their present shape, the majority of people, not alone in Ireland, but everywhere, had very imperfect notions of geography, and often applied the few geographical names which had reached their ears by pure hazard, and generally without having more than the vaguest notions of the places they referred to. A perusal of Irish and, we may add, of Welsh poems and tales will bear out what is here stated. Spain in the Milesian story probably means no more than that the Milesians, whoever they were, came from a distance, and not from neighboring countries with which the early Irish had intercourse. Ethnic traditions as a rule do not add much to our knowledge, but it is always dangerous to ignore them altogether because they must necessarily contain some truth. Of all the Irish traditions of this class those only seem to possess real importance which relate to the mysterious people called the *Tuatha Dé Danann*. This name appears to mean the tribes of *Dé* and *Ana;* and as *Dé* is God, and *Ana* is called the mother of the Irish gods, these supposed invading tribes are only the deities in a system of mythology which has yet to be unravelled.

Irish mythology.

All these deities descend from a common ancestor, the *Alldai*, or All-God, and appear to form two lines—the *Aes Trebair* and the *Aes Síde*, probably analogous to the Teutonic *Vanir* and *Æsir*. The close resemblance between the Irish and Norse words *Aes* and *Æsir* can hardly be accidental. The former signifies a people; the latter is connected with the Norse *ans* and the Anglo-Saxon *ós*, God, which occurs in many men's names. The *Síd* was the heavenly fort of the *Aes Síde*, as *Asgard* was of the *Æsir*. The *Mna Sidhe*, women of the *Sidh*, or in the singular *Bean Sidh* (pronounced *Banshee*) of modern fairy mythology, represent the goddesses of the *Aes Síde*. As in other mythologies, the same deity was endowed with different attributes and received different appellatives. The mediæval genealogists who looked upon the *Tuatha Dé Danann* as a real human race, thought it necessary to provide a place in the genealogies which they invented for every different name, and so added confusion to what was before obscure enough.

As some of those deities occupy a place in Celtic romance, we shall venture to say a few words about some of them, though at the risk of making one out of several distinct deities, and of making several out of one. In a subject of inquiry which has been hitherto almost entirely uncultivated, and all but unknown, this is nearly inevitable; but a few mistakes, should we make them, will not seriously interfere with the object we have in view. One of the chief deities of the Irish pantheon was *Ogma*, surnamed *Griainainech*, "of the sun-like face," son of *Eladan*, or *Elathan*, that is, of knowledge. *Ogma* had other appellatives, the most important being *Dagda*, *Delbaith Dana* or *Tuirenn Bicrenn*, and *Cermait* "of the honey-mouth," though the last sometimes appears as the son of the *Dagda*. Under the last appellative his wife is *Ana*, the mother of the gods, or the *Mór Rigu*, or *Mór Rigan*, also known by the appellatives of *Badb* and *Macha*. As the latter, she was the mother of *Aed* (fire), who is probably the *Aed Mawr* of Welsh legends, father of *Prydain*, the first legendary king of Britain, whence the name *Ynys Prydain*, or the Island of *Prydain*, and the real origin of the mythical *Hu* of the mediæval bards. The *Dagda* had another son, whose name was *Aengus*, or the *Mac Oy*, a celebrated personage of early Irish legend, and an equally celebrated daughter, *Brigit*, the goddess of wisdom and judgment. Under the appellative of *Delbaith Dana* or *Tuirenn Bicrenn* (who is represented as the son of *Ogma*, and not that personage himself), *Ogma* has two wives, *Ana*, under that name, and of her other two appellatives, and *Ernmas*, who is represented as the mother of the first-named wife; *Ana*, under her various names, is therefore at once the daughter and wife of *Delbaith*. *Ana's* sons by *Delbaith* are *Brian*, *Iuchair* and *Iucharba*, who are called the gods of *Ana*, and hence she is called the mother of the gods. They are the same as the sons of *Cermait* "of the honey-mouth," already mentioned as being an appellative of *Ogma* himself, or his son under that of the *Dagda*. These sons are *Seithoir* or *Mac Cuill*, a sea-god, *Teithoir* or *Mac Cecht*, the ruler of the sky and heavenly bodies, to whom the plough was sacred, and *Ceithoir* or *Mac Greine* (son of the earth), the god of the earth. Their mother was the *Etain* of Irish legend; and as she was the wife of *Ogma* under that name, it proves that *Cermait* "of the honey-mouth" was only an appellative for the latter, and not his son, under his appellative the *Dagda*. The wives of the three gods above mentioned were *Banba*, *Fotla*, and *Eire*, names under which Ireland was personified. *Elcmair* was either a son of *Ogma* as *Delbaith*, or more probably his brother, and was the same as *Tadc Mor*, *Orbsen*, and *Lêr* (the sea). Under the last-named appellative he was god of the sea, and is especially interesting, for in him we have the original of Shakespeare's King Lear, and the father of *Manandan* of Irish and Welsh romance. It is probable that *Lêr* was the same as *Mac Cuill*, the sea-god above mentioned. There was also a god of war, *Neit* (battle), whose son *Eserg* (slaughter) was the father of *Diancécht*, *Dia na-cécht*, the god of the powers (of healing), of *Goibniu*, the smith, and of other impersonations of the Arts. The god of healing had a son *Cian* or *Conn* (valor), who is also known under other appellatives, such as *Scalbalb*, and is sometimes confounded with his wife *Ethlenn* or *Ethne* (skill). His daughters were *Airmed*, the goddess of physic, and *Etain*, the wife of *Ogma*, above mentioned. *Ethlenn's* son *Lug* is a prominent figure in Celtic romance, and was known also by the names of *Lug Lámfada*, or *Lug* "the long-armed," *En*, and the *Sab Ildanach*, or "pillar of many arts." *Abhcan*, the grandson of *Ethlenn* and *Conn*, was god of music. *Conn*, under his appellative of *Scalbalb*, is also made one of the sons of *Echaid Garb*, son of *Breas* (power), personages who fill prominent parts in Irish story. Among the other sons of *Echaid* we must mention *Badb Derg*, the chief of the *Síde* of Munster, and *Uillind Faebar Derg*, who kills *Manandan Mac Lir* in a legend. The deities related to *Conn* or *Cian*, husband of *Ethlenn*, and his son *Lug* are called the *Aes Trebair*, while those related to the *Dagda* or *Ogma* are the *Aes Síde* of story. The two tribes appear in contention or warfare, but nevertheless, occasionally associated and intermarry, like the Teutonic *Vanir* and *Æsir;* thus *Etain*, the daughter of the god of healing, was the wife of the *Dagda*, and *Cermait* "of the honey-mouth;" and *Fea* and *Nemand*, the goddess of war, the wives of *Neit* or *Neid*, the god of war, were the daughters of *Elcmair* (great evil), known also as *Lêr*.

The Fomorians.

Before leaving the subject of the early races of Ireland we shall say a few words upon a people incidentally mentioned above, the Fomorians. In Irish legends they appear as sea-rovers who only occasionally visited the coasts, pillaged and oppressed the people by levying tribute, or rather holding the inhabitants to ransom. One of the principal battles of Irish legendary history is supposed to have been fought between the *Tuatha Dê Danann* and the Fomorians. Even did we not know, as in this instance we do, that one of the contending races was mythical, we should naturally be inclined to regard such ethnic quarrels as imaginary, unless where we had unquestionable physical evidence of the occurrence of the struggle. On the other hand, in the case of mythologies which reach us, not as the recorded living belief of a people, but as the traditions of a prehistoric time, clothing real personages, who lived just at the close of that period, in what we might call the twilight of the historic period, and around whom as lay figures gather and assume definite shape fragments of old beliefs, we should always expect to find some nucleus of fact in legends relating to such ethnic wars. That the Fomorian and *Tuatha Dê Danann* contests are mythological there can be no doubt, but the kernel of fact around which the myths have gathered is the contests of the Irish and the Romans; in other words we believe the Fomorians to have been the Romans. The latter never made any settlements in Ireland, but there can be no doubt that they kept a few galleys in the western ports of Britain to protect the country from the hostile incursions of the Irish or Scots, and that they often chased these into Irish ports, and forced them to pay ransom. The accounts of the Fomorians in Irish story are just in accordance with this view, which can be supported by other evidence, into which, however, we cannot enter here.

Welsh ethnic traditions.

The Welsh or Cymric ethnic traditions are not so elaborate as the Irish, nor do they in their present form bear the same appearance of antiquity about them. According to the Triads, a peculiar kind of literature to which we shall return hereafter, four classes of tribes entered Britain—the social, the refuge-seeking, the invading, and the treacherous tribes. The social tribes, of which there must have been three to make a triad, were the *Cymry*, the *Lloegrwys*, and the *Brython*, who were all of the same race and closely related. The Cymry like the Irish Firbolgs came from the summer land called *Defrobani* or Greece, or to speak as precisely as the Triads, from "where is now Constantinople, by way of the Hazy Sea," or German Ocean. The *Lloegrwys*, or Loegrians, came from the land of *Gwasgwyn*, not Gascony, however, but the country of the Veneti, about the mouth of the Loire, between whom and the Britons there appears to have been much intercourse in the time of Cæsar. The *Brython* or Britons came from *Llydaw*, that is Armorica, or rather that part of France which lies between the Seine and the English Channel, and which, therefore, included Normandy as well as Brittany. The refuge-seeking tribes were the *Celyddon* in *y Gogled*, the *Gwyddel* in *Alba*, and the men of *Galedin*. *Y Gogled* was apparently a general term among early Welsh writers for all the country between the Ribble and the Clyde inhabited by Britons; but it probably had a more restricted meaning, of which we shall speak presently. The *Celyddon* can hardly be other, at least in name, than the Caledonians, and were probably a Pictish tribe which had settled in the great forest district amidst the British people of the Scotch Lowlands. The *Gwyddel* of *Alba* were the Picts, and as the name *Gwyddel* implies, they were Gaelic. *Gwyddel* is the Welsh form of the old Irish *Góidil*, or in its modified later form *Gaeidhil*, or phonetically *Gael*. The men of *Galedin*, the present Galloway (Wigtown and Kirkcudbright), were part of the tribe known in Ireland as *Cruitne*, that is Picts, and only differed from the *Gwyddel* or Picts of *Alba*, in having come into Galloway from Ireland. The three invading tribes were the *Coraniaid*, the *Gwyddel Ffichti*, and the *Saeson* or Saxons. The *Coraniaid* are said to have come from "the land of *Pwyl*, and they could not be driven out," but dwelt about the River Humber and the shore of the North Sea. If these be the same as the people known to the Romans as the *Coritani*, they were probably Picts of the same tribe as the Irish Picts, for there can be no doubt that *Cruitne* and *Coritani* are the same word. The *Gwyddel Ffichti* or Irish Picts who came to *Alba* by the Sea of *Luychtyn* (Norway), that is the North Sea, were doubtless a brauch of the same Picts who settled about the Humber, in Galloway, and in Ireland. The three treacherous tribes were the *Gwyddel Coch* or Red *Góidil*, or *Gael* from Ireland, the men of *Llychlyn* or Norsemen, and the *Saeson* or Saxons. The Triads expressly tell us that the *Cymry*, the *Lloegrwys*, and the *Brython* were of the same stock. The different tribes of the *Gwyddel* or *Gael*, including the *Coraniaid*, were simply part of the same people who inhabited Ireland. We therefore assume with Mr. W. F. Skene that the Picts and *Gael* were the same people.

Ethnic character of British people.

It thus appears that all the Celtic inhabitants of the British Islands consisted of two brauches, which though originally the same people had branched off from each other in language and in other ways, producing the two classes of Celtic dialects, the Goidelic or Irish and the British, as we have above pointed out. But while we agree with M. de Belloguet that the Gauls were one in race and language, and, moreover, believe that the people who inhabited the British Islands were the same as those of Gaul, and that the divergence which we now observe between the Goidelic and British dialects first took place after their arrival, there seems no reason to doubt that the Celtic population flowed into these islands in two streams, one from the neighboring Gaul, and one from some country east of Gaul by way of the North Sea,—the *Coritani*, the *Gwyddel Ffichti* from about the Forth, the Irish *Cruitne*, and the Scots forming part of the latter stream, and, if our conjecture be correct, the latest comers, a view in harmony with ethnic traditions, but differing from the ordinary opinion that the so-called *Cymry* came long after the *Góidil*, and drove them westward, they themselves being in turn pushed in the same direction by the incoming Saxons.

It would be interesting to pursue the subject of the ethnology of the early races of the British Islands through the conflicts and displacements of races which took place between the landing of Cæsar and the final retirement of the Romans in the 5th century. But as this is not absolutely necessary for the illustration of a literature which only dates from the latter event, we shall content ourselves with giving a sketch of the ethnic distribution of the people of Britain resulting from the conflicts and displacements referred to as it existed in the beginning of the 6th century, when we are on sure ground in the history and literature of Ireland at least. Without such a preliminary sketch much that we shall have to say of great importance in the history of Celtic literature would be unintelligible.

Ethnic distribution of British population.

In the end of the 5th and beginning of the 6th centuries external invasions had ceased, and the different races had gathered into separate states, and commenced a struggle for mastery. In England the Saxons (using that term as a collective name for Saxons proper, Frisians, Angles, and Jutes) held possession of the southern and eastern coast from Dorsetshire to the Humber—the Angles chiefly occupying what is now Suffolk, Norfolk, and Lincoln—and were gradually making themselves masters of Central England towards the Severn, and were even penetrating northwards between the vale of the Ouse and the Pennine Chain, into what is now the West Riding of Yorkshire. With the exception, perhaps, of the immediate neighborhood of the south-eastern coast, where the continuous arrival of fresh bands of Saxons had driven away the British inhabitants, and of the district about the Humber, where in like manner the fresh bands of Angles continually coming must have done the same, we are not to assume, as is usually done, that the former British inhabitants, called by the Welsh *Lloegrwys* or Loegrians, had all been exterminated, or driven away. On the contrary as the Saxons advanced inwards and the external invasion practically ceased, an increasing proportion of Britons must have been left. The new comers merely dispossessed the British ruling families, as the Norsemen did in Normandy, and as happened afterwards in Ireland, and left the bulk of the peasants. This was unquestionably the case in Central and Western England, and in Deira and Bernicia, the present counties of York, Northumberland, Durham, and the eastern Lowlands of Scotland. Cornwall and Devon were independent British kingdoms. What the Saxons had

done on the southern and eastern coast the Irish did on the west. We cannot enter here into the question of when the Irish occupation of Western England commenced, or how long it lasted; there is no doubt, however, now that in the 5th century they occupied a considerable part of Gwynned, or that part of North Wales now forming Anglesea, Carnarvon, Merioneth, Denbigh, and Flintshire; and Demetia, or that part of South Wales now forming Cardigan, Pembroke, and Carmarthen, or in other words, the north and west coast of Wales. But while the Saxons were gradually displacing the British rule in the east, the Britons were gradually dispossessing the Irish in the west. The leaders of these Britons were the descendants of a certain *Cunedda*, reputed to have been a *Gwyddel* or Pict of the east of Scotland. Another *Gwyddel*, but probably one from Ireland, who like *Cunedda* was said to have married a British wife, *Brychan*, has given his name to Brecon or Brecknockshire. *Brychan* may, however, have been only the eponymous ancestor of the Goidelic families of Brecon.

The west of Britain from the Dee to the Clyde, with the exception of Galloway, was occupied by independent British tribes, apparently confederated for purposes of war. On the eastern side between the Humber and the Tyne was *Dyfer* or Deira, also British at this period; and north of Deira, was *Bryneich* or Bernicia, which extended to the Forth. These two states probably formed in the beginning of the 6th century part of a confederation of Cumbrian states. But in the course of that century they seem to have been gradually converted into Anglian states without any serious displacement of population, or even of ruling families. On the shore of the Firth of Forth was a district called in Welsh *Guotodin*, the eastern part of which about the Pentland Hills was called *Manau Guotodin*, and was occupied by a tribe of Goidelic or Irish Picts, who, there is reason to believe, had also settlements in other parts of *Bryneich* along the east coast. It was from this tribe that *Cunedda*, if, as is probable, he was not an eponymous ancestor, had sprung. The remainder of *Guotodin*, between the Lammermoor Hills and the sea, seems to have been also at least partially occupied by another foreign people, most probably Frisians. On the western side, in what is now Argyllshire, north of the Clyde, a settlement of Scots, who had gradually leaked in there from the opposite coast of Ireland, had been formed, and had become organized into a distinct state which was ultimately destined to absorb the whole of Scotland, and give its present name. The remainder of the country north of the Forth and Clyde was occupied by the Picts, properly so called, a Goidelic people closely akin to, indeed almost identical with, the Irish. In Galloway was another branch of Picts, called *Gwyddel Ffichti* by the Welsh, that is, Goidelic or Irish Picts, part of the *Cruitne* who leaked over from Ireland like the Scots.

In the beginning of the 6th century the Romanized Britons were giving way everywhere before the Teutonic tribes, and the only independent territory which they appear to have held comprised—(1) The Damnonian kingdom of Devon and Cornwall; (2) the part of Eastern Wales now forming Montgomeryshire and Radnorshire, which later formed the principality or lordship of *Powys*, and perhaps even yet all the land to the Severn, that is, Herefordshire and Shropshire; (3) Cumbria, that is, all the land from the Ribble to the Solway west of the Pennine chain, and all the Lowlands of Scotland to the Roman Wall, save Galloway, and *Guotodin*, or Linlithgow (including part of Stirlingshire), Edinburgh, and Haddingtonshire; (4) *Bryneich*, Bernicia, that is, Berwickshire, Durham, and Northumberland; (5) *Dyfr*, or Deira, that is, Yorkshire. The ancient dioceses of Scotland, even as they existed in the 13th century, seem to mark out very well the ethnic condition of the Lowlands in the early part of the 6th century. The diocese of Galloway included the territory of the Irish Picts; the diocese of Lothian, which had three rural deaneries—(1) Linlithgow, or *Manau Guotodin* (comprising the shire of that name, part of Stirlingshire, and the most of Edinburgh), occupied by the *Brithwyr*, a mixed race of Picts and Britons, according to Mr. Skene; (2) Haddington and the remainder of Edinburgh, that is, *Guotodin*, in which, as we have said, there was an early settlement of Frisians, or Angles; and (3) Merse, that is, Berwick. The continued existence of a Goidelic or Pictish population on the south side of the Firth of Forth, even in Berwickshire, down to as late as the 8th century at least, seems to be shown by the existence there of churches belonging to the ancient diocese of Dunkeld. In the 13th century they formed a separate deanery of that diocese, which appears to have corresponded with the Goidelic population of *Guotodin*. *Prydain*, the Cymric or true British country of the Lowlands, was consequently conterminous with the diocese of Glasgow, comprising the five rural deaneries of Glasgow proper—Rutherglen, Lennox, Lanark, Kyle and Cunninghame, and Carrick; and the four deaneries of the archdeaconry of Teviotsdale,—Teviotsdale, Peebles, Nithsdale, and Annandale. This was the region called *y Gogled*, though it is probable that this term was applied to the whole of the independent British territory, that is, Cumbria as well as *Prydain* proper; but whatever was its extent, *y Gogled* was the cradle of the language and literature of Wales. It was the country of its prehistoric poets Aneurin and Llywarch Hên, and of the seer Merlin, whose fame was so great in the Middle Ages, and who is also reckoned among the early poets of the Welsh.

To complete this ethnic picture of Britain at the dawn of Celtic literature it would be necessary to give a sketch of the political and social state of the various Celtic tribes, so far as we could directly or by induction ascertain it. But as the articles BREHON LAW and CLANS give perhaps enough of this kind of information for the purpose we have in view, we refer the readers to those articles.

The Druids.

In the earlier stages of tribal organization among the Aryans and other races, the chief was priest as well as king. But the Celts appear to have already passed into a higher political stage before they came within the light of history, and to have established a distinct priesthood known to us as that of the Druids. Greek and Roman writers give us very little information on this subject, and the early Welsh records and poetry none at all. Modern Welsh writers have, however, made up for this want in their genuine literature by inventing an elaborate Druidical system of religion and philosophy, which, they pretend, survived the introduction of Christianity, and was secretly upheld by the Welsh bards in the Middle Ages. This neo-Druidic imposture has found numerous adherents, and has been supported with a good deal of misspent learning by several persons of considerable talent. It would be a waste of time to say anything further on the subject here. In Irish poems and tales Druids, and other organized learned classes, are frequently mentioned. From an analysis of these, and aided by whatever light the classical writers throw on the Druidism of Gaul and Britain, we may make the following induction as to their position and organization in Ireland, where they cannot have been very different from what they were in other Celtic countries. There are no definite accounts of the religious rites practised by the pagan Irish, but there are several allusions, which, though vague, plainly show that such rites existed, and that it was one of the functions of the Druids to perform them. The Druids also invoked the divinities in favor of their friends and against their enemies, and for this purpose they made incantations upon a mound or elevated ground near the field of battle. They determined, by auguries from the heavenly bodies, clouds, wind, smoke, the flight of birds, and other phenomena, the propitious and unpropitious times for fighting a battle, or doing any other important action. They announced the *Gaesa* or things which it would be unlucky for a chief or a tribe to do, foretold future events, practised incantations of various kinds, kept events in remembrance, and were, in a word, the depositaries of such knowledge as was possessed in Ireland at the time. Many of these functions belong equally to the persons usually called poets, and among the qualifications of the higher grade of the latter was a knowledge of certain kinds of incantation, some of which involved many pagan rites, the practice of which we find distinctly ascribed to Druids. That the latter were therefore only a higher degree of the order of poets seems certain. As such they naturally performed or superintended all the higher pagan rites, and hence the whole order, of which they were the highest representatives, were called Druids. After the introduction of Christianity the hieratic functions of the Druids ceased, and the term Druid, which had been the special appellative of the poets who performed those functions, gradually fell into desuetude. But the order of which they were the highest exponents did not disappear as it did in Gaul; there its lay functions were swept away by Roman

law, whereas in Ireland they acquired new vigor. In pagan times the poets enjoyed great power and many privileges, both of which they are said to have abused to such an extent that it was proposed to banish them altogether out of Ireland. Through the intercession of the mythical king of Ulster, *Conchobar Mac Nessa*, this, we are told, was not done; their number was, however, diminished, and their power and privileges curtailed. Among other changes said to have been then effected was that of depriving the poets of the functions of judge, which they had hitherto performed. This legend indicates the existence at some period immediately preceding the introduction of Christianity of a struggle between the lay and the spiritual power, in which the former were to some extent successful. The struggle continued even into Christian times, for in the 6th century it was again proposed to banish them, but on this occasion they were protected by St. Columcillé, not, however, without a further diminution of their number and loss of power.

The learned classes in Ireland.

The organization of the learned classes, as we find it described in Irish manuscripts, is no doubt to be referred to the *Dal* or parliament holden at Druimceta about the year 575, at which were present the king of the Dalriadic or Scotic kingdom, the paramount king of Ireland, and many sub-reguli, and prominent above all St. Columcillé. According to this organization there were three grades or orders,—the *Gradh Ecna*, the *Gradh Fene*, and the *Gradh Fili*. *Ecna*, wisdom, meant general as distinguished from special professional knowledge. A graduate of *Ecna* was called a *Sai*, sage, but there appear to have been several degrees of the title, the highest of which was the *Ollamh Sai*, sometimes called also the *Rosai*, or very sage, or *Sai leitre*, lettered sage. *Ollamh* (pron. *Ollave*), we may remark, was the title of the highest degree in any profession. An *Ollamh Sai* had the rank and was entitled to the retinue of a *Rig Tuatha*, or tribe king. All questions between the different tribes, the interpretation of the laws, the succession to chieftainships, and similar questions were decided by them. They were the genealogists or historians of the chiefs or kings. In pagan times the *Gradh Ecna*, which was only a branch of the order, call it which we will, of Druids or poets, was probably the highest, judging by the dignity and privilege of its *Ollamh*, and consequently the one whose members were specially called Druids. If this view be correct, it was to this branch that the functions of judge originally belonged. When the right of judgment passed from the Druids into the hands of the *Rig*, or chief, the latter no doubt acted as judge himself, or appointed some one to fill his place. This judge was called a *Breitheam*, or as he is called from the pronunciation of the modern form of the word, a Brehon, and was always in early times a *Sai*, for *Fenechas*, or law, formed part of the knowledge comprised under the term *Ecna*, a fact which strongly supports the view above expressed, that the *Sai* was the successor of the Druid. In time the practice of law grew into a distinct profession, and every *Breitheam* of the higher class, that is every one who was a *Sai*, kept a kind of law school. Thus arose the *Gradh Fene*, or lawyers. One of the causes which no doubt helped to separate the study of *Fenechas*, or law, from the general study of *Ecna*, or wisdom, was the rise of schools in connection with religious establishments.

The class of persons whom we have above designated as poets were called *File* in Irish, and their art *Filidecht*. The latter is usually translated poetry, but it was rather vaticination in which they used verse. The *Fili* truly represents the Οὐάτεις, or vates, who formed one of the orders of Druids, mentioned by Strabo. Some of the forms of incantation practised by the *Fili* are described in Irish manuscripts, and, as we have stated above, are attributed to the Druid as well as to the *Fili*. Those which involved pagan rites, and which were consequently forbidden by St. Patrick, fell into desuetude with the name Druid; but simple incantations by rhymes continued to be practised in Christian times. One of these, the *Glam Dichinn*, or an incantation of satirical verses accompanied by certain ceremonies, which was believed to be capable of raising blisters on the face, was much used, and supplies, perhaps, one reason of the great sensitiveness of Celts to satire. The *Fili* appears to have been distinguished in early times by some kind of tonsure, the exact nature of which we do not understand. Perhaps it was the same as that afterwards used by the Christian priests, which was one of the causes of difference between the early Irish church and the Roman church. It is at all events worthy of remark that the Irish priests were reproached with having the tonsure of Simon Magus, who in those times was the representative of all magicians or others who practised necromancy or vaticination. There were several degrees of the order of *Fili*, the highest being the *Ollamh Fili*, as we have already pointed out. A *Fili* of this rank was entitled to keep—that is, to have supported for him—a greyhound, a beagle, four stallions, two mares, and their foals, the maintenance of the horses being, we are told, at the expense of the church. The king fostered the *Ollamh's* sons as if they were his own; and the queen was bound to give dowries to his daughters. In return for all these emoluments and privileges the *Fili*, or poet, was bound to furnish a panegyric of the prince annually. In fact the chief function of the *Fili* when he became a mere poet was to eulogize the chief and the chief's family and ancestors. The designation, given to the Gaulish bards, of parasites who attended the Gaulish warriors on military expeditions to celebrate their praise, by Posidonius the Rhodian Stoic, who visited Gaul about 100 B.C., applies with equal truth to the Irish *Fili*. The flattery was not given without hope of reward, however. In the glossary attributed to Cormac, who was at the same time king and bishop at Cashel in the 9th century, which is at least as old as the 10th century, we are told that the reason why the second degree of *Fili* was called an *Anruth* was because of "the rich stream (*Sruth*) of beautiful praise which flows from him, and the stream of treasures which flows to him in return." This was exactly the sentiment of the Gaulish bard who in eulogizing the magnificence of Bituitus the Avernian chief said, "From the track of his chariot-wheels sprang gold and blessings to mortals." An *Ollamh*, or as we might call him a doctor, in *Filidecht* was entitled to have a certain number of scholars who formed his retinue when he went abroad. One of his privileges was to make a circuit at certain times, the extent of which depended upon his rank. When, for instance, an *Ollamh Fili* became chief poet, and was invested with the *Tugen*, or cloak trimmed with white feathers, the symbol of his office, he might make a circuit of Ireland. During his circuit the *Ollamh Fili* was entitled to maintenance and protection for a certain time, not only for himself but for his legal retinue, and their horses and dogs also. They could not, however, remain beyond the fixed legal time without special invitation. A *Fili*, or indeed any of the recognized learned professions, could not claim hospitality as a right from any one below a certain rank, which was measured by his own.

The bards who recited poems and stories formed at first a distinct branch from the *Fili*. According as the true *Filidecht* fell into desuetude, and the *Fili* became simply a poet, the two orders practically coalesced, and the names *Fili* and bard became synonymous. There were several degrees of bards, according to the number of poems and stories which the graduate should be able to recite. In pagan times, and during the Middle Ages, the Irish bards, like the Gaulish ones, accompanied their recitation of poems on a stringed instrument called a *Crut*, believed to have been a harp. The bard was therefore to the *Fili*, or poet, what the *Jogler* was to the *Troubadour*, and the *Jongleur* to the *Trouvère*. The *Cruitire*, or harper, who likewise played upon a kind of Rote called a *Timpan*, and who belonged to the privileged classes, while the players on other instruments did not, was probably the representative of the true bard.

The learned classes and the ancient Church of Ireland.

One of the most interesting points in the history of Celtic literature is the relation of the transformed Druidic hierarchy just described to the Christian Church. Independent of its own intrinsic interest some knowledge of this is necessary in order to understand the system of schools in Ireland in the early Middle Ages, and the position which the native literature occupied in them. Before stating what we have to say on the latter subjects we must therefore briefly describe the character of the early Irish church.

The presence of British bishops at several councils, and the production of so distinguished a heresiarch as Pelagius, prove that there must have been an organized church in Britain in the 4th century. At that period there were many populous towns there, and much of the culture of

a rich Roman province. The British Church must, therefore, have been organized upon the municipal type as in the rest of the Roman empire; that is, the jurisdiction of the bishops must have coincided with the civil government of the Romans, out of which the later diocesan system grew. The intercourse, partly commercial, partly hostile, which took place between Britain and Ireland in the 3d and 4th centuries could scarcely have failed to introduce Christianity into the latter country. Mediæval writers state that Christianity existed in Ireland before St. Patrick; and Celestius, the chief disciple of Pelagius, and, according to St. Augustine, the real leader of the Pelagians, was an Irishman. Indeed, if we can trust the statement of Gennadius, who flourished at the end of the 6th century, the parents of Celestius must not only have been Christians in Ireland in the year 369, but must have known the use of letters, for, according to the writer quoted, Celestius wrote three letters, in the form of little books, on the things necessary for all desirous of serving God. This primitive Irish Church appears to have been principally, if not altogether, confined to the south of Ireland, the province of Munster forming an independent kingdom at this period, or at least one having but little political connection with the other provinces. In after times, when the fame of St. Patrick had become established, and he came to be regarded as the sole apostle of Ireland, the saints of the primitive church, many of whose names have come down to us, were assumed to have belonged to the Patrician period, or were confounded with persons of the same name. In this way St. Brendan, the voyager, born on the shore of the Atlantic Ocean in the county of Kerry, has been confounded with a later St. Brendan who lived in the centre of Ireland. The church which grew up in the south of Ireland, though the offspring of the British Church, must necessarily have adapted itself to the political and social organization of the country, which was altogether tribal, and being without walled towns had none of the elements of municipal government which had moulded the church organization elsewhere. Some of the Irish legendary lives of saints of the early church, though, in the form in which we have them, not older than from the 12th to the 14th century, give us amidst a luxuriant growth of prodigies an insight into this highly interesting church, which the subsequent conversion of the rest of Ireland by St. Patrick merely extended, but did not change. When a missionary had converted a chief and his *Occa*, or principal men, he became an adopted member of the tribe, and was considered to be a *Sai;* in other words, he was given the same rank and privileges as the pagan priests had. Beyond building a round wicker oratory for the priest, no change whatever was made in the organization of the tribe. The course of study for the different grades of *Ecna*, *Filidecht*, and *Fenechas* went on as before, except that in the course of *Ecna*, or wisdom, the Christian doctrine was added. The practice of the different kinds of verbal incantation which did not involve distinct pagan rites some centuries later by the poets shows this. Fasting, prayer, and vigils were practised, and those who wished to embrace the ecclesiastical state, that is, to join the new learned class called later the *Gradh Eclasa*, or grade of the church, tonsured themselves, as did the students of *Filidecht* also, as we have before said. The *Dun*, or fortified residence, of the chief, around which lay always a village of the different classes of people who constituted the retainers of an Irish chief, became a kind of *Cenobium* of a novel type. Some members of the *Fine*, or "House," desirous of practising a higher degree of asceticism, went into the march-land, or waste land of the territory, and built a wicker hut and oratory. Others followed, and built their huts all around, and a new Cenobium, consisting of a village of huts and a circular oratory, gradually grew up, which differed from the original one only by the absence of the ramparts and ditch forming the *Dun*. Afterwards the round tower, which was a mere extension of the circular stone *Caisel*—itself an imitation in stone of a circular wicker-house—afforded a refuge and place of safety for preserving from fire and theft the sacred vessels and books belonging to those religious establishments which were directly established for religious purposes.

Whether a single *Fine* or the collection of "Houses" forming a *Tuath*, or tribe, became Christian, they were all of the same blood, and the right of succession to the property and government of the church remained with the *Fine* or "House" of the donor. The church within each *Tuath*, or tribe, which constituted the unit state of the Irish political system, was simply a spiritual *Fine*, or "House," and could receive and hold land only in the same way as any other *Fine*. Hence the *Comorb* (coheir), or successor of the founder of a Cenobium, might be, and frequently was, a layman. This explains, too, the aristocratic character of the saints of the early Irish Church, who all necessarily belonged to the families of the chiefs, as the unfree classes could not form *Fines*, or "Houses," or enter those in existence, except by adoption according to legal forms. When a person of low birth appears among the saints we are sure to have some legend showing how he came to be adopted by somebody. As a consequence of this system all the Cenobia which grew out of the first, and the chapels which were established in connection with Cenobia to supply the religious wants of districts remote from the latter, remained under the government of the parent establishment. Nay, more, the Cenobia founded in neighboring countries by missionaries often continued to acknowledge the headship of the parent establishment. They formed, in fact, a religious clan, in which the abbot of the parent establishment exercised the same kind of authority as the head of the ordinary clan. In this way it often happened that bishops, notwithstanding the higher order of their functions, were under the jurisdiction of priests, and even of women, as in the case of St. Brigit. This peculiar organization of the church continued to exist unaltered in Ireland during several centuries, indeed with few changes, chiefly relating to the position of bishops, down to the Norman Conquest. The Irish carried this organization with them into Wales, Scotland, England, Gaul, Germany, and Switzerland, where it was finally supplanted by the Benedictine order.

Early Irish schools.

When a *Dun*, and its surrounding village, in which lived the various classes who formed the household and retainers of a chief, became a kind of Cenobium, in which were associated together those who had formally adopted a religious life and those who had not, we can understand how a school could grow up in which *Ecna*, *Filidecht*, and *Fenechas* should be taught along with Latin and Christian knowledge. But even in the case of Cenobia which had a direct religious origin the same thing took place, because many persons of those professions embraced a religious life, and came there with their pupils, either with the object of increasing their own knowledge, or to partake of the literary life of the place. In the 6th century some of those schools had already acquired considerable reputation; while in the 7th and 8th centuries some had grown into small towns, and were much frequented by strangers. Bede tells us that in 664 many of the nobility and lower ranks of the English nation were in Ireland leading a monastic life, or attending the schools, "going about from one master's cell (hut) to another." Incidentally we learn that one of those schools, namely, *Cill Belaigh*, had seven streets of huts occupied by foreigners in the first half of the 8th century. From all this it will be seen that the teachers in the Irish schools, even when connected with Cenobia, or later with monasteries, were not necessarily ecclesiastics. Indeed some of the most distinguished men who taught in them were laymen, such as MacCoise, Colman O'Cluasaigh, &c.; and even Flann, surnamed of the monastery, who was head-master of the school of St. *Buite*, now Monasterboyce, in the first half of the 11th century, was a layman and married. This explains the circumstance, so unusual in other countries in the Middle Ages, of so distinguished a scholar as Johannes Scotus Erigena being a layman.

The course of instruction included under the term *Filidecht*, which an *Ollamh Fili* passed through, as laid down in a special tract called the *Leabhar Ollamhan*, or Book of Ollaves, occupied twelve years, eight of which were devoted to learning to read and write the grammar of the Irish language, the laws of the privileged classes, *Filidecht* proper, which besides vaticination, &c., included whatever knowledge was then possessed of the phenomena of nature, the elements of philosophy, *Dinnsenchas* or historical topography, and learning by heart about 270 tales and a number of poems, and the secret language of the poets, &c. The ninth and tenth years were devoted to the composition of various kinds of poetry; the eleventh year was employed in composing fifty major and fifty minor specimens of verse requiring the use of four kinds

of metre. The studies of the twelfth year consisted in the composition of six orations, and the study of the art of poetry according to the precepts of four different authors, whose treatises are unfortunately either lost or unknown. The last two years of the course were for those who proposed to become *Ollamhs*. Whatever may have been the character of the teaching or the value of the outcome, it is the earliest example of the cultivation of any vulgar language in Europe. As an example of the importance attached to the native literature, it may be mentioned that the head-master of a school was obliged to go through the course just indicated, as well as to know Latin, "and from the Ten Commandments to the whole of the Scriptures." The school here implied would be one of those connected with a Cenobium, or monastery, and had usually six teachers. The lowest of these taught the students to recite the psalms; the second taught the course of native literature just described up to the end of the 10th year. The fourth master taught Latin, arithmetic, and the elements of astronomy and geography; the fifth master was professor of divinity; and the sixth was the head-master, who was supposed to know the whole course, both profane and sacred.

Existing Irish MSS.

In discussing the outcome of this system of education we can here of course take cognizance only of what has been written in Irish, and must consequently leave out of consideration the Latin hymns of the early church, the writings of Columbanus, Sidil or Sedulius, Johannes Scotus, Adamnan, and others who wrote in Latin. For the same reason we must in speaking of existing Irish manuscripts leave out of consideration the Latin ones, among which are some of the most remarkable illuminated books in Europe, such as the Book of Kells. In the Ambrosian Library in Milan, the libraries of the convent of St. Gall and of Bern in Switzerland, of the University of Würzburg, and of Carlsruhe, there are several Latin manuscripts glossed more or less copiously with explanatory Irish words. There is also in the town library of Cambray a manuscript containing the canons of an Irish council held in 684, in the middle of which is preserved a fragment of an Irish sermon on self-denial. These manuscripts, some of which belong to the 8th century and the others to the 9th, furnished materials to Zeuss for his *Grammatica Celtica*, a work which created an epoch in Celtic philology. With the exception of the last-mentioned none of these manuscripts contain a continuous Old Irish text. But according to Mone there is in the convent of St. Paul, somewhere in Carinthia, a manuscript altogether in Irish, containing among other pieces poems, copies of which are to be found in manuscripts of the 14th century in Ireland. In the Royal Library at Copenhagen there is one manuscript, partly vellum and partly paper, containing Irish poems, which formerly belonged to Professor Thorkelin, but we do not know its age. The manuscripts formerly belonging to the Irish College at Louvain were dispersed, the better portion being taken to the Franciscan convent of St. Isidore at Rome, where they remained until within the last five or six years, when they were brought to the convent of the same order in Dublin. The remainder of the Louvain manuscripts, consisting chiefly of copies of Irish lives of the saints made for Colgan when preparing his *Acta Sanctorum*, are now in the Royal Library at Brussels. These are all the Irish manuscripts now known to exist on the Continent. The Irish manuscripts in the United Kingdom are very numerous, and by good fortune the majority of them, and these the most valuable, are in public libraries, and are thus at once more accessible to scholars and safer from fire, the danger by which Welsh literature has already suffered much loss. The number of Irish manuscripts which formerly existed must have been considerable if the *File* were as industrious as they were numerous and well rewarded. More than thirty books are mentioned by special names as sources from which some of the most important existing manuscripts were compiled, which are now lost, although some of them existed as late as the 17th century. Nearly all the most valuable existing books are to be found in four public libraries, namely, those of the Royal Irish Academy and Trinity College, Dublin, the Bodleian Library at Oxford, and the British Museum. The collection of Irish manuscripts belonging to the Royal Irish Academy is the largest of all, and comprises, besides a large number of paper manuscripts containing many things not found elsewhere, the valuable vellum manuscripts, *Leabhar na h-Uidhri* or Book of the Dun Cow, the Book of Ballymote, the Book of Lecan, the *Leabhar Breac* or Speckled Book, the Book of Fermoy. Next in importance stands the collection of Trinity College, Dublin, which contains the Book of Leinster (the most valuable from a literary point of view of all existing manuscripts), the yellow Book of Lecan, and a number of other manuscripts full of poems and prose tales, besides the most valuable of the existing law manuscripts. The collection in the Bodleian Library, though consisting we believe of only sixteen volumes, is very valuable. Besides a rare law manuscript it includes a manuscript compiled perhaps as early as the year 1100, and certainly not later than the first half of the 12th century, and containing some important poems not known to exist elsewhere. The British Museum Library has now a considerable number of Irish manuscripts, chiefly, however, written on paper. But besides some law manuscripts of value, there is one vellum manuscript, a small folio of 68 leaves beautifully written about the year 1460, formerly belonging to Sir Henry Spelman, which contains the best extant copies of several of the most celebrated historic tales. Of the vellum manuscripts in private hands the most important are the Book of Lismore, belonging to the duke of Devonshire, and kept at Lismore Castle in Ireland; a manuscript in the possession of the O'Connor Don, containing a large number of poems of the 15th and 16th centuries; the Liber Flavus, a small folio manuscript of about the beginning of the 15th century; the manuscripts formerly belonging to the duke of Buckingham, and now in the possession of the earl of Ashburnham. The most important manuscript in this collection, which is inaccessible to scholars, is the larger fragment of the Book of O'Duvegan, *Ollamh* of *Ui Maine*, the O'Kelly's country, who died in the year 1372. The other part of this manuscript is in the British Museum.

Contents of Irish MSS.

The contents of these manuscripts are of the most miscellaneous character, in fact many of them are mere scrap-books. The following classification will enable the reader to form some general notion of the nature of existing Irish literature:—(1) grammar and glossaries; (2) annals, genealogies, and pedigrees; (3) history, legendary and real, including a large number of narrative poems, some of which might be considered to be ballads, and prose historical tales; (4) mythological and other imaginative tales; (5) lyric poetry; (6) satire; (7) religious literature, including lives of saints; (8) law; (9) science, inclusive of medicine; and (10) miscellaneous translations from other languages. The manuscripts containing this varied literature were written after the 11th century; only three of the principal ones above mentioned are as old as the 12th, the remainder being written chiefly in the 13th and 14th centuries. The contents of a manuscript are at least as old as itself and may be much older. Sometimes the manuscript itself informs us that a particular piece was copied from another manuscript which is named. Again poems are attributed to authors who lived long before the manuscript containing them was written, even as far back as pagan times. Can we look upon those poems as the genuine work of the period they are referred to, in the same way as we accept the works of Greek and Latin writers, although we do not possess any manuscripts of them written within even centuries of the author's time? and if not, how are we to determine the true age of the contents of an Irish or of a Welsh manuscript? The answer to this question necessarily affects everything that could be said on the character and growth of Irish and Welsh literature. We must, therefore, say a few words on the subject, especially with a view of pointing out some of the considerations which might help us to arrive at a true solution of the problem.

Use of letters by the Pagan Irish.

The first point which naturally suggests itself for inquiry is whether the Irish knew the use of letters before the introduction of Christianity. This question has been much discussed, but, as there is not much evidence one way or the other, the discussion has not been profitable. Cæsar says that the Gauls knew writing and used the Greek alphabet, showing that their knowledge of letters probably came from the Greek colony of Massilia; and the Gauls of North Italy used the Etruscan alphabet long before the time of Cæsar. But these facts do not necessarily imply that their brethren in

the British Islands had also a knowledge of letters before the arrival of the Romans, nor have we any evidence even after that event that the British language was written. The Celtic names on British coins prove nothing one way or the other. As regards Ireland the only piece of evidence of the existence of a knowledge of writing before St. Patrick's time is the statement of Gennadius respecting the letters of Celestius. This, it must be admitted, would be very slender evidence to found a conclusion upon unless supported by more definite facts.

Ogam inscriptions.

In certain parts of Ireland, and in those parts of Wales once occupied by the Irish, are found rude stone monuments, upon the edges of which are cut inscriptions consisting of a number of long and short lines. This method of writing, which is called *Ogam*, was practised in Christian times even as late as the 9th and 10th centuries, for marginal entries written in *Ogam* characters are found in some of the manuscripts of St. Gall; and in the vellum manuscript in the library of the Royal Irish Academy, called the Book of Ballymote, compiled near the close of the 14th century, the different styles of Ogamic writing and the value of the letters are explained in a special tract on the subject. The character of many inscribed monuments, and the circumstances under which they are usually found, seem to favor their pre-Christian use also. On this point, however, there is still much uncertainty, and the utmost that we could venture to say is that the archaic character of the grammatical forms of Ogamic words, and especially the case of one bilingual inscription, places their relative antiquity beyond question. The geographical distribution of *Ogam*-inscribed stones is worthy of attention; they are almost exclusively confined in Ireland to Munster, and chiefly to the south-western counties. In the provinces of Leinster and Connaught only a few have been found at one or two spots, and but one has been found in Ulster; they are, in fact, most abundant in the district where, according to tradition, the Milesians or Scots first landed in Ireland. In Wales they seem also to be chiefly confined to the districts formerly occupied by the *Gwyddel*, or *Gael*. Notwithstanding the use of *Ogam* by Irish scribes in the 9th century, and the existence of the key in the Book of Ballymote, the deciphering of the inscriptions has not been hitherto very easy, perhaps, as some think, because many are cryptic. Those that have been deciphered with certainty are very simple, and evidently marked the grave in some instances, perhaps in every case, of a *Sai* or *Fili*, that is, if used in pagan times, of one of the Druidic order. If we can trust to the authority of some of the oldest of the romantic tales, *Ogam* was used in the north of Ireland as well as in the south; there, however, it was cut on sticks or twigs, as Venantius Fortunatus tells us the barbarians cut their runes. In some Irish poems mention is made of *Duile Feda*, which has been interpreted to mean "Books of Wood," and many have been *Ogam*-inscribed tablets. But as no specimen of this literature has come down to us, and as they must, if they were ever used at all, have been an inconvenient and imperfect mode of recording the product of thought, we may leave them out of consideration. Whatever opinion then may be held as to the existence in Ireland of a knowledge of letters in prehistoric times, we may safely assume that literature in the true sense of the word began there with Christianity. In saying this, however,

Oral transmission of poems, &c.

we are not to be understood as denying that a record of events, accounts of battles, panegyrics of warriors, may not be orally transmitted in verse. Metre, alliteration, rhyme, and assonance are powerful aids to the memory, and a bar to the introduction of new matter, and consequently prevent two different streams of traditions from mingling. But in time, and especially among a highly imaginative people possessing the power of improvising in verse, the streams of verse did mingle, enlarge, and modify themselves. Nevertheless it is marvellous how perfectly long poems of the most complex metrical structure may be transmitted by oral tradition for centuries. Poems transmitted in this way follow of course all the phonetic changes of the language, and, when at length they are written down from memory, look as if they had been composed at first in the living language. In this way an essentially pagan literature may come as it were into existence long after paganism itself had passed away. The *Kalevala*, or heroic epopee of the Finns, and the *Kalevi Poeg* of the Esthonians, are examples of this. In order that this should take place, the manners, customs, and general state of culture should undergo but little change. When any serious change in these respects occurs, the stream either ceases altogether, or becomes so modified and admixed with foreign elements that a new literature may be said to begin. One of the most marked changes which takes place under such circumstances is the substitution of vague descriptions of dress and arms, and a vague toponomy, for the full and definite descriptions and precise toponomy of the primitive poems.

Oral and written transmission may coexist.

The knowledge of writing does not necessarily involve the entire supplanting of tradition by written narrative. Many Asiatic nations who possess alphabets from olden time nevertheless still transmit their history by oral tradition. The account which we have given of the organization and method of instruction of the poets clearly shows that in early times genealogies, laws, history, tales, &c., were transmitted orally, or, as was said, "from mouth and tongue." This should always be borne in mind when discussing the antiquity or genuineness of poems, prose tales, or histories. Here it may be well

Verse and prose as vehicles for oral tradition.

to remark that verse is a better vehicle for the oral transmission of knowledge than prose. Besides being more difficult to remember than verse, prose offers greater facility, not to say inducements, to introduce new matter by way of explanation or commentary, or to fuse legends of different kinds. Hence laws were transmitted in verse, and wherever we have a legend embodied in verse, it will be found to be both more archaic and purer than when in prose. The use of prose seems to indicate the passage from oral to written tradition. Another point which

Changes of language through copying.

should be kept in view in judging of such literatures as those of Ireland and of Wales, is that after the traditions of a country have been committed to writing the different kinds of knowledge will not be transmitted in equal purity or preserve their original form and language equally. Every fresh copy of an account of a battle, a legend, or a life of a saint, or of a narrative or description, would follow the change in the spoken language, and to some extent in the accessories of the picture, such as dress, arms, &c.; in other words it would be a new and popular edition made intelligible to all. On the other hand, the exact words of a law or decision are important and would be sure to be copied without other changes than what the carelessness or ignorance of the scribe would produce. As vellum was dear and not easily procured everywhere the words were written close together and contractions were used, especially for the terminations; here was a fertile source of error and of the corruption of grammatical forms by ignorant and careless scribes. The most cursory examination of Irish manuscripts will illustrate the preceding remarks. In the same manuscript may be found pieces which differ in language by centuries. If the manuscript contain law-tracts, or pieces on subjects not of common or popular interest, they will be found written in obsolete language, and generally noted with explanatory glosses or commentaries. The language of the tales and popular poems on the other hand will represent exactly the period of the compilation of the manuscript; and yet they may have been originally composed long before the law.

Irish Literature. Grammar and Glossaries.

We need not dwell on the first category of Irish literature further than to observe that Irish scribes seem to have had a special liking for glossing, and that if all the existing glossaries, old and new, were added together we should have at least 30,000 words besides those in printed dictionaries, a richness of vocabulary unequalled perhaps by any living language. Among the old glossaries we may mention that attributed to *Cormac Mac Cuilennáin*, king and bishop of Cashel, who was killed in 903, as an early attempt at comparative etymology, the author referring to Latin, Greek, Hebrew, Norse, and British. Many of these derivations are no doubt wrong, but as an early attempt it is curious. The earliest copy of this glossary is to be found in the Book of Leinster, compiled in the first half of the 12th century, but though some articles may have been added, there is no reason to doubt that it was the work of Cormac. As grammar formed an important subject of the course of *Filidecht* we might expect to find many treatises on it in Irish manuscripts. Several are mentioned, but

they appear to be lost. There is, however, one deserving of much attention, written perhaps in the 9th or 10th century; the oldest copies now known, however, are those in the Books of Ballymote and of Lecan, manuscripts compiled towards the end of the 13th century.

Annals. Annals form a notable element in Irish literature, but we can do little more than mention a few of the more important compilations. During the 11th century attempts were made to synchronize Irish events with those of other countries. Of these may be mentioned the synchronisms of *Flann* of Monasterboyce, already mentioned. But the most notable attempt to synchronize events is that made by *Tighernach O'Braoin*, abbot of Clonmacnoise, who died in 1088. *Tighernach* in his Annals displays considerable scholarship, and for the time fair critical power. He was probably the first to introduce the common era into Irish annals. The oldest copy, and unfortunately only a fragment, is in a manuscript of the 12th century in the Bodleian Library at Oxford, nor can a perfect copy be made out of the six or seven other copies which are known. The Annals called by most writers since the times of Usher and Ware the *Annals of Ulster*, but more correctly the Annals of *Senat Mic Maghnusa*, or Mac Manus, compiled or copied by Cathal Maguire in 1498, in an island in Upper Lough Erne called *Senat Mic Maghnusa*, and continued in some copies to 1604, are of special importance, because the book contains notices of comets, eclipses, and other natural phenomena, which appear to have been recorded by eye-witnesses, as is proved by the day and hour of the eclipse of the sun on 1st May, 664, being correctly recorded, while Bede, who records the same eclipse, post-dates it, as the result of calculation, by two days, as does the Saxon Chronicle also. *Tighernach*, like the *Annals of Ulster*, gives the right date. This fact shows that both *Tighernach* and the compiler of the *Annals of Ulster* must have had access to contemporary documents, at least as old as the middle of the 7th century. But the most extensive though the latest-compiled Annals is the collection called by Father John Colgan, editor of the *Acta Sanctorum Hiberniæ*, the Annals of the Four Masters, the chief of whom was Michael O'Clery, a Franciscan friar, who, after collecting materials from then existing Irish manuscripts, commenced in 1632, amidst the ruins of the convent of his order in Donegal, the compilation of his very remarkable monument, and in four years completed it. The Annals of the Four Masters extend from fabulous antiquity to 1616. Down to the 4th century the entries are little more than lists of kings, but thenceforward they become fuller and more trustworthy.

Pedigrees. The political and social organization of Ireland, and especially the custom of gavel-kind, made pedigrees and genealogies matters of great importance. The Irish genealogies are usually carried up to Noah, and include on the way many eponyms and even divinities. The Biblical portion may be easily removed without detriment to the Irish part; but it is not so easy to say where the legendary and the true touch. Within the historical period the pedigrees and genealogies afford great help in historical inquiry, though it should not be forgotten that a *Sai* was quite as capable of inventing a pedigree as any modern herald.

Topography. Topography may be said to be the complement of pedigrees, and like the latter was of great use to Irish families, and was accordingly, as we have already pointed out, well attended to. Of this kind of literature the most curious and valuable example is the tract called the *Dinnsenchas*, said to have been compiled at Tara by a *Sai*, named *Amergin Mac Amalgaidh*, or Macauley, about the year 550. This work, the oldest copy of which is in the Book of Leinster, gives an account of the legendary origin of several places of note, and thus preserves invaluable mythological materials.

Historical poems. Every successive race which peopled Ireland had, we are told, its historian, whose names are given, and in some cases particular verses and even long poems are attributed to them. These are, of course, mythological personages, but this fact is in itself a proof of the antiquity of the system of recording in verse the history of the country. Without going back to *Coirbre*, the son of the goddess *Etain*, wife of *Ogma* "of the sun-like face," a long list of poets beginning with *Ailill Olum*, a king of Munster in the 2d century, the supposed progenitor of the chief Celtic families of the south of Ireland, may be made out. There are three poems in the Book of Leinster attributed to the *Ailill* just named. It is needless to say that in their present form these poems could not be the work of a poet who lived a thousand years before the Book of Leinster was written, even if the poet were not, as is probable, only an eponymous ancestor of Munster clans. To the same or a somewhat later period belong several other mythological personages to whom poems still extant are attributed, and of whom we shall have something to say presently,—namely, *Finn* son of *Cumall*, contemporary of *Cormac* son of *Art*, "the lone man," and a reputed author himself, *Oisin* the son of *Finn* (the Ossian of later romance), and his brother *Fergus*, and his cousin *Cailte*. In *Niall* of the Nine Hostages, who was killed on an excursion into Britain in 405, we have probably an undoubted historic personage, and in *Torna Eigeas* or "the learned," his *Fili*, a real poet. There are many poems attributed to him still extant, but in their present form they belong to a period not perhaps earlier than the 11th century. His contemporary *Laidcenn* was the author of an Art of Poetry which has not reached us. After the conversion of the whole country in the 5th century there cannot be any doubt that the poets whose names occur in the Annals, and to whom poems are attributed in manuscripts, were real personages. Some of the poems attributed to the earlier ones have come down in such an archaic dress that it is probable we have the genuine work of the poet. The works of the poets of the 9th, 10th, and 11th centuries are either their genuine productions or at most slightly modernized versions. Between the first of those centuries and the 14th the change in the language was not very great. Among the names of authors of historical poems who lived between the 5th and the 11th century the following deserve special mention:—Bishop *Fiacc*, author of a metrical life of St. Patrick which survives nearly, if not quite, in its original form; and *Dallan Forgaill*, a contemporary of St. Columcillé, and author of an elegy on that saint, which is to be found in the oldest manuscript written wholly in Irish now in Ireland, the *Leabhar na h-Uidhri*, or Book of the Dun Cow, which was compiled before 1106. The poem in question is glossed and accompanied by a kind of commentary on the difficult words, so that the language was already so obsolete in the end of the 11th century as to be practically unintelligible. In the 7th century the most prominent names are the following: *Senchán Torpeist*, the successor of the *Dallan* just mentioned as chief poet of Ireland, flourished about the year 600. *Senchán* is one of those to whom the authorship of the existing form of the principal Irish tale, the *Táin Bó Cuailnge*, is attributed. *Finntann*, poet of *Raghallach*, king of Connaught, killed in 648, has attributed to him the authorship of a very spirited ballad on the deeds and death of his patron. The language of this poem, admitting it to have been written by *Finntann*, has been modified to some extent in the way above suggested. St. *Moling* was the author of several poems of considerable merit, some of which only come under the present category. Two of St. *Moling's* poems have been found by Mone in the manuscript in the convent of St. Paul in Carinthia above mentioned, and scarcely differ in orthography from the copies which exist in manuscripts in Ireland compiled six hundred years later than the St. Paul codex, assuming the latter to be, as Mone suggested, of the 8th century. *Cennfaeladh* "the Learned," the reputed author of the grammar of the Irish language above mentioned, died in 678. During the 8th century the number of writers appears to have been smaller than in the preceding and succeeding centuries. This was no doubt due to the great number who went abroad, for during that century, and the early part of the 9th, Irishmen were to be found in every part of Europe. In the latter century *Fothadh*, *Flanagan*, and *Flann Mac Lonáin*, occupied a prominent position as writers of historical poems. *Laitheog*, the mother of *Flann Mac Lonáin*, deserves mention also as a poetess, and as showing that women shared in the literary cultivation of the period. In the 10th century the most prominent poets were *Cormac* "the Learned," *Cinaedh O'Hartagan*, and *Echaid O'Flinn;* and in the 11th century, *Echaid O'Ceirin*, surnamed "the Learned," author of a curious historical poem descriptive of one of the great fairs or *Oenechs*, held in Ireland; *Mac Liag*, *Mac Coise*, *Cuan O'Lothcain*, and *Flann* of the Monastery. The historical

poems attributed to the writers of the 10th and 11th centuries are, as might be expected, much more numerous than those of preceding ones. Indeed we might make an epitome of the whole history of the country, especially of the legendary part, from the poems of the writers just mentioned, the poets of one period deriving the materials of their own poems from those of their predecessors.

Prose history.

In the 11th and 12th century prose came largely into use, as is shown by the large number of prose historic tales and romances which were written at this time. It is difficult to draw a line between real history and historical fiction in an early literature, but in Irish it is especially so, for we find many of the so-called historical tales so free from the miraculous, and so sober in the narrative, that at first sight we could scarcely refuse to accept them as history; and yet one of them to which this description applies is undoubtedly an account of a war between deities. In general, however, we can follow all the stages from a simple historical narrative up to a full-blown romance. The circumstances under which this kind of literature was produced show why this should be so. The business of the *Fili*, or poet, was to praise his chief, celebrate the achievements of his ancestors, and find him amusement when he regaled his *Sabaid*, or props, as the chief men of the tribe were called, in his alehouse. For this purpose a simple narrative of a foray or a skirmish required to be embroidered with a little romance; hence the number of accounts of battles, deaths, feasts, &c., which though in the main founded on real events belong by their treatment to fiction. There are, however, some productions which though not free from invention may yet be classed as attempts at writing prose historical narrative. Perhaps the earliest of this class of compositions is the History of the Borromean Tribute, or great tribute of cows levied in the province of Leinster by *Tuathal*, surnamed *Teachtmar*, or "the Legitimate," whose death is variously stated to have occurred at from 106 to 160, and who consequently belongs to the dawn of the historic period. This tribute was abolished by the paramount king of Ireland *Finnachta*, surnamed "the Festive," at the instance of the St. *Moling* above mentioned, but imposed again in the beginning of the 11th century by *Brian*, surnamed from this circumstance *Boroimhé*, or "Brian of the Cow Tribute," as a punishment of Leinster for supporting the Danes. This interesting work is found in the Book of Leinster, and was therefore probably written at the time of the re-imposition of the tribute. Another work of the same period is the Wars of the *Gaedhil* with the *Gaill*, or the history of the invasions of Ireland by the Danes and Norsemen. The only perfect copy of this work known is one in the handwriting of Michael O'Clery, chief of the Four Masters, in the National Library at Brussels, but there is a fragment of it in the Book of Leinster, the remainder being lost. The existence of this fragment shows that it was written at latest within a century of the battle of Clontarf; but from curious incidental evidence it must have been written by an eye-witness of the battle, or by some one who received his information from one who had been there. It is mentioned in the history that the tide in Dublin Bay coincided with sunrise on the 23d of April, 1014, the day the battle of Clontarf was fought, and that the returning tide in the evening aided in the defeat of the Danes; astronomical calculations have shown that the first part of this statement is quite correct. The style of this work is poor, the descriptions are wanting in precision and accuracy of detail, owing to the redundancy of nearly synonymous adjectives, and it was evidently written by a partisan of *Brian*. But with all its faults it is a work of some interest even from a literary point of view. The Wars of Turloch, written by John Mac Grath, historian of the Clans of Thomond, now the county of Clare, about the year 1459, is a third example of historic prose, and one which gives us an insight into the nature of the feuds and struggles for power between rival claimants for a chieftaincy, and the part which the Norman adventurers played in these intestinal contests, which ultimately allowed them to become masters of the country. The immediate subject of the history in question was the war between Turloch O'Brian and his uncle Brian Ruadh O'Brien, and the sons of the latter, aided by the De Clares; but it may be said to be a history of Thomond for more than two hundred years, from the Anglo-Norman invasion to the death of Robert de Clare and his son. Like the work last mentioned the style of this history is very redundant, the descriptions being overloaded with adjectives almost identical in meaning, and often incorrectly applied; it is not, however, devoid of skill in the narrative, and many of the incidents are described with vigor and force. Perhaps if we had the original texts of this and the Wars of the *Gaedhil* with the *Gaill*, we should find the style purer. One of the ways in which scribes corrupted the texts of the works they copied was by adding meaningless adjectives to give as they thought dignity and ornament to the descriptions.

The Book of Munster, though of uncertain date, and not known to exist in any old manuscript, is a work which illustrates very well the peculiarities of Irish historical compilations. It begins with an account of the Creation taken from Genesis, which serves as an excuse for tacking on the Biblical genealogies to the Irish ones; then follows the history of the Milesians from *Eber*, son of *Miled*, the eponymous ancestor of the Munster tribes, to *Brian Boroimhé*. The legendary part of the work is to be found in most of the principal Irish manuscripts; but the part relating to the period from the 7th to the 10th century is of great interest, and contains much not found elsewhere. The ethnic legends just referred to, which form so prominent a feature in Irish historical compilations, have been all brought together in what is called the Book of Invasions. This work is a link between genealogies and historical narrative proper, and consists of the legendary histories of the successive tribes supposed to have peopled Ireland, and of their eponymous leaders, into which are introduced many curious so-called historical poems, the matter of which, if not the language, is of considerable antiquity. The oldest copy of the Book of Invasions, the author of which is not known, is that in the Book of Leinster; the one which existed in the Book of the Dun Cow in 1631 has been unfortunately since lost, with much of that valuable manuscript. Michael O'Clery, chief of the Four Masters, compiled from the copy just referred to and others, a condensed version, the original of which is now in the possession of Lord Ashburnham. In speaking of the Book of Invasions we are reminded of the first attempt made to write a general history of Ireland, by Geoffrey Keating, a parish priest in the county of Tipperary, in the beginning of the 17th century. His work, which is written in the spoken Irish of the period, and compiled under very unfavorable circumstances, is an epitome of the copious mixture of legend and fact which is found in Irish manuscripts, and among other things contains much borrowed from the Book of Invasions. He appears to have had access to many manuscripts since lost, and though he makes no attempt to examine his materials critically, the work has considerable value, and bears comparison with similar attempts made under analogous conditions in other languages.

Different classes of tales.

The learning of stories formed, as we have seen, an important feature in the course of *Filidecht*. An *Ollamh Fili*, for example, was bound to know two hundred and fifty prime stories and one hundred secondary ones. In the 11th and 12th centuries the number of stories current must have been very considerable. There is a list of one hundred and eighty-one tales in the Book of Leinster classified under the heads—Destructions, Cow Spoils, Wooings, Battles, Adventures in Caves, Wanderings and Voyages, Deaths or Tragedies, Feasts, Sieges, Adventures, Abductions, Slaughters, Irruptions of Lakes, &c., Visions, Loves, Expeditions, Marches or Progressions. More than one hundred of these are still extant, and of these nearly one-half are to be found in manuscripts as old as the 12th century, into which they were copied, as in many instances we are distinctly told, from older books. The existing tales belong to six categories,—(1) ethnic, or those relating to the peopling of the country, and the subsequent struggles of the different races: (2) voyages, expeditions to Scotland, the Isle of Man, or Britain, and the sieges, battles, adventures, deaths, and abductions which took place there; (3) mythological stories connected with the *Síde;* (4) tales forming the heroic cycle of Queen *Medb* and *Cúchulaind;* (5) the tales of the Fennian or Oisianic period; and (6) miscellaneous tales belonging to pagan and Christian times, but chiefly to the periods of the 3d and 7th centuries.

Ethnic legends.

The Book of Invasions is simply an attempt to put the principal stories of the first category into a methodical order. The staple of the stories of this

class is unquestionably of considerable antiquity, though in the present form they are not much older than the 12th century. Of the existing ones the most important are the accounts of the battle of *Mag Tuired Conga*, supposed to have been fought between the *Firbolgs* and the intrusive *Tuatha Dé Danann*, and the battle of *Mag Tuired* of the Fomorians, supposed to have been fought between the latter and the *Tuatha Dé Danann*. The first of these tales has the terseness and simplicity of a Norse Saga, and depicts a rude and early state of society wholly unlike that in the later stories. The supernatural is so little developed in them that, notwithstanding the chief personages are the gods of the Irish pantheon, they must represent real ethnic struggles.

Legends of early intercourse with Britain.

The stories we would propose to place in the second category have little in common save that they refer to what we might call the prehistoric relations of Ireland with Britain. Some relate to personages of the heroic or mythological cycles; others to Scotic invasions of Britain; and others again to the Christian Dalriadic kingdom. Of the tales of this second category two are of great value in the history of romance—namely, the Abduction of *Blathnad* daughter of *Paill* by *Cúchulaind*, and the Voyage or Exile of *Breccán*. The *Paill* of the first story appears to be the *Pawl* of the Welsh *Mabinogion*, which we shall mention further on; and in her second husband we have the *Corroi mab Dayry* of a Welsh poem, which gave rise to much discussion. The *Breccán* of the second story was, according to Cormac's glossary, the son of *Niall* of the Nine Hostages, one of the Scotic invaders of Britain, who traded with a fleet of fifty boats between Ireland and Alba, but was wrecked, and he and his whole fleet lost, in a whirlpool formed by the meeting of the tidal currents in the channel between the two countries, which on this account was called *Coire Breccáin* or *Breccán's* cauldron. Dr. Reeves thinks this was between the mainland of Antrim and the Island of Rathlin; but it has since migrated with the legend to the channel between Jura and

> "Scarba's Isle, whose tortured shore
> Still rings to Corrievrekan's roar."

Breccán has also left footprints of himself not only in Welsh legend, but also in Welsh hagiology, and as we have already mentioned in Welsh toponomy, for he is the *Brychan*, the founder of one of three families of saints, who has given his name to Brecknock.

Mythological tales.

The mythological tales all relate to the inhabitants of the *Síde* or Celtic Elysium, whose chiefs were the mythical *Tuatha Dé Danann* leaders, and who form, as we have pointed out above, an extensive pantheon. Among those who figure in the tales are *Etain*, *Lêr*, *Manandan* his son, the *Dagda*, *Tuirenn Bicrenn* or *Delbaith* and his three sons, and *Lug Mac Eithlenn*. These tales may be divided into three classes. In the first of these the actors are all *Tuatha Dé Danann*, or these associated only with personages of remote antiquity, and in the second the same divinities are associated with personages of the heroic period, especially with *Medb* and *Cúchulaind*, and those in which historic or semi-historic personages are associated with the deities of the *Síde*. The Wooing of *Etain*, the Exile of *Bri Leith*, the Death of the Sons of *Tuirenn*, are examples of the first class. The *Seirglige Conchulaind*, or Bed of Declinc of *Cúchulaind*, one of the most remarkable of all the Celtic mythological tales, is an excellent example of the second. The third class embraces such tales as the Wooing of *Becuma* by *Conn* "of the Hundred Battles," and the Adventures of *Condla* the Beautiful, son of the *Conn* just mentioned. In the third class might also be placed a number of curious tales in which pagan myths are transformed into Christian ones. We may observe this transformation of the pagan into the Christian myth in every stage of the process; thus in the tale called *Tomaidm Locha Eachach*, or the Irruption of Loch Neagh, or, as it is called in the *Leabnar na h-Uidhri*, *Aided Echach Mac Maireda*, the Death of *Echaid* son of *Maired*, we have a legend more than half of which is pagan, but which in the latter part is changed into a Christian myth without affecting the general pagan character of the whole. The Fate of the Children of *Lêr*, or Lear, is a legend of the same kind; indeed the same pagan myth serves as the basis of the Christian part of the myth in both tales. In the Birth of *Aed Slane*, king of Ireland, who died in 600, we have an Aryan myth completely transformed into a Christian one. *Diarmait*, son of *Cerbeoil Aed's* father, had two wives, *Murend* and *Murgán*, the former of whom was bald, and was provided with flowing hair by the aid of St. *Ciaran*, or Kyran; the latter was barren, but becomes fruitful through the aid of St. *Finden* and of a bishop named *Aed* (fire, spark), who gives her a drink of blessed water which renders her pregnant of a lamb; a second drink causes her to bring forth a silver salmon; but the third drink gives her a son called *Aed*.

Immrams, or wanderings.

There is a special class of legends, the *Immrams* or Wanderings by sea, which we have not included in any of the foregoing categories, but which, as examples of the fusion of pagan and Christian elements in a legend, may be disposed of here. The origin of the Christian *Immram* is to be found in several pagan tales such as the Visit of *Conn* "of the Hundred Battles" to the Land of Promise, which forms part of the Wooing of *Becuma*, already mentioned. The principal *Immrams* are—the Voyage of St. Brendan (the most celebrated of all), the Wandering of the sons of *Ua Corra*, and the Wandering of *Maeldun*. In these the transformation of the pagan myth is so complete that we should not have been able to trace their origin but for the existence of the pagan tales just mentioned.

Fisa, or visions.

There is another class of compositions—the *Fisa*, or Visions, which, though strictly belonging to the category of religious literature, offer so many analogies to the *Immrams* or Wanderings, in some of the incidents, that it is better to say a few words on them in this place. In several pagan tales we have examples of visions, some brought about by pagan rites, which are the prototypes of the later Christian visions, such as those of St. *Adamnán*, and St. Fursey. The Christian visions of Hell and Heaven owe something to Virgil, but the extent of the obligation is much smaller than might at first sight be supposed, for we can trace the growth of the ideas under which the *Fís* or vision was evolved and developed to the fusion of pagan, Celtic, and Christian notions. Several of the adventures of Brendan, *Maeldun*, and the sons of *Ua Corra* contain scenes which have the same origin as many of those depicted in the visions.

Heroic tales.

The tales which we propose to include under the head of heroic tales form a large and well-marked epic cycle. The central tale of the series is the *Táin Bó Cuailnge* or Cattle Spoil of *Cualnge*, now Cooly, in the county of Louth, which relates the history of the war waged by *Medb*, queen of Connaught, the Queen Mab of fairy mythology, and her husband *Ailill*, with *Conchobar Mac Nessa*, king of Ulster, for the possession of the mystic brown bull of *Cualnge*, in which the hero *Cúchulaind* defends Ulster single-handed, while the king and his champions are in a peculiar state of debility inflicted upon them for a savage act of the former. The existing tales of the series amount to about thirty, exclusive of the tale of the *Táin* itself and of the prologues and fore-tales narrating the preparations for the great cow-prey. In these tales as a whole we have one of the most complete epic cycles in any literature. We have a narrative of the life of the great hero of the series from his conception to his death, of *Medb*, the chief heroine, and of all the chief personages on both sides, male and female—*Conchobor Mac Nessa*, *Fergus Mac-Roigh*, *Ailill*, husband of *Medb*, *Conall Cernach* and *Lóiguire* or *Leghaire Buadach*, companions of *Cúchulaind*, the sons of *Uisnech*, and *Ferdiad*; *Deirdríu*, *Emer*, and the other women who take part in the action. In some of the stories *Curoi Mac Daire*, the Munster king, *Conaire Mór*, the paramount king of Ireland, *Manandan Mac Lir* and his wife *Fand*, and many other personages of Celtic mythology come in. The principal tales of this remarkable series exist in manuscripts written in or before the early part of the 12th century, and the others in vellum manuscripts of good authority. The stories are mixed prose and verse, the latter being generally more abundant in the oldest copies; the finest episode of the *Táin* itself, descriptive of the single combats between *Cúchulaind* and *Ferdiad*, consists of about equal parts of both. Prose, as we have said above, marks a transition period, and it is therefore likely that the whole series originally consisted of poems which the bard in reciting introduced by brief prologues which served to connect the subjects of the several poems into a kind of connected narrative. This may be regarded as the first stage in the composition of national epics, that is, when

the isolated poems fashioned by different rhyme-smiths are first welded into some kind of connected whole. A second stage would be the linking together of the separate episodes by a permanent setting of prose which would connect, continue, and expand the stories of the separate poems into a continuous coherent narrative. A third stage would be the forging of the whole material, poems and prose settings, into one continuous epic poem. The elder Edda, which consists of thirty-eight poems collected from the mouths of the Skalds, perhaps in part composed by Saemund Sigfusson, towards the end of the 11th century, gives us the first or embryonic stage of growth. Snorro-Sturleson's prose Edda, made in the beginning of the 13th century out of the poetic Edda and other materials, gives us a second stage: and after a long interval a third stage was reached in Oehlenschläger's *Norden's Guder*, or "Gods of the North." In this case the original materials underwent complete fusion in each stage. The *Iliad* and *Odyssey* of Homer are examples of epics in a third stage, but we do not know their previous stages. The Finnish Epic, *Kalevala*, made in the present century, shows us that an epic may be fashioned directly from the popular poems without passing through a prose stage at all. The *Táin Bó Cuailnge* is clearly in the second stage, a fact which should not be forgotten in comparing it with other national epics, as for instance with the Nibelungen Lay, which is an epic in the third stage. But the Irish epic not only belongs to a different stage of poetic workmanship, but, owing to the comparatively isolated position of Ireland, to a relatively much earlier and more archaic type of society than that of the German epic, which moreover was recast, or at all events reached its third stage in the 12th century in the times of the brilliant Hohenstaufen.

Who the author of the *Táin Bó Cuailnge* or of any of the tales of the heroic period was is not known. A curious legend points to *Senchán Torpeist*, a poet who flourished about 600, as the person who gave the *Táin* its present form; another tradition assigns the work to St. *Ciaran* of Clonmacnoise. The language of the portion of the *Táin* in the Book of the Dun Cow is not older at most than the beginning of the 10th century; the text of the Book of Leinster, which contains the whole story, is more modern, although the two manuscripts do not differ in age perhaps fifty years, the language of each copy evidently following, as we have before pointed out, the current of the spoken language. The tales of the heroic cycle, whenever originally written, are essentially pagan, and represent an early state of society still unaffected by Christianity or by Roman influence. That real persons may become the heroes of legends, and very simple everyday acts the roots of myths, is too well known to require proof. Indeed, it may be doubted whether a real personage may not always be necessary as a lay figure for the myths to gather round in the first instance. Be this as it may, *Cúchulaind*, *Medb*, and the rest of the personages of the heroic period, notwithstanding their complete anthropomorphism, are a phase of Irish mythology. The connection of the *Tuatha Dé Danann* pantheon and the actors in the heroic tales is direct and explicit. Thus the rival bulls, which are the direct cause of the war, are but metamorphoses of two hostile personages among the inhabitants of the *Síde*, the representatives perhaps of the Teutonic Æsir and Vanir. *Fedelm*, the *Ben Fáth*, prophetess, from the *Síd* of *Cruachan*, appears to *Medb* and describes to her *Cúchulaind; Badb*, the *Mór Rígu*, forewarns *Cúchulaind* of his death; the latter in the tale of the Bed of Decline, which we have referred to in speaking of the mythological tales, is bewitched by the woman of the *Síd; Fand*, wife of *Manandan Mac Lir*, falls in love with him; he visits *Tir Tairngire*, or the Land of Promise, and assists the people of the *Síde* in a battle against their enemies. *Medb*, too, has power over the *Geiniti Glindi*, or Spirits of the Glen, and in many ways shows her divine nature.

Fennian or Oisianic Tales.

The poems and tales which we have called Fennian, or Oisianic, form a cycle entirely distinct from the heroic one. Their history, too, is curious. *Finn*, or *Find*, the son of *Cumall*, the chief hero of the tales, is supposed to have flourished in the second half of the 3d century and to have acted as commander of a body of mercenaries. He therefore lived at a time which may be considered, if not actually within the historic period, at least upon its threshold. The struggle of the various races for mastery was ended, and this militia or standing army was evidently intended to keep the subject races in check. That the idea of such a force was suggested by the Roman army in Britain there can be little doubt. Perhaps to the existence of this body is due the considerable scale upon which the subsequent invasions of Britain by the Scots took place. As *Finn* appears in the accounts of the battles which he is supposed to have fought, he has all the air of an historical character, and is almost entirely devoid of legendary accessories. The same may be said of his son *Oisin*, the poet, and of his grandson *Oscar*. In the Book of Leinster are two poems ascribed to *Oisin*, and only two or three tales belonging to the Fennian cycle—one of which has reached the present time—are mentioned. Indeed in the older manuscripts there are few references to *Finn*, or to any of the personages of the Fennian romances. In the 12th century it would appera, therefore, that *Finn* and the other Fennians had only just begun to become the heroes of romance. But between the end of the 12th and the middle of the 15th century a rich body of poems and tales came into existence. This new Fennian epos possessed considerable vitality, for it continued to grow even down to the present century, and at least one entirely new tale belongs to the 18th century, and many received considerable expansion during the same time. The cause of this very remarkable growth of legend is obscure, and would be well worth investigating in connection with the history of romance. The two streams of romance are perfectly distinct and never mingle; at least we never find any of the heroes of the heroic period mentioned as actors in genuine Fennian tales. No better proof of the spurious character of a legend could be given than the co-existence in the same poem or story of actors belonging to the two romantic cycles.

The Fennian or Oisianic legends are very numerous and very romantic, and there is a distinct Fennian toponomy, which has not obscured or invaded that of the heroic period. *Finn* is still a popular hero, while *Cúchulaind* has become a shadow. In the current Fennian literature, as distinguished from the mere corrupt popular plastic legend on the one hand, and the Fennian poems and tales contained in good manuscripts of the 15th century on the other, there is an increasing disregard of relative chronology, and of consistent toponomy. There is not the same terseness and clearness of expression in the new as in the old stories; they are evidently the work of a people who are no longer in the same stage of culture. The descriptions of the dress and arms of the actors are vague, the number of those slain in battle is greater. The romances of the 14th and 15th centuries are full of magic and wild prodigies, but nevertheless they have the aroma of the forest and the mountain heather; one hears the echo of the huntsman's horn, and sees the rude life of the *Dun*, and the deep drinking of the chief's ale-house. The prose tales lack the refinement of the Welsh *Mabinogion*, and the poems the polish of the Welsh ones, but they are truer products of the national culture of the period.

Miscellaneous legends.

The sixth or miscellaneous class of legends do not require special notice, the more so as we have already included among the mythological tales some that might come under this head. Nor do the limits of this article permit us to say anything on the subject of lyric poetry. We have spoken of the incantations in verse of the *File*, and of the satirical poetry which originated in them, and which for a long time was endowed by the popular mind with baneful powers. This belief was the source of the *Fili's* influence in Christian times, and encouraged him to indulge in satirical compositions. Some of these possess considerable merit, and two of them deserve to be specially mentioned as early examples of a form of satire which was used by the French writers of *fabliaux*, and which in the hands of Rabelais and Swift gave rise to great works. The first is the *Aislinge* or Phantasy of a certain *Anier*, the son of *Conglinn*, who lived at the end of the 8th century. He was at first a theological student, but soon relinquished divinity for satire and the free life of a *Fili*. He betook himself to Cork, to *Cathal*, king of Munster, who happened to suffer at the time from the disease of a voracious appetite, for which he sought everywhere a cure. *Anier* undertakes it and succeeds. The piece opens with a kind of prelude in which a northern hag boasts that *Maeldun*, king of *Ailech* in Ulster, *Cathal's* rival for the paramount sovereignty of Ireland, ic

about to go to the south and carry off its spoils; a southern hag defies him, and says he will stop on the way. The poet, as if to raise his own importance, gives in a short poem the names, tribes, and places of eight scholars of repute, among whom is of course the poet himself, who had studied together at the school of Armagh. Having thus given himself the necessary importance, he describes his preparation for his journey to Cork, and the journey itself. On his arrival there he goes to the guest-house of the Cenobium, but not finding it an agreeable place, and the food being not to his liking, he writes a severe satire on the place, for which he is treated badly by the abbot. *Anier* revenges himself by writing a singular genealogy of *Manchan*, the abbot, whose ancestors up to Adam he represents to be various forms of luxurious viands. He then acquaints the abbot with his object in visiting Cork, and relates a vision which he had of an island of wheaten bread in the midst of a lake of new milk, on which was a house of butter and other articles of food. He fancies himself ferried over to this island in a boat of beef, and finds at the house a singular doorkeeper dressed in clothes of beef, curds, fish, butter, &c., and ornamented with garlands of sausages. Here he learns how to cure his voracious appetite, which he feigns to be the object of his search. The result of this account of his vision is that *Manchan* sends him to the house of a certain *Pichan*, where he has an interview with king *Cathal*, and relates to him another vision of a mansion made of the most delicious viands, with the object of enticing the *Lonchraes*, or voracious demon, with which the king was supposed to be possessed, to come forth. By such stratagems he ultimately succeeds in enticing the demon out, and curing the king. The personification of viands in this curious piece forcibly reminds us of the French *fabliau* of the *Bataille de Karesme et de Charnage*,[1] in which the combatants on one side are fish and the various dishes permitted in Lent personified, and on the other the various kinds of flesh meats.

The Dream or Phantasy of *Anier Mac Conglinne* is in a manuscript, of about the year 1400, called *Leabhar Breac*, the Speckled Book, but the language of the piece even in its present state proves that it is much older. There seems, indeed, no reason to doubt that it really was written in the 8th or 9th century, and that the orthography has been only a little changed by the scribes who copied it. The contrast between the dishes, the mere recital of which it was hoped would entice the demon from *Cathal's* stomach, and those mentioned in the French *fabliau* are very instructive as regards the kinds of food in use, and the relative degree of skill in the culinary art, and the general culture of Ireland and France at the periods when the *Aislinge* and the *fabliau* were respectively written.

The second piece referred to above is the Plunder of the *Cathair* of *Mael Milscothach*, or *Mael* "of the honeyed words," written by *Erard Mac Coise*, who died about the year 1023. The poet had a *Cathair*, or residence, at *Clartha*, now Clara in Westmeath, which was plundered and demolished in his absence by some of the O'Neills, and his furniture, ornaments, and cattle carried off. *Mac Coise* not being in a position to demand redress directly, had recourse to his art. Going to the *Dun* of *Domnal* O'Neill at *Ailech*, near Derry, the king, as was customary, asked him what tales he could recite; the poet names those he knows, all of which the king has heard before save one called the Plunder of *Mael Milscothach's Cathair*, which he desires to hear. *Mac Coise* then describes the attack and destruction of his house, using allegorical names for all the actors in the outrage. He first gives the pedigree of *Mael* "of the honeyed words," from the god *Dagda*. As the hostile party approach the *Cathair* the nymph of poetry ascends to the top, and asks who they are, and what they seek. The spokesman of the enemy gives a number of allegorical names, which when interpreted mean the O'Neills themselves. The nymph asks would they not prefer the jewels of poetic eloquence and eulogy to the torturing lash of satire, for she possessed abundance of both, from the panegyrics of *Mac Lonáin*, the satires of *Morán*, the eloquence of *Laidech*, the stories of *Leach Liathmhuim*, the proverbs of *Fithal*, the wisdom of the *Ferceirtnes*, the intellect of the poetess *Etain*, the brilliancy of *Nera*, the clear truths of the princess *Mór Mumhan*. The marauders heed not the question, but burst into the house and plunder it. On going to the cellar they are met by the guardian *Dathghel*, who enumerates the male and female defenders of the place; these are no other than the various household articles personified, such as "Bellows, son of constant Fire-place;" "Blanket, son of Women's Work;" "Broom, daughter of Tidiness," and so on. The result of this clever piece of satire was the restoration of the poet's property, and compensation for his loss.

[1] *Fabliaux et contes des Poètes François des XI., &c., Siècles*, publie par Barbazan, Paris, 1808, vol. iv. p. 80.

Law. The subject of law and its literature will be found fully treated under the heading BREHON LAW, vol. iv. p. 225.

Medicine. Among the gods of the Irish pantheon mentioned above was *Diancécht*, that is, *Dia na Cécht*, the god of the powers (of healing). In the *Táin Bó Cuailnge*, a *Fáth-Liag*, or prophet-leech, heals the wounds of *Cúchulaind* after his fight with *Ferdiad*. It is probable, therefore, that in pagan times the *Liag*, leech, belonged to the order which may be conventionally called Druidic, and tha charms and incantations formed part of the means of cure, like those of the Gallo-Roman physician Marcellus Burdigallensis. The position assigned to the leech by the laws in the Middle Ages was a very high one. He ranked with the smith and the *Cerd*, or artist in gold and silver; and the *Ollamh*, or doctor in leechcraft, ranked with an *Aire Ard*, that is, one of the highest grades of lord, who had ten free-stock tenants and ten base-stock tenants. He had also a distinguished place at assemblies, and at the table of the king. Leechcraft became hereditary in certain families, some of whose names indicate their profession, as O'Lee, that is *O'Liaigh*, the descendant of the leech; and O'Hickey, *O'Hiceadha*, the descendant of the healer. The heads of these families kept schools of leechcraft, as the *Breitheams* kept schools of law, many of which were in existence in the 16th century, for Campion, who wrote in 1571, says of both classes of schools, "They speake Latine like a vulgar language, learned in their common schooles of Leachcraft and Law, whereat they begin children, and hold on sixteene or twentie yeares conning by roate the Aphorismes of Hypocrates, and the Civill Institutions, and a few other parings of those two faculties." Many of the books of these families still exist in the libraries of the Royal Irish Academy, the King's Inns, &c., in Dublin. These books show that the Irish leeches were well acquainted with the works of Hippocrates, Dioscorides, Galen, Avicenna, Rhazes, and most of the medical writers of the Continent of their time. They also contain early translations into Irish of several medical works of repute.

With the exception of the hymn of St. *Colman O'Cluasaighe*, published in the Liber Hymnorum of the early Irish Church, some fragments of poems attributed to *St. Bec Mac Dé*, and some others, everything ecclesiastical which could with certainty be referred to an early period is in Latin, and therefore outside the scope of this article. The *Leabhar Breac*, or Speckled Book, now in the library of the Royal Irish Academy, contains chiefly religious writings, which give us the means of estimating what may be called the popular religious literature in the 13th and 14th centuries. It contains homilies on moral, scriptural, doctrinal, and ritualistic subjects, *e.g.*, on the duties of kings and subjects, on charity, almsgiving, the ten commandments, the commandments of the church, the different festivals, prayer, fasting, and abstinence, baptism, the ceremonies of the mass, &c.; an epitome of Bible history from the Creation to the Ascension, which often so closely follows the text of the Scriptures, that we may regard it almost as a translation; the legends of the Finding and Exaltation of the Holy Cross, embodying much of the Gospel of Nicodemus, which was popularized in every country in Europe in the Middle Ages; the acts of several saints, which are found in Early English, French, and German literature; the lives of the three principal Irish saints, Patrick, Brigit, and Columcillé, and of some others; the elegies of St. *Colum Cillé*, and St. *Senán*, &c. There are also many legendary lives of the saints of the early Irish Church in some of the principal vellum manuscripts. It will thus be seen that the popular religious literature in Ireland did not differ from that of neighboring countries, and on the whole bears favorable comparison with it.

GAELIC LITERATURE OF SCOTLAND. We have no direct evidence that the Pictish language was ever written, but inductive reasoning is rather against the supposition, for no trace of a poem or legend has survived. The cause of this is not far to seek. The Pictish language, as we have already pointed out, was a Goidelic dialect, which

at the period of the principal Dalriadic settlement in the west of Scotland did not perhaps differ from Irish more than Low German or Alemanian does from High German, if even so much. There was just difference enough to make intercourse between the Scots and the Picts at first somewhat difficult. This close relationship of language is no doubt the explanation of the readiness with which Scots and Picts allied against the Britons. In the 5th and 6th centuries, when the Irish kingdom established in Alba began to become an important factor in the affairs of that country, the Irish were a lettered people. The Irish *Fili*, or poet, followed in the track of the Irish missionary, and carried the poems and historic tales of Ireland among a kindred people, having the same eponymous ancestors, and nearly identical mythological traditions. For several centuries after the conversion of the Picts, Alba, as Scotland was then called, was a second home to the Irish *Ceilé Dé*, or monk, and the Irish poet and harper. Even in the 12th and 13th centuries the Irish poets and musicians included Scotland in their circuit, and took refuge or sought their fortune there. We shall mention one instance as it happens to be instructive in another way, that of *Muiredhach* O'Daly, better known, on account of his long residence in Scotland, as *Muiredhach Albanach*, or *Muireach* the Albanian, or as we should now say, the Scotchman. Did we not know the whole history of this man, who is believed by the Rev. Dr. T. M'Lauchlan to be the ancestor of the great race of MacVurrichs, bards to MacDonald of Clanranald, we should never have suspected him to have been an Irish *Fili*. It is easy to understand how under these circumstances the literary and cultivated language came to be Irish. But beneath this literary language there was the under-current of the original Pictish, which was gradually modified under the influence of the Irish, in the same way that a literary language always influences the spoken language. Nor should we forget that in this case the action was more potent because it was directly exerted on the people through the preachers, and by the bards reciting their poems and telling their stories. Towards the middle of the 15th century Irish literature began to decline and the Irish language to recede. Irish poets and musicians still continued, however, to include Scotland in their visitations, but the connection between the two countries began to be weakened, and the Scottish dialect accordingly gradually rose into literary importance. Poems and tales began to be written in it; and those originally written in Irish were recast in the local dialect. There can be no doubt, too, that the legends and historical traditions brought over from Ireland, which had been transformed by, or had absorbed into them, the primitive Pictish traditions of the same kind which grew from the same original stem, began to be recast and modified, and a new growth of legends to spring up indigenous to Scotland. In this way a *Gaelic* literature arose, of which some examples are to be found in the Dean of Lismore's Book. Its development was, however, arrested by the Reformation. This would have been only a temporary check, but for the political changes which followed, and which by gradually bringing the most remote part of the Highlands into the current of a wider and more active political life, and by drawing to the capital and within the direct influence of modern European culture the Scottish nobility, gave an additional stimulus to the spread of English, and reduced the Gaelic to a peasant's patois. Under other and more favorable circumstances the translation of the Bible into Gaelic, and the composition of a Gaelic liturgy, together with the change in the whole current of religious ideas, might have given rise to a new type of Celtic literature.

MacPherson's Ossian.

The success which attended some translations made by James MacPherson led him to make a tour in the Highlands, and to gather as many poems and other specimens of Gaelic literature as he could find. It was no doubt during this tour that he matured his idea of using the legends preserved in the popular memory, written down in Scottish Gaelic, and existing in the Irish MSS., which he came across in his travels, as materials out of which to compose the poems which have since become so celebrated under the name of the poems of Ossian. We mean of course the English poems for in the usual sense of that word no Gaelic originals existed. The so-called originals are a very curious kind of mosaic, constructed evidently with great labor afterwards, in which sentences, or parts of sentences of genuine poems are cemented together in a very inferior word-paste of MacPherson's own. We have pointed out that the personages of the two cycles of romance, the heroic and the Fennian, are never mingled as actors in genuine national poetry or tales. This is, however, done commonly by MacPherson. Thus in Dar-thula, which is based upon a tale of the heroic age called the Exile of the Sons of *Uisnech*, we have *Deirdriu* (Dar-thula), *Nois* (Nathos), *Ardan*, and *Cathbad* (Cathba) the Druid, actors of the original tale, associated with *Oisin* and *Cormac* who belong to a different time and another phase of Irish legend. In Temora we have *Find* son of *Cumall* (Fingal), his son *Oisin* (Ossian) and grandson *Oscar*, and *Cormac Mac Airt*, associated with *Cathaeir Mór*, *Nois* (Nathos), *Cúchulaind* (Cuthulin), and the antediluvian *Carill*. Again, in Fingal, which has manifestly been written under the influence of the *Táin Bó Cuailnge*, we have *Carill*, *Cúchulaind*, *Cathbad*, *Conlaech* (Conloch) son of *Cúchulaind*, *Ferdiad* son of *Daman* (Ferdia), associated with *Finn* (Fingal), *Oisin* (Ossian), *Oscar*, *Goll Mac Morna* (Gaul, son of Morna), and other heroes of the Ossianic period. This mingling of the heroes of two different cycles of romance would be sufficient to prove, did we possess no other test, that MacPherson had no original. The old Celtic tales are especially characterized on the one hand by the detailed descriptions they give of the personal appearance, dress, and arms of the chief actors in a tale, and of the internal arrangements of the houses, &c.; and on the other by the absence of descriptions of scenery, except when *Tir Tairngire*, the Land of Promise, is in question. The aspects of nature were familiar to those who listened to those tales, what they wanted to realize was the actors and their deeds. MacPherson's poems on the contrary are full of word-pictures of nature, sometimes no doubt bombastic, but generally giving beautiful, and often grandly poetic, descriptions of the most characteristic features of the scenery of the Highlands. But the actors in his epic are like figures seen through a mist, barely sketched in outline, whose dress, ornaments, and arms are so generally and vaguely described as to lose all peculiar and distinctive character. The Poems of Ossian are thoroughly modern, more so even than the current legends of the west of Scotland which retain many things—talking ravens, soothsaying, &c., which savor of old times. An examination of the poems and prose tales of the Irish Oisianic cycle is very instructive in this connection; the older they are the more detailed are the descriptions of the actors and of their dress and arms; the newer the vaguer and more general—the more like MacPherson's heroes do they become. In this respect MacPherson did no more than what he was entitled to do, and what has been done by others who have used similar materials for the construction of poems. The author of the Nibelungen Lay fused in the 12th century legends of the Horny Siegfried with those of a different and newer cycle concerning Attila, Dietrich von Bern, Brunhild, &c. So the romances of Arthur and the St. Graal, though of a totally different origin have mingled together. So, too, the mediæval German poets took many liberties with the French romances, which served them as materials. What he had no right to do was to call his poem a translation. It is unfortunate for his fame that he should have supported this comparatively trivial error by the grave one of producing his pretended original. Let us add that the publication of a selection of the poems in the manuscript known as the Dean of Lismore's Book by Mr. W. F. Skene and the Rev. T. M'Lauchlan, and Mr. J. F. Campbell's collection of *Popular Tales of the West Highlands*, has done more to settle the Ossianic controversy than all that had been written by the combatants on both sides.

WELSH LITERATURE. Manuscripts.

The number of Welsh manuscripts is considerable, but with the exception of those in the British Museum, the library of Jesus College, Oxford, and that of the university of Cambridge, they are all in private collections. Of these the most important is the Hengwrt collection, consisting of the manuscripts collected by Mr. Jones of Gelly Lyvdy, between the years 1590 and 1630, and by the antiquary Mr. Robert Vaughan of Hengwrt, who died in 1666. The two collectors arranged that their manuscripts should be united on the death of one of them, the survivor to become the possessor of the whole. According to this arrangement they became the property of Mr. Vaughan, and hence got

the name of the Hengwrt collection. Some years ago Sir Robert Vaughan bequeathed the collection, comprising, we believe, about four hundred volumes, to Mr. W. W. E. Wynne of Peniarth, in whose possession it now is. But although Welsh manuscripts are numerous there are very few of any considerable antiquity, the others being comparatively modern compilations, often the work of ignorant scribes, the contents of which seem for the most part to have been in the first instance taken from the old books just spoken of. Of such old books there are, exclusive of law manuscripts, only five of such antiquity or importance as to deserve special mention here. The first is a copy of the hexametrical paraphrase of the Gospels of Juvencus in the University library of Cambridge, as old at least as the 9th century. The only Welsh it contains are some glosses and two short poems written in Irish characters; but as the oldest specimens of Welsh known they are invaluable as a standard wherewith to compare the language of other manuscripts. The second is the Black Book of Carmarthen, a small quarto vellum manuscript of 54 leaves, written in Gothic letters by various hands in the reign of Henry II. (1154–1189). This manuscript originally belonged to the Priory of Black Canons at Carmarthen, and was given by the treasurer of the Church of St. David to one of the commissioners appointed by Henry VIII. for the suppressed monasteries, Sir John Price. It is now in the Hengwrt collection at Peniarth. The third is the Book of Taliessin, also in the Hengwrt collection, a small quarto manuscript consisting of 38 leaves of vellum written in Gothic letters throughout in one hand, some time in the early part of the 14th century. Its history before it came into the possession of Robert Vaughan, the antiquary, is not known. The fourth is the Book of Aneurin, a small quarto manuscript of 19 leaves of vellum, written probably in the end of the 13th century. It was purchased by the late Sir Thomas Phillips of Middlehill, and may have been formerly in the Hengwrt collection. The fifth is the Red Book of Hergest, so called from Hergest Court, one of the seats of the Vaughans, for whom it was probably compiled. This important manuscript, the chief repository of Welsh literature, is a folio volume of 360 leaves of vellum, written in double columns at different times, from the early part of the 14th to the middle of the 15th century, and is now in the library of Jesus College, Oxford.

Myvyrian Archaiology of Wales.

The text of a large number of the poems and other compositions contained in Welsh manuscripts has been published in a work in three volumes, called the *Myvyrian Archaiology of Wales*. The first volume, containing poems, and the second, chronicles and historical documents of various kinds, were published in 1801; and the third, moral, didactic, legal, and miscellaneous pieces, in 1803. This publication is due to the noble patriotism of three men,—Owen Jones, a furrier in London, and the son of a Welshman, with whom the idea originated while still a young man, and who devoted no inconsiderable portion of his fortune to its realization; Edward Williams, a stone-mason, better known by his assumed name of *Iolo Morganwg*, the chief contributor to the collection; and William Owen, who afterwards assumed the name of Pughe, the author of the principal dictionary of the Welsh. Had the critical judgment and knowledge of the editors equalled their patriotism, the work would be of great value.

Classification of Welsh litature.

Welsh manuscript literature may be classed for our purpose under the following heads:—(1.) Glossaries and grammars; (2.) The *Bruts*, or annals, genealogies, and histories; (3.) Poems; (4.) *Mabinogion*, and other prose tales; (5.) Laws; (6.) Medicine and science. There are very few Welsh glossaries, because there exist in fact few examples of obsolete or old Welsh. The oldest Welsh laws are attributed to *Howel Dda*, who died in 950, and the oldest codex containing them is believed to have been written in the 12th century. If this codex contained the laws in their original form they would probably require no gloss to explain them, because the language did not change very much in the interval between the framing of the laws and the writing of the manuscripts. But like all Welsh manuscripts, even the oldest copy of the laws gives us an edition in the language of the time. A grammar of the Welsh, said to have been made by *Edeyrn Dafod Aur*, by the order and at the desire of three Welsh princes, in the second half of the 13th century, has been published by the Rev. J. Williams ab Ithel, from a copy made in 1832 from another copy made in 1821 from a manuscript of Edward Williams, or *Iolo Morganwg*. Whatever may be the intrinsic scientific value of the treatise itself, this is a very doubtful source to derive historical value from. Mr. Williams has also published in the same volume a work on the rules of Welsh poetry, originally compiled by *Davydd Ddu Athraw* in the 14th century, and subsequently enlarged by *Simwnt Vychan* in the 16th century. We have no evidence as to how much belonged to the former and how much to the latter, but it all appears to belong to the 17th century. Mr. Williams has also added a great deal of matter of his own, which is distinguished from the text by being printed in smaller type. His object was to combine in one volume as complete a body of information on the subject as possible. It would be outside the scope of this article to criticise this laborious work.

If we might judge by names alone, the British, between the departure of the Romans and the conversion of the Anglo-Saxons, possessed many historians. Welsh antiquaries give a long list, and some find a place even in the works of English and foreign writers; but with the exception of Gildas and Nennius, the titles only of their writings are known, nor are these above suspicion. Bede quotes Gildas, and so far we have proof that as early as his time there was a belief in the existence of such an author. The works now known as those of Gildas and Nennius are written in Latin, and are properly outside our scope, but they are so inseparably connected with the *Bruts* or Annals, and with the history of romance, that we must say a few words concerning each. Gildas was the son of a British king of *Ailclyd*, the present Dumbarton, and was therefore from that part of Britain referred to in Welsh works as *y Gogled*. Several dates have been assigned for his birth and death, but we prefer for the former 516, and for the latter 570, and his book *De Excidio Britanniæ*, if genuine, seems to have been written about 560. According to his legendary lives, he went to Ireland on the invitation of St. Brigit, founded monasteries there, and taught at the school of Armagh. His work above named is written in an inflated style, and is a mere sketch of British history under the Romans, and in the period immediately succeeding their withdrawal from the country, and so includes the period of the wars of the Britons with the Picts, Scots, and Saxons; it is full of blunders and anachronisms. Mr. Skene suggests, very reasonably, that the well-known letter of the Britons to Aetius, asking for Roman aid, is misplaced, and that if put in its proper place the discrepancy between Gildas's account of the departure of the Romans from Britain and that of Greek and Roman writers will disappear.

Gildas.

Nothing is known of the person called Nennius, to whom the short History of the Britons known by his name is attributed. In the earliest known manuscript of it, written about the middle of the 10th century, and now in the Vatican library, it is ascribed to a certain Marc, who is believed to be the Marc who with his nephew, *Moengal*, better known as Marcellus (little Marc), came to the monastery of St. Gall about the middle of the 9th century, having with him many books and a considerable retinue. Bestowing his wealth on his followers, and reserving for himself only the books, he and his nephew remained at St. Gall, where the latter became celebrated as the teacher of Notker, Ratpert, and Tutilo. Mr. Skene thinks it was originally written in British in Cumbria, or *y Gogled*, and was afterwards translated into Latin. To this nucleus was added the genealogies of the Saxon kings, down to 738; the above-mentioned Marc appended, probably about 823, the life of St. Germanus, and the legends of St. Patrick, which were subsequently incorporated with the history. Some South Welshman added to the oldest manuscript of the history in these countries, about 977, a chronicle of events from 444 to 954, in which there are genealogies beginning with *Owain*, son of *Howel Dda* king of South Wales. This chronicle, which is not found in other manuscripts, has been made the basis of two later chronicles brought down to 1286 and 1288 respectively. It is consequently not the work of one author. A *Sai* and *Fili*, named *Gilla Caomhan*, who died 1072, translated it into Irish, and added many things concerning the Irish and the Picts.

Nennius.

The *Historia Britonum* is more valuable for the legen-

dary matter which it contains than for what may be accepted as history, for it gives us, at least as early as the 10th century, the British legends of the colonization of Great Britain and Ireland, the exploits of King Arthur, and the wonderful birth and prophecies of Merlin, which are not found elsewhere before the 12th century. The date of the book is of the greatest importance to the history of mediæval romance, and there can now be no doubt, especially since the publication of the Irish Nennius, that it is earlier than the Norman Conquest, and that the legends themselves are of British origin. The books attributed to Gildas and Nennius contain the germs of the fables which expanded into Geoffrey of Monmouth's History of Britain, which was written in Latin some time before 1147, the date of the epistle dedicatory to Robert, earl of Gloucester, the son of Henry I. by *Nest*, only daughter of *Rhys ab Tewdwr*, and was a manifestation of the great advance which took place in Welsh literature consequent on the restoration of the Welsh prince just named, and of *Gruffyd ab Cynan*, and of which we shall have more to say hereafter. In the epistle just referred to Geoffrey states that Walter, archdeacon of Oxford, had given him a very ancient book in the British tongue, giving an account of the kings of Britain from Brutus to *Cadwaladyr*, and that he had translated it into Latin at the archdeacon's request. But in the Welsh version of Geoffrey's chronicle in the *Myvyrian Archaiology*, the *Brut Geoffrey ap Arthur*, there is this postscript: "I, Walter, archdeacon of Oxford, did turn this book out of Welsh into Latin; and in my old age I turned it a second time out of Latin into Welsh." That Geoffrey drew his materials from British sources, and did not coin any of them, seems to us the legitimate conclusion to be drawn from a careful study of the whole subject. His book is, however, a compilation and not a translation, at all events no book now exists which can be regarded as his original, while all the *Bruts* or chronicles are posterior to Geoffrey's book and based upon it. Of these there are the *Brut Tysilio* and the *Brut Geoffrey ap Arthur*, both of which are also called *Brut y Brenhinoedd*, or Chronicle of the Kings. The copy of the latter in the Red Book is followed by a chronicle in continuation which, according to an entry in a later hand, was called *Brut Twysogion*, or Chronicle of the Princes. In some manuscripts there is also added a chronicle of Welsh events interspersed with Saxon ones, which is from this called the *Brut y Saeson*, or Chronicle of the Saxons; in one manuscript this is attributed to Caradoc of Llancarvan. The chronicle of events from 444 to 954, which is contained in the British Museum manuscript of the History of Nennius, and two other chronicles, already mentioned, bringing events down to 1286 and 1288, have been printed together as the *Annales Cambriæ*. These later chronicles ought not, as Mr. Skene properly remarks, to have been incorporated with the older one, which alone possesses the special value of having been written before the Norman Conquest, and a century and a half before the *Bruts*.

Geoffrey of Monmouth.

The *Bruts*.

Besides the chronicles or *Bruts* there are no historical works properly so called in Welsh, unless we include the Triads, a curious kind of literature peculiar to Wales; for although there are some Irish Triads they are imitations of the Welsh ones, an imitation which fortunately did not extend very far. The Triads are an arrangement of similar subjects, similar events, or things which might be associated in the mind, or be worthy of remembrance, &c., in series of three, *e.g.*, "Three ornaments of a hamlet—a book, a teacher versed in song, and a smith in his smithy;" or "Three punishments for theft in hand—the first is imprisonment, the second is cutting off a limb, the third is hanging." This kind of composition appears to have come into use in the 12th century, the earliest specimen being the Triads of the Horses, which are in the Black Book. The Triads of Arthur and his warriors are perhaps as old as the 13th century. The Red Book contains the Triads of the island of Britain, which include those last mentioned, an enlarged edition of the Triads of the Horses, and many others. The Triads of *Dyfnwal Moelmud*, a supposed ancient king of Britain, are perhaps as old as the beginning of the 16th century.

The Triads.

The poetic literature of the Welsh, which is very extensive, may be conveniently divided into—(1.) Poems attributed to poets who lived before the 12th century, and anonymous poems in the Black Book; and (2.) Poems written by or attributed to poets who lived in the 12th and succeeding centuries. The claim of the Welsh to possess an ancient literature rests altogether on the poems of the first category, hence they have been the subject of much discussion. The grounds upon which such discussions have hitherto rested have altered considerably within the last few years. The labors of Zeuss and others who have worked at Celtic philology, and the discovery of specimens of Old Welsh in the Cambridge Codex of Juvencus, furnish us with much safer canons of criticism than existed in 1849, when even a learned Welshman, the late Mr. Thomas Stephens, who did more than any one else to establish the claims of his country to a real literature, doubted the authenticity of a large number of the poems said to have been written by Taliessin, Aneurin, Merlin, and Llywarch Hên, who are supposed to have lived in the 5th century. Mr. W. F. Skene has done a very great service to Welsh literature by the publication of the texts of those poems from the four principal manuscripts now known, the Black Book, the Book of Taliessin, the Book of Aneurin, and the Red Book. In addition to the texts Mr. Skene has given translations of the poems specially made for him by the Rev. D. Silvan Evans and the Rev. Robert Williams, so that next to the Welsh Laws, and Stephens's *Literature of the Kymry*, his *Four Ancient Books of Wales* is the most important contribution to Welsh literature yet made.

Welsh poetry.

If we judge by the test of language alone, the poems which we have included in our first category, and which are nearly all to be found in Mr. Skene's book, are not in their present form older than the 11th century. But while the form may be new the substance may be old, as we have already pointed out in the case of many Irish poems. It is probable that many of the poems attributed to Aneurin, and several of the mythological and religious poems, are only popular editions of much older poems, and further that the change effected in some of them may be so small that we have substantially the original poems. Others again have been so deeply modified that they may be regarded as new poems on an old theme.

Classification of reputed older Welsh poems.

The following classification of those poems shows their origin, and will help to render the few observations we can offer here more intelligible.

1. Poems referring to events in Romanized Britain, or to the east frontier of Wales.

2. Poems referring to events on the Mercian frontier and in South Cumbria.

3. Poems referring to personages and events connected with the *Gwyddel* or Goidelic occupation of Wales and Cornwall.

4. Poems referring to the *Gwyr y Gogled*, or Men of the North.

5. Poems relating to or attributed to *Taliessin* of a general character.

6. Proverbial poetry attributed to *Llywarch Hên*.

7. Poems attributed to poets between the 7th and 11th centuries.

8. Anonymous religious poems in the Black Book.

9. Poems referring to personages and events of Welsh history in the 12th and subsequent centuries.

The first class is represented by one poem in the Book of *Taliessin*, The Reconciliation of *Llud* the Less, which would be unintelligible but for a *Mabinogi* to which we shall refer later. The poem has no mark of antiquity about it, and belongs to the 13th century. To the second class belong the Death Song of *Erof*, and other pieces in which that warrior is mentioned, and the Death Song of *Uthyr Pendragon*, all of which are in the Book of *Taliessin*, and in form and substance are not older than the 12th century. The poems of the third class are of considerable importance, but here we shall merely give the names of a few as examples, reserving what we have to say concerning them until we come to the *Mabinogion*. The following are good examples of the class—The Death Song of *Corroi*, The Battle of *Godeu*, and The Chair of *Ceridwen*, from the Book of *Taliessin*; the *Preiddue Annwn*; *Daronwy*, and the poems relating to *Gwydyon ap Don*, from the Black Book, the Book of *Taliessin*, and the Red Book. The poems which belong to the fourth class are the most numerous and important. Among them

may be mentioned first of all the *Gododin* poems, those relating to *Urien Rheged*, the war between the sons of *Llywarch Hên* and *Mwg Mawr Drefydd*, poems relating to the battle of *Adderyd*, as for instance the *Avallenau*, or Apple Trees, and poems relating to *Cadwallawn* and *Cadwaladyr*. We have already explained that *y Gogled* was that portion of Britain which lay between the walls of Hadrian and Antoninus, and had been erected into the Roman province of Valentia. As it was a loose term, it may have included all the independent British country north of the Ribble. This country, and especially that part of it forming the ancient diocese of Glasgow, was the cradle of the Welsh language and literature. It was the only part that could have been this. Here the question naturally suggests itself, to what extent was Britain Romanized? That it was not so to the extent usually supposed may be shown in many ways. It is obvious that, if the southern Britons were as thoroughly Romanized as Gaul or Spain, the language of Cornwall should have been a Romance dialect, and that of Brittany an allied one. Again, if the Welsh were a remnant of the Romanized Britons driven westward by the conquering Saxons, the Welsh language also should be a Romance dialect, or its vocabulary should contain a large intermixture of words borrowed from the Latin, and especially of words connected with law, trades, &c. But this is not so. The fact is the population of Britain was not Romanized to any extent. In the towns the principal citizens no doubt spoke Latin, as they speak English in Calcutta and other large towns in India. A large British population in part bilingual gathered round the cities and towns, as the Irish did about the Anglo-Norman towns of the Pale, and as the Letts, Esthonians, and Russians do about the German towns of the Russian Baltic provinces. We should also not forget that the legionaries in the 2d and 3d centuries were only Roman in name, being recruited from every part of the empire, and consequently could not contribute to Romanizing the inhabitants among whom they were located. The peasantry continued British, but the nobility, no doubt, learned to speak Latin, but not for home use. When afterwards the Saxons on the east and the Irish on the west of what is now Wales displaced the ruling families, the Romanized part of the independent British population, hemmed in between the two hostile peoples, and with an ever-encroaching Saxon frontier on one side, gradually merged into the Celtic-speaking peasantry, and lost the use of the Latin tongue. This was not a state of things favorable for the development of a literature. In the north especially, between the Walls of Hadrian and Antoninus, in the province of Valentia, which never had Roman towns, only camps occupied by legionaries, who for the most part probably spoke no Latin, the whole population must have remained essentially British after the withdrawal of Roman power.

Extent to which Britain was Romanized.

Here if anywhere the first germs of a British literature should show themselves, and accordingly tradition makes *Taliessin*, *Aneurin*, *Llywarch Hên*, and *Myrdin* or Merlin, to whom most of the supposed ancient Welsh poems are attributed, natives of this region. Here also the actors in the events referred to in the poems lived, and the places where those events are supposed to have taken place are to be found. The greater part of this region, too, enjoyed substantial independence down to the end of the 9th century, with the exception of the interval from 655, when they were subjected to the kingdom of Northumbria by Oswy, after the defeat of *Cadwallawn* and Penda, to the battle of Dunnichen in 686, when Ecfrid, king of Northumbria, was defeated. From the 7th to the 9th century Cumbria, including under that name all the British territory from the Ribble to the Clyde, was the principal theatre of British and Saxon conflict. The rise of the dynasty of *Mailcun*, who according to Welsh tradition was a descendant of *Cunedda*, one of the *Gwyddel* or Goidelic Picts of the district called *Guotodin*, brought Wales into close connection with the Cumbrian kingdom, and prepared both North and South Wales for the reception of the northern traditions and the rise of a true Welsh literature.

Rise of Welsh poetry in *y Gogled.*

Whether the poets of Cumbria really wrote any of the poems which in a modified form have come down to us or not, there can be no doubt that a number of lays attributed to them lived in popular tradition, and that under the sudden bursts of glory which the deeds of *Cadwallawn* called forth, and which ended in the disastrous defeat of 655, a British literature began to spring up, and was nourished by the hopes of a future resurrection under his son, *Cadwaladyr*, whose death was disbelieved in for so long a time. These floating lays and traditions gradually gathered into North Wales, according as the nobility and bards sought refuge there from the advancing conquests of the Saxon kings in the north. The heroes of Cumbria became Welshmen, and the sites of the battles they fought were identified with places of similar name in Wales and England. When *Howel Dda* became king of all Wales, the legends of the north passed into South Wales, and like the legends of *Oisin* in Scotland, became so thoroughly identified with their new home, that they seem to have first originated there.

Of all the poems attributed to the four ancient Welsh bards, the one which has most claim to be considered genuine, and the only one we can specially allude to here, is that known as *y Gododin*. As published by Mr. Skene from the Book of *Aneurin*, it consists of 94 stanzas, and is both obscure and fragmentary. The latter character Mr. Skene explains, and we think successfully, by supposing that it consists in reality of two distinct poems, referring to two events separated by a long interval of time. The first event is the battle of *Cattraeth*, the *Bellum Miathorum* of Adamnan, fought between the Britons and Scots under *Aedan*, king of Dalriada, and the pagan Saxons and their British subjects in *Devyr* and *Bryneich* or Deira and Bernicia, and the half-pagan Picts of *Guotodin*, a district corresponding to the northern part of the Lothians along the Firth of Forth. *Cattraeth* was the adjoining district on the Forth where the great Roman wall terminates at Carriden, the fort of *Eidinn*. If this view be correct, and it is the best that has yet been proposed, the *Mynydawg* of the poem was *Aedan Mac Gabran*, and the battle the one fought in 596, of which Columcillé prophesied that *Aedan* would be unfortunate but victorious, —the misfortune being doubtless the loss of his four sons in the battle, one of whom was named *Artur* (*Art*). The second and later portion of the poem, Mr. Skene thinks, refers to the battle of *Strathcairinn*, now Strathcarron, in which *Domnal Brec*, king of the Dalriadic Scots of *Alba*, was slain, 642. In the brevity of the narrative, the careless boldness of the actors as they present themselves, the condensed energy of the action, and the fierce exultation of the slaughter, together with the recurring elegiac note, this poem (or poems if it be the work of two authors) has some of the highest epic qualities. The ideas and manners are in harmony with the age and country to which it is referred. The poems called the *Gorchans*, which are also found in the Book of *Aneurin*, and refer to the personages and events of the *Gododin*, possess many of the characteristics of that poem, and are probably the work of the same time, if not of the same poet.

The *y Gododin* poems.

Still more celebrated than *Aneurin*, the reputed author of *y Gododin*, was *Taliessin*, a name which has been interpreted as "Splendid Forehead," and has consequently been the subject of a good deal of mysticism. The number of poems in the Book of *Taliessin* supposed to have been written by him is considerable; in language they are not older than the 12th century, though many of them may be what we have called in other cases popular editions of older poems. Several belong to the fourth class which we have been just considering; the poems which we would include in a special fifth class are those which have been made the subject of bardic speculation in consequence of their generality and vagueness, such as the Fold of the Bards, Hostile Confederacy, Song to the Wind, Mead Song, Songs to Great and Little Worlds, Elegy of the Thousand Sons, Pleasant things of *Taliessin*. Many of these poems possess considerable merit, and even as the work of the 12th and 13th centuries might bear comparison with similar compositions in other European literatures of the period.

Poems ascribed to *Taliessin.*

The poems of the sixth class attributed to *Llywarch Hên* are in the Red Book, and are the work of some Tupper of the 14th century, too disinterestedly proud of his work to put his own name to it. They are curious and interesting examples of a sort of proverbial philosophy in which each proverb or wise saw is accompanied by a reference to some natural feature, such as "Bright the tops of the broom," which serves as a kind of mnemonic catchword. This catchword

Poems attributed to *Llywarch Hên.*

is sometimes the same in every verse, as in the poem *Eiry mnyd*, mountain snow.

Poets from the 7th to the 11th century.

Welsh tradition has preserved few poems of the period between the end of the 6th century and the end of the 11th, a period of 500 years, nor for the matter of that even the names of poets, a circumstance which is intelligible enough if we consider that Welsh literature really began with the 11th century, but inexplicable according to the ordinary views of Welshmen. In the Black Book are five poems attributed to three poets who lived in the early part of the barren interval,—*Meigant*, whose name also occurs in Irish literature; *Elaeth*, to whom are attributed two out of the five poems, which are of a religious character; and *Cuhelyn*, a bard of the 9th century. The two poems attributed to the last are of very great importance, because in them occurs the earliest mention of the goddess *Ceridwen*, who plays so conspicuous a part in the modern bardic system of Neo-Druidism.

Religious poems in Black Book.

The anonymous religious poems of the Black Book, apart from the language, may belong to any time from the 6th to the 12th centuries; they probably belong in great part to the 11th and 12th centuries, and were most likely the work of the monks in whose monastery the Black Book was compiled.

Poems attributed to *Myrdin*.

The ninth and last division of the early Welsh poems are those which covertly allude to passing events in Wales, and can therefore be no older than those events. Two of them refer to *Powys* in Norman times, the Satire of *Cynan Garwyn*, son of *Brochwael*, in the Book of *Taliessin*, and the elegy on *Cyndylan* in the Red Book. The others are the poems which Mr. Skene groups together under the head "Poems which mention Henry or the son of Henry;" the most important of them are those attributed to *Myrdin* or Merlin, such as the Dialogue between *Myrdin* and his sister *Gwendydd*, a fugitive poem of *Myrdin* in his Grave, containing a number of predictions, and the Songs of the Little Pigs, each stanza of which begins with "*Oian a parchellan*," "Listen, O Little Pig." The structure of the last poem being like that of the poem called the *Avellenau*, each stanza of which commences with that word "Sweet Apple-tree," both are classed together, and in the *Myvyrian Archaiology* are attributed to Merlin. The *Avellenau* is, however, found in the Black Book, and is every way an older poem; but it is needless to add that none of the poems of Merlin are genuine, and that with the exception perhaps of the Apple-tree poem, they all refer to times later than the 12th century, and to the present Wales.

The Welsh bards.

Before discussing the second division of Welsh poetic literature, or poems written by or attributed to poets who lived in Wales in the 12th and succeeding centuries, we must say a few words on the Welsh bards. The organization of the classes of learned men in Wales was far less developed than in Ireland. According to the laws each king or prince had a household bard, who appears to have performed the functions of the Irish *Sai* and *Fili*, and also that of harper. His position was honorable, and on investiture he was presented by the king with a harp, and by the queen with a gold ring. Beside the *Bardd Teuleu*, or household bard just spoken of, a *Pencerdd*, chief of song, is mentioned in the laws, who in North Wales was an officer of the household, but in South Wales was not,—his position there being apparently that of a privileged personage entitled to make a circuit and so spend his time where he pleased. The chief of song was also called a chaired bard, because he was one of the fourteen entitled to a chair at court. The installation of a bard to a chair appears to have been attended with some ceremony, for the judge of the king's court was entitled as a perquisite of his office to the bugle-horn, the gold ring, and the cushion which was under the bard on the occasion. The *Pencerdd* represented the Irish *Ollamh Fili*, and like him appears to have kept a school of poetry, for he was entitled to receive 24 pence from each minstrel who completed his course of instruction, to their services, "as a man placed in authority over them," and to the *Gobyr* or *Amobyr* of their daughters, that is to the fee payable to the lord on the marriage of a maiden. Among his emoluments was a fee of 24 pence from every maiden on her marriage. In the court his seat was on the side of the judge of the court, and he lodged with the *Edling*, that is the heir-apparent of the king or prince, corresponding to the Irish *Tanaiste*. A villain or serf could not become a bard, nor a smith without the permission of his lord; nor could a bard practise his art after he had taken holy orders. Should a serf or a stranger happen to become a bard he became personally a free *Cymro* or Welshman, but his children were not free, though the time in which his descendants might rise to the privileges of a free *Cymro* was shortened. A minor bard was forbidden to solicit a gift without the permission of the *Pencerdd*, but the latter might ask a gift though all others should be forbidden to do so. The duty of the chief of song was to commence the singing or recitation of poetry by singing two songs on entering the hall, one concerning God and the other about kings; the household bard then repeated the third song below the entrance of the hall. This is nearly all that the laws contain about bards. There is not a word about the *Ovydd*, or the Druid-bard, nor about the sky-blue dress of the former, the emblem of peace and truth, nor of the white robe of the Druid, nor of the green robe of the *Ovydd*, the color of nature, nor of the robe of the *Awenydd* or bardic student striped with the three colors, nor of the *Gorsedd* or assembly of bards. If any of these things existed in the 12th century, the most brilliant period of Welsh poetry, we should expect to find them in the Welsh laws. But so far from any relics of the ancient Druidic organization having survived at that period, it is probable that even the organization above given from the laws was in part at least the work of *Gruffydd ab Cynan*. They are, in fact, the inventions of later times when Wales had lost its political liberty. We have the first stage of the invention in the Triads, and it seems to have been completed by that extraordinary man Edward Williams, whom we have already mentioned as one of the editors and the principal contributor of the *Myvyrian Archaiology*, who pretended to be the head of the bardic order of South Wales, and accordingly assumed the bardic title of *Iolo Morganwg* from his native county of Glamorgan. He is probably the source whence the Rev. Edward Davies derived the chief part of the material for his marvellous system of Neo-Druidic philosophy. According to the supporters of this system, the religion of the Druids, a medley of sun-worship and Jewish Noachian traditions, the emblems of which were the bull, the horse, and fire, survived the introduction of Christianity, and continued to be believed by the bards, and its rites practised in secret by them. The principal source whence evidence was derived in support of this assumption was the early poems which we have been discussing. Davies gave what he called translations of some of those poems, in which the simplest and plainest phrases are made to express mysterious and abstruse doctrines. In the religious poems which contain such expressions as "Christ the Son," "Merciful Trinity," Mr. Davies omits the latter, or treats them as mere phrases introduced to deceive the uninitiated, and make them believe the pagan bards were Christians. Among the doctrines attributed to the Neo-Druids was that of metempsychosis. The chief source from whence evidence was derived in support of this assumption outside a pretended work called *Barddas*, or treatise on the whole system of the bards, which *Iolo Morganwg* possessed, was the Romance called *Hanes Taliessin*, or history of *Taliessin*, which though partly prose, and therefore coming under the head of the prose romances, of which we shall speak later, may be more conveniently referred to here. A fragment of the Welsh text of this history was given in the *Myvyrian Archaiology;* the whole tale was afterwards published by Dr. Owen Pughe; and Lady Charlotte Guest published it again in the third volume of her *Mabinogion* from two fragments, one dated about 1758, and the other belonging to *Iolo Morganwg*. The romance of the *Hanes Taliessin* in its existing form belongs to the beginning of the 17th century. Of the thirteen poems contained in Lady Charlotte Guest's book, only two are found in the Book of *Taliessin*, the Ode to the Wind and the Mead Song. It is evident that a number of poems attributed to *Taliessin* were floating about in popular tradition, and were strung together in the 16th century into a romance. Although of these so taken up only the two just mentioned find a place in the special manuscript of *Taliessin's* poems in the 14th century, we are not therefore entitled to assume that the other poems did not therefore exist at that period. It is singular that the compiler of the *Hanes Taliessin* did not include such poems as the *Canu y Meirch*, or the Song of the Horses, which would find its place after the account

Neo-Druidism.

of the contest of *Elphin* against the 24 horses of *Maileun*, the Ale Song, which is the counterpart of the Mead Song, the Chair of *Taliessin*, and the Chair of the Sovereign (*Kadeir Teyrnon*). In all these there is no mythology, nor indeed anything indicative of a secret. But when the Elegy of the Thousand Sons, a religious poem on the saints before and after Christ, which is in the Book of *Taliessin*, is believed to contain the doctrine of metempsychosis, any doctrine whatever may be drawn from the Welsh poetry. But while the whole of the Neo-Druidic speculations must be looked upon as fables, it does not follow that there are no mythological allusions in Welsh poems as old as from the 12th to the 14th century. We have already alluded to the occurrence of the name of the goddess *Ceridwen* in two poems in the Black Book attributed to *Cuhelyn*, a bard of the 9th century. The following poems in the Book of *Taliessin* also contain traces of mythology:—Song concerning the Sons of *Llyr ab Brochwel*, the Chair of *Ceridwen* the Spoils of *Annwn*, *Daronwy*, and the *Angar Cyfindawd*. But as the mythology of the poems is intimately connected with that of the prose tales we shall reserve our observations on the subject until we are considering the *Mabinogion*.

Mythological poems.

Influence of *Rhys ab Tewdwr* and *Gruffyd ab Cynan* on Welsh poetry.

Whether the poems we have been hitherto considering were really first written after the 10th century, or, as seems much more probable, were composed at an earlier period and transmitted by popular tradition, their language undergoing the same changes as the spoken language, they must be considered from a merely literary point of view as the products of the period from the 11th to the 13th century inclusive. But apart from those poems there is another and a perfectly legitimate Welsh literature which may be said to have commenced with the restoration of the old royal families of North and South Wales. *Rhys ab Tewdwr*, the reputed legitimate heir to the throne of South Wales, returned from Brittany in 1077, bringing with him no doubt the Armoric legends of the Round Table; and *Gruffyd ab Cynan* came in 1080 from Ireland, where he was born and had been educated, and where he must have become familiar with its poetry and music. Indeed, we know on the authority of Welsh writers that *Gruffyd* reorganized the bards and improved the music, and in other ways gave a great and beneficial impulse to Welsh literature. Among the changes which he effected in the organization of the bards may have been the institution of bardic *Gorsedds* or meetings, of which the modern *Eisteddfod* is an imitation. In Ireland the poets did not, so far as we know, hold separate meetings of this kind, but they took a prominent part in the great periodic gatherings called *Oenachs* or fairs held for a threefold purpose,—for promulgating laws, for public games, and as a market. At these gatherings poems were sung, stories narrated, and prizes awarded.

Poets of the 12th century.

One of the earliest poets whose productions we can be certain of is *Meilyr*, bard of *Trahaearn*, whom *Gruffyd ab Cynan* defeated at the battle of Carno, and afterwards of the conqueror *Gruffyd* himself. His best piece is the Death-bed of the Bard, a semi-religious poem, which is distinguished by the structure of the verse, poetic feeling, and religious thought. *Meilyr* was the head of a family of bards; his son was *Gwalchmai*, one of the best Welsh poets; and the latter had two sons, *Einion* and *Meilyr*, some of whose poetry has reached us. *Gwalchmai* was a true poet, and not a mere professional bard. In his *Gorhoffedd Gwalchmai*, *Gwalchmai's* Delights, there is an appreciation of the charms of nature, the murmuring of brooks, and the songs of birds not unworthy of one of the modern Lake poets. His *Arwyrain i Owain* is an ode of considerable beauty, and full of vigor in praise of *Owain Gwynnedd*, king of North Wales, on account of his victory of *Tal y Moelvre*, part of which has been translated by Gray under the name of "The Triumphs of Owen." This translation, though not very literal, preserves the terseness and boldness of action of the original. *Knyddelw*, who lived in the second half of the 12th century, was a contemporary of *Gwalchmai*, and wrote on a great number of subjects including religious ones; indeed, some of his eulogies have a kind of religious prelude. He had command of words and much skill in versification, but he is pleonastic and fond of complicated metres and of ending his lines with the same syllable. There is a certain obscurity about some of his poems which has given him an importance among the disciples of the Neo-Druidic or bardic philosophy. Among the other poets of the second half of the 12th century may be mentioned *Owain Kyveilwg* and *Howel ab Owain Gwynnedd*. The first-named was prince of *Powys*, and was distinguished also as a soldier. The *Hirlas*, or Drinking Horn, is a rather long poem marked alike by originality and poetic merit. The prince represents himself as carousing in his hall after a fight; bidding his cup-bearer fill his great drinking-horn, he orders him to present it in turn to each of the assembled warriors. As the horn passes from hand to hand he eulogizes each in a verse beginning *Diwallaw di venestr*, "Fill, cup-bearer." Having thus praised the deeds of two warriors, *Tudyr* and *Moreiddig*, he turns round to challenge them, but suddenly recollecting that they had fallen in the fray, and listening as it were to their dying groans, he bursts into a broken lamentation for their loss. The second was also a prince; he was the eldest of the many sons of *Owain Gwynnedd*, and ruled for two years after his father until he fell in a battle between himself and his step-brother David. He was a young man of conspicuous merit, and one of the most charming poets of Wales,—his poems being especially free from the conceits, trivial common-places, and complicated metres of the professional bards, while full of gay humor, a love of nature, and a delicate appreciation of woman. Some of his love-songs especially are charming. There are two other poets, who, though they lived into the 13th century, belonged perhaps more to the 12th, namely, *Llywarch ab Llewelyn* and *Gwynvardd Brycheiniog*. Mr. Stephens attributes the Songs of the Pigs to the former, and believes that the poet covertly alludes to the events which occurred in the reign of *Llewelyn ab Iorwerth*, grandson of *Owain Gwynnedd;* but as this poem occurs in the Black Book it can hardly be the work of *Llywarch*. The poems which are distinctly referred to him are marked by much power of delineation and poetic feeling, of which his address to *Llewelyn ab Iorwerth* affords a good instance. The Welsh poets, as we have said, went circuit like their Irish brethren, staying in each place according as hospitality was extended to them. When departing, a bard was expected to leave a sample of his versification behind him. In this way many manuscripts came to be written, as we find them, in different hands. The Irish manuscript known as the Book of Fermoy is just such a book kept in the house of David Roche of Fermoy in the 15th century. *Llywarch* has left us one of those departing eulogies addressed to *Rhys Gryg*, prince of South Wales, which affords a favorable specimen of his style. *Gwynvardd Brycheiniog's* poem on St. David, in which he enumerates all the churches dedicated to the saint, is a typical example of a kind of topographical poem abounding in Irish. There is an early anonymous example of this kind of poem in the Black Book, the *Englynnionn y Bedeu*, The Verses of the Graves, which is the exact counterpart of the Irish Lay of the *Leachts*, and some other poems of the same kind.

Poets of the 13th century.

The following are a few of the poets of the 13th century whose poems are still extant. *Davydd Benvras* was the author of a poem in praise of *Llewelyn ab Iorwerth;* his works, though not so verbose or trite as bardic poems of this class usually are, do not rise much above the bardic level, and are full of alliteration. *Elidyr Sais* was, as his name implies, of Saxon origin, and wrote chiefly religious poetry. *Einiawn ab Gwgawn* is the author of an extant address to *Llewelyn ab Iorwerth* of considerable merit. *Phylip Brydydd*, or Philip the poet, was household bard to *Rhys Gryg* (*Rhys* the hoarse), lord of South Wales; one of his pieces, An Apology to *Rhys Gryg*, is a striking example of the fulsome epithets a household bard was expected to bestow upon his patron, and of the privileged domesticity in which the bards lived, which as in Ireland must have been fatal to genius. *Prydydd Bychan*, the Little Poet, was a South Wales bard, whose extant works consist of short poems all addressed to his own princes. The chief feature of his *Englynnionn* is the use of a kind of assonance in which in some cases the final vowels agreed alternately in each quatrain, and in others each line ended in a different vowel,—in both cases with alliteration and consonance of final consonants, or full rhyme. *Llygad Gwr* is known by an ode in five parts to *Llewelyn ab Gruffyd* written about the year 1270, which is a good type of the conventional flattery of a family bard. *Howel Voel*, who was of Irish extraction, possessed some poetical merit; his re-

monstrance to *Llewelyn* against the imprisonment of his brother *Owain* is a pleasing variety upon the conventional eulogy. It has many lines commencing with the same word, *e.g.*, *gwr*, man. The poems of *Bleddyn Vardd*, or *Bleddyn* the Bard, which have come down to us are all short eulogies and elegies. One of the latter on *Llewelyn ab Gruffyd* is a good example of the elaborate and artificial nature of the Welsh versification. There are seven quatrains, the first, second, and fourth of which all end in *-af*. With the exception of the first and last stanza the first three lines of each stanza begin with *gwr*, man, or a compound of it, "manly." The second, third, and fourth lines of the first stanza also begin in the same way; the fourth line is a kind of refrain, which in the first two stanzas begins like the other lines with *gwr* or a compound of it; in the third and last it begins with *yn*, and in the fourth, fifth, and sixth with *hyd*. The best of all the poets of the century was *Gruffyd ab yr Ynad Coch*, whose elegy, notwithstanding its alliteration and conventional use of the same initial word, or of words having the same fore-sound, has the ring of true poetry. His religious poems, too, possess considerable merit. But of all the religious poems in early Welsh we have seen, that which best deserves the name is one written by *Madawc ab Gwallter*.

Poets of the 14th century.

The death of *Llewelyn* and the subjugation of all Wales, and especially the social and other internal changes which took place in the Principality, necessarily checked literary efforts. A general revival took place, however, in the time of *Owain Glyndwr* and the Wars of the Roses, with which the Welsh had much to do. In the meantime a considerable improvement had taken place in the æsthetic feeling of the people. The bardic system, which had helped to raise the Celtic people in their tribal stage above other barbarous peoples, but which at a later period had fettered their intellectual and political development, was, at least so far as regards exclusive privileges, at an end: inter-tribal wars had ceased, and great improvements in the houses, churches, dress, and food of the people had taken place. Love supplanted war as the theme of song, and much attention was paid to language and versification. Nature, too, was made a theme of poetry by several poets. We have already had occasion to notice some examples of this love of nature; but at the period we are now considering, one cannot help being struck with the power of observation of natural phenomena, and the keen sense of objective natural beauty, which many Welsh poets exhibit; nor is there wanting the higher poetic feeling of subjective beauty. These high qualities are, it is true, often marred by artificial systems of versification. Among the poets who flourished in the 14th century, the following may be mentioned. *Gwilym Ddu* is the author of two odes to the unfortunate Sir *Gruffyd Llwyd*, one of which, the Odes of the Months, written in 1322, was composed while the subject of it was in prison. Forty-three out of sixty-three begin with the word *neud;* it is, moreover, strongly alliterated, and many of the lines end in *-ed*. He is also the author of an elegy on the poet *Trahaearn*, son of *Gronwy*, a contemporary poet. This poem, which is a panegyric on Welsh poets past and present, is skilfully constructed. A considerable number of writers of love *Englynnionns* flourished at this time, among whom may be specially mentioned *Iorwerth Vychan*, *Casnodyn*, who is believed to be the same as the foregoing *Trahaearn*, and *Gronwy ab Davydd*, who was probably the father of the latter. But the representative poets of this period are *Rhys Goch ab Rhicert* and *Davydd ab Gwilym*. The verses of the former to a Maiden's Hair, though strongly alliterated and rhymed, are smooth and less intricate and conventional than most poems of the period, and possess a good deal of the character of the love romants of the time in Southern Europe, with which he undoubtedly was acquainted. Both *Rhys Goch* and *Davydd ab Gwilym*, the Cambrian Petrarch, as he has been called, were great lovers of nature, and no modern poets sing more sweetly of the woodland, wild-flowers, the voice of birds, and other charms of the country. It is amidst such scenes they place their lovers, who are real swains and maids, and not the mock ones of the pastoral poetry of the 18th century. Two hundred and sixty-two poems, chiefly pastoral, of *Davydd ab Gwilym* are said to exist, some of which, as for instance his exquisite Ode to Summer, would be worthy of any literature.

The most distinguished poet of the 15th century was *Lewis Glynn Cothi*, more than one hundred and fifty of whose poems are known. The period of the civil wars in the 17th century had its poets, the best known of whom, *Huw Morus*, was on the Royalist side. Since then a new literature has grown up, which, however, lies outside the scope of this article.

Poets of the 15th century.

We have already alluded to the probability of the tales in verse, whether historical or romantic, being earlier than those in prose. Most of the heroes of the earlier poems, whatever may be their real age, are also the subjects of prose tales. In the poems, as a rule, if there be any definite picture of the actors, they appear as men, and there is very little necromancy surrounding them; the prose tales, on the other hand, are full of marvels and magical transformations. In the older prose tales there is a certain unity in the personages and events; gradually two or more streams of romance mingle, as in MacPherson's Ossian. The Welsh prose tales all belong to South Wales; the poems, on the other hand, belong to a large extent to North Wales. The prose tales which still exist are few in number, and are evidently only a small part of those which were once current. The reason of the small number of prose tales preserved, as compared with the very large number of poems, is doubtless to be explained by the fact that the poets were a privileged class, who formed part of the households of the lords; while the prose tales were chiefly told by the strolling minstrels, against whom, and not against the bards properly so called, so many severe enactments were made. The privileged bards despised the tales of the story-teller, and hence, unfortunately for the history of romance and of comparative mythology, so few have been preserved.

Prose tales.

In the Red Book there are eleven prose tales, which have been published by Lady Charlotte Guest, together with the *Hanes Taliessin*, of which we have spoken above, under the name of *Mabinogion*, though that name is applied in the Red Book to four only. We may classify them thus according to their origin. I. Roman-British—(1) The Contention of *Lludd* and *Llevelys;* (2) The Dream of *Maxen Wledic*. II. Irish Romances—(3) The Tale of *Pwyll*, Prince of *Dyved;* (4) *Branwen*, daughter of *Llyr;* (5) *Manawyddan*, the son of *Llyr;* (6) *Math*, son of *Mathonwy*. III. Arthurian Romances—(7) The Lady of the Fountain; (8) *Peredur*, son of *Evrawc;* (9) *Geraint*, son of *Erbin*. IV. Mixed Romances—(10) The Story of *Kilhwch* and *Olwen;* (11) The Dream of *Rhonabwy*. To the category of mixed romances may also be added, as a third kind, the story of the St. Graal contained in a Hengwrt manuscript.

Classification of prose tales.

The first story relates to *Lludd*, son of *Beli* the great, son of *Manogan*, who became king after his father's death, while his brother *Llevelys* becomes king of France, and shows his brother how to get rid of the three plagues which devastated Britain:—first a strange race, the Coranians, whose knowledge was so great that they heard everything, no matter how low soever it might be spoken; second, a shriek which came into every house on May eve, caused by the fighting of two dragons; and third, a great giant, who carried off all the provisions in the king's palace every day. The second relates how *Maxen* or Maximus, emperor of Rome, has a dream while hunting, in which he imagines that he visits Britain, and sees a beautiful damsel, Helen, whom he ultimately succeeds in finding and marrying. The personages of this tale are mentioned in the earliest form of the *Brut Gruffyd ab Arthur*, but the account is different. Both tales seem to be British, and to be traceable to Roman times.

Roman-British tales.

We have called the second group Irish romances, not only because the action in some of them is placed occasionally in Ireland, and some of the actors are distinctly stated to have been Irishmen, but because they are unmistakably relics of the period of the occupation of the coast of Wales by the *Gwyddel* or Irish. The group of four romances form a cycle of legends, and are the only ones called *Mabinogion* in the manuscript from which they have been taken. In the first tale the principal characters are *Pwyll*, prince of *Dyfed*, and *Arawn*, king of *Annwn* or *Annwyvn;* in the second *Bran* and *Manawyddan* the sons, and *Branwen* the daughter, of *Llyr*, and *Matholwch*, king of Ireland; in the third *Manawyddan*, son of *Llyr*, and *Pryderi*, son of *Pwyll;* and in the fourth *Math*, son of *Mathonwy* king

Goidelic romances or *Mabinogion*.

of *Arvon* and *Mona*, *Gwydyon ap Don* and *Arianrod* his sister, and *Llew Llaw Gyffes* and *Dylan eil Ton*, the sons of *Arianrod*. These personages are mentioned in several of the poems attributed to *Taliessin*, in whose reputed works curiously enough the relics of the ancient mythology are chiefly found. Among these poems we may mention the following, some of which are in the Book of *Taliessin*, while others are not:—*Kadeir Kerrituen*, or the Chair of *Ceridwen*; the Spoils of *Annwn*; the *Kat Godeu*, the Battle of *Godeu*; *Marwnat eil Ton*, the Death Song of *Dylan*, son of the wave; *Daronwy*; *Angar Cyfindawd*; the story of *Llyr ab Brochwel Powys*;—in other words, all the so-called mythological poems. In these tales and poems we have undoubtedly the relics of the ancient Irish mythology of the *Tuatha Dé Danann*, sometimes mixed with later Arthurian myths. The *Caer Sidi* is the *Síd* of Irish mythology, the residence of the gods of the *Aes Síde*. The seven other *Caers* or residences mentioned in the poem on the Spoils of *Annwn* are the various *Síde* of the immortals. *Llyr* is the Irish sea-god *Lêr*, and was called *Llyr Lledíaith*, or the half-tongued, implying that he spoke a language only partially intelligible to the people of the country. *Bran*, the son of *Llyr*, is the Irish *Bran Mac Allait*, *Allat* being one of the names of *Lêr*. This *Bran* is probably the same as *Brian*, son of *Tuirenn*, though according to the Irish genealogies, *Brian* would be the nephew of *Lêr*. *Manawyddan ap Llyr* is clearly the *Manandan* or *Manannan Mac Lir* of Irish mythology. In one derivation of his name, if correct, we have a most important link in these romances. According to this etymology, *Manannan* comes from *Man*, lord, and *Annan*, of the foamy sea, *Lêr*, his father's name, meaning also the sea. In *Annan* we would have the *Annwn* of the poems, and of the story of *Pwyll*, and commonly identified with hell, but really corresponding to the *Tir Tairngire* or Elysium of the Irish. *Rhiannon*, the wife of *Pwyll*, who possessed marvellous birds which held warriors spell-bound for eighty years by their singing, comes from *Annwn*, and her son *Pryderi* gives her, on the death of *Pwyll*, as a wife to *Manawyddan*. With *Annwn* or *Annwvyn* we naturally connect the Irish *Ana*, the mother of the gods, or *Mór Rígu*, and wife of the *Dagda*. She was the mother of *Aed*, the Welsh *Aed Mawr*, and was probably the same as *Ceridwen*. In a previous part of this article we have made the *Dagda* the same as *Delbaith Dana* or *Tuirenn*, the father of *Lêr*; if we are right in our conjecture, *Ana* would be the mother of *Lêr*, the sea, as well as of *Aed*, fire. *Rhiannon*, daughter of *Heveydd Hên*, and wife of *Pwyll*, and afterwards of *Manawyddan*, is perhaps also to be connected with *Ana* and *Annwn*. Again, the *Caer Sidi* above mentioned, where neither disease nor old age affects any one, is called the prison of *Gweir* in one of the poems. This *Gweir*, we have no doubt, represents *Gaiar*, son of *Manandan Mac Lir*, the Atropos who cut the thread of life of Irish mythology. In one legend *Gaiar* is made the son of *Uisle* and of *Deirdriu*, celebrated in the story of the sons of *Uisnech*, and the foster son of *Manandan*, who aids him in banishing *Conchobar Mac Nessa* to Alba on account of his killing the sons of *Uisnech*, and becoming king of Ulster in his place. Afterwards, *Gaiar* relinquishes the kingship by the advice of *Manandan*, who takes him to *Emhain Abhlach*, or *Emain* of the Apple-trees, where he dies. *Gaiar's* sister *Aeb-greine*, the Sunlike, married *Rinn*, son of *Echaid Iuil* of *Tir Tairngire*, or the Land of Promise. This *Rinn* takes part in the contests between the swineherds of *Ochull Ochne* and *Badb*, chiefs of the rival *Síde*, who after a series of metamorphoses become the *Finnuenduch*, or bull of Connaught, and the *Donn Cualngiu*, the celebrated bull of the *Táin Bó Cuailnge*. *Math*, son of *Mathonwy*, may be connected with *Mat*, the great Druid of the *Tuatha Dé Danann*. The necromancer *Mathene* or *Lonán*, the companion of *Art*, of whom we shall have something to say presently, may be a relic of the older mythology. Nor should we forget to mention in connection with this name that the mother of Queen *Medb* or Mab was *Mata Muirisc*. The *Llew Llaw Gyffes* of the tale of *Math*, son of *Mathonwy*, is *Lug Lám Fada*, king of the *Tuatha Dé Danann*, whose mother was *Ethlenn* or *Cethlenn*, daughter of *Balor* of the Evil Eye, a Fomorian chief. This *Lug* was known by several names, among which was that of the *Sab Ildanach*, or Skilful Pillar, because he knew or supported all arts, a name which connects him with *Illanach* or *Ildanach* (Skilful), son of *Manandan*. *Lug*, according to Irish legends, was the first who introduced fighting on horseback into Ireland, and who established funeral games. *Gwydyon*, son of *Don*, who fills so important a part in the early Welsh poems and tales, was the brother of *Arianrod*, the mother of *Llew Llaw Gyffes* and of *Dylan*, Son of the Wave, and the grandson of *Daronwy*, the son of *Brynach* or *Urnach Wyddel* by *Corth*, daughter of *Brychan*, by which another line of legend, originating also in Ireland, is brought into connection. *Gwydyon* is an enchanter of wonderful power, his master being *Math*. He produces a woman from blossoms, and the forms of horses from springing plants. The tale of *Math*, son of *Mathonwy*, is full of such transformations as those of the swine-herds in the preface to the *Táin Bó Cuailnge*. There are also similar transformations in the poem of the *Kat Godeu*, or Battle of *Godeu*. The Milky Way is called *Caer Gwydyon*; the constellation Cassiopeia is *Llys Don*, the court of *Don*; and the Corona Borealis is *Caer Arianrod*, the residence of *Arianrod*, daughter of *Don*, and mother of *Llew*. Thus *Arianrod* is the same as *Ethlenn*. There are several *Dons* or *Donns* in Irish romance:—the chief of the Munster fairies, or people of the *Síde*, was *Donn Firinne* of *Cnoc Firinne*, now Knockfierna, in the west of the county of Limerick; *Donn Dumhach*, or *Donn* of the sandbank at the mouth of the *Eidhneach* near Ennistymon, in the county of Clare, and *Donn Chnuic na n-Oss*, now Knockanoss, in the county of Cork, were also chiefs of *Síde*. These examples show that *Don*, the father of *Gwydyon*, may be connected with the *Aes Síde*. *Manandan Mac Lir* had a son who was *Ech-Don Mór*, or the great *Ech-Don*, who is probably the *Donn* mentioned in the Fennian *Agallamh na Senorach*, or Dialogue of the Sages, as having been slain by a certain *Derg Dianscothach* in a war between *Ilbhreach* of the *Síd* of *Eas Ruadh* and *Lêr* of *Síd Finnachaidh*. It may be remarked here that whenever the *Aes Síde* are brought into the Fennian romances there is generally some confusion. Thus in the romance just mentioned *Lêr* is represented as at war with *Ilbhreach*, who in the genealogies is made the son of *Manandan*. Before leaving those curious tales, it will be better to discuss one of the mixed romances, The Story of *Kilhwch* and *Olwen*. By mixed romance we mean one in which two distinct streams of legends have mingled. The one just mentioned belonged originally to the same class of legends as the four *Mabinogion* we have been discussing, but it got mixed up with the Arthurian romance. *Kilhwch* asks for wife *Olwen*, the daughter of *Yspaddaden Penkawr*, who imposes upon him a number of tasks before he would give him his daughter, the final one being to fetch the comb and scissors which were between the ears of the *Twrch Trwyth*. All these he effects through the aid of his cousin Arthur. Among the personages mentioned are—*Amaethon*, son of *Don*, who is represented as a great husbandman, and *Govannon*, son of *Don*, a smith. Among the actors are *Gwyther*, the son of *Greidawl*, who is betrothed to *Creiddylad*, daughter of *Lludd Llaw Ereint*, that is Cordelia, daughter of Lear. *Gwen Ap Nudd*, however, carries off *Creiddylad*, but Arthur makes peace between them, the condition being that the maiden should be restored to her father's house, and *Gwen* and *Gwyther* should fight for the yellow-haired maiden on the first of May each year. This very curious tale is altogether based on Irish mythology. *Govannon* is *Goibniu*, the Irish Vulcan, the brother of *Diancécht* or *Dia na-cécht*, the god of the powers (of healing). *Creiddylad* is the Irish *Creide* of *Tir Tairngire*. The *Twrch Trwyth* is the Irish *Torc Triath*, the King Boar. Indeed the story puts him in Ireland, and says that he cannot be hunted without *Garselit* the *Gwyddelian*, the chief huntsman of Ireland. This king boar belonged to *Brigit*, the poetess daughter of the *Dagda*, the Minerva of the Irish. *Nudd*, the father of *Gwen*, is apparently *Neit* (battle), the god of war, and *Kilhwch* himself seems to represent *Coin Ceallach*—son of *Delbaith*, son of *Neit*, the god of war—who received the name *Eladan* (art, skill) in consequence of the skill he displayed in preparing ropes for capturing *Masau*, king of Britain.

Mixed romances.

By an Arthurian romance we mean a tale in which Arthur is a chief hero, and the scene of which is laid in Wales or South England. The legends of Arthur in this sense belong chiefly to South Wales, and must have originated there in great part, though they were afterwards much modified by new elements introduced from Armorica by *Rhys ab Tewdwr* and his followers at the end of the 11th century. At this period

Arthurian romances.

Condition of S. Wales at end of 11th century.

South Wales was more civilized than North Wales, because less mountainous and more fertile, and also because it had considerable intercourse with France. These very circumstances led to its conquest by the Normans earlier than North Wales, which maintained its independence nearly a century longer. Before the advent of the Normans in South Wales, stone-built castles and churches existed, but they erected much stronger and more splendid castles, and the clergy whom they introduced built fine churches and great abbeys. The Norman castles and walled towns and trained men at arms, always ready for war, must have afforded more protection to commerce and agriculture than it could enjoy under the Welsh tribal system. The wants of the new nobility, too, were greater, their courts were more splendid, their dresses and arms more costly than those of Welsh princes; and corresponding splendor was introduced into the ceremonies of the church. The Norman baron was not prouder, but he was graver and more courtly than the Welsh lord. All these things acted on the popular stories and gradually transformed them, as manners improved, into elegant romances of chivalry. The abundant materials of romance which existed in Wales were the property, so to say, of the strolling minstrels and peasantry, and were despised by the lettered bard with whose poems the popular tales competed. Carried into Armorica, they became, as it were, ennobled, and assumed a more polished and courtly form; and when brought back by *Rhys ab Tewdwr*, almost entirely displaced the conventional poems of the bards, which were chiefly eulogies of the living, and elegies of their dead patrons. This is the reason why South Wales produced so few poems from the 12th to the 15th century. These romances were soon translated, or rather new ones constructed upon the same themes, by the Norman Jongleurs, who soon spread them among the Norman nobility everywhere. The heroes of *y Gogled* were well adapted to serve as actors in the courtly romances. They appear in the poems which we have discussed above as so many lay figures upon which to put the rich dresses and armor of the Normans, and who might be put into a fine castle anywhere without incongruity. The necromancy seems to have been largely borrowed from the Irish legends, a great many of which, of the same character as the Mabinogion, must have still existed in the 12th and 13th centuries.

Origin of the Arthur romance.

The position assigned to Arthur in romance is due to accident. No one of the name occupied so prominent a position in the north as to give him of right the place occupied by Arthur in those productions. Some tale or ballad, in which a hero called *Artur* was the chief actor, might have had perchance the necessary elements for popular success; and around this as a nucleus gathered the legends of other *Arturs*. One of the sons of *Aedan Mac Gabran*, killed at the battle of *Cattraeth*, was named *Artur;* and there were doubtless many others of the name, both Scots and Britons. The name *Art* has a place in Irish romance also. Thus *Art*, "the lone man," son of *Conn* of the Hundred Battles, was beloved on account of his great fame by *Becuma* of the fair skin, wife of *Labrad* of the quick-hand-at-sword, and probably the same as *Etain*, a goddess already so often mentioned, and who had been unfaithful with *Gaiar*, son of *Manandan Mac Lir*. *Becuma*, driven out of *Tir Tairngire* or Elysium on account of her offence, is sent adrift in a boat, and lands on the Hill of Howth in Ireland, where, under the name of *Delbh Caemh*, daughter of *Morgan*, she presents herself to *Conn* and marries him. She next insists on the banishment of *Art* from Tara. Evil, however, comes on the country on account of *Conn's* marriage, and the Druids announce that it could only be averted by sprinkling the blood of the son of an undefiled couple on the door posts. *Conn* sails away in search of such a youth, finds him in *Tir Tairngire*, Elysium, and brings him to Ireland. Then we have a scene of exactly the same character as that told of *Gortigern*, but the boy is ultimately saved from immolation by the appearance of his mother, who tells them they must banish *Becuma*. The latter then plays a game of chess with *Art* the son of *Conn*, and he wins, and imposes upon her the obligation of getting the champion's wand which was in the hand of *Curoi Mac Daire* when making the conquest of *Eriu*, and of the whole world. She visits the *Side*, and at length finds it, and brings it to *Art*. They play again, and this time *Becuma* wins, and sends him in search of *Delbh Caemh*, daughter of *Morgan*, *i.e.*, herself, whom he would find in an island in the middle of the sea. He sails away, and arrives at a beautiful island full of apple-trees, flowers, birds, and spotted horses; in which too there were joyous, ever-blooming women, and *Crede*, the ever beautiful. Again *Art* was named *Oenfhir*, "the lone man," because his brother *Condla*, "the beautiful," being invited by a *Ben Side* to rule over *Magh Mell*, "the plain of honey in the Land of Promise," went thither and left him without a brother. *Art* is also credited with having anticipated Christian belief; and consequently it is supposed that neither he nor his son *Cormac* was buried in the pagan cemetery on the River Boyne.

Growth of the Arthurian fable.

It should be remembered that this *Art* lived either at the beginning of the Scotic invasions of Roman Britain, or immediately before that period, for his son *Cormac*, according to Irish legends, was expelled from Ireland, and, going over the sea, obtained the sovereignty of Alba, and his fame must have been carried into Wales, where he must have been the subject of many legends. These legends were the nucleus around which gathered all the floating traditions which came down from the north into North Wales, and thence into South Wales. Some obscure Arthur of the north, perchance *Aedan's* son, was clothed in the legendary glory of *Art*, and was made a *Gwledig* or generalissimo, and paramount king of Britain. From South Wales these legends passed into Cornwall and Armorica, where it is probable the Round Table was invented or borrowed in the same way that at a later period the legend of the St. Graal, which there is reason to believe originally came from Provençe, was carried by the Jongleurs into Brittany, and thence into Wales. If the preceding view be correct, the Arthurian legends attained considerable development in Wales before the Round Table was developed, and were carried by itinerant story-tellers and musicians among the Normans before Geoffrey of Monmouth wrote his history. That book gave a value to the popular tales which they otherwise could never have attained, and afforded a key by which to correct them. To the Norman clerics the romances owe their polish, and to a large extent their chivalry. But the germs of mediæval chivalry, and even of knight-errantry, were already in the original legends, associated, no doubt, with much barbarism.

Other Welsh literature.

Besides the *Bruts*, poems, *Mabinogion*, genealogies, and some miscellaneous pieces including a few legendary lives of saints and the grammatical works alluded to in a preceding part, the only other early works in the Welsh language which have been printed, are two medicine books and a music book. The two medicine books belonged to a family of leeches of *Mydvai* in Carmarthen, descended from *Rhiwallon*, family leech to *Rhys Gryg* or *Rhys* the Hoarse, prince of South Wales in the 13th century. The oldest of the two books is in the Red Book, and may possibly have been copied from the Book of *Rhiwallon* himself, or of his sons; the second is the Book of *Howel Veddyg*, or Howel the Leech, a descendant of *Einion*, son of *Rhiwallon*, and was written probably towards the end of the 17th century. Both books are mere dispensatories, and contain very little which would enable us to judge of the theoretical knowledge of disease possessed by the Welsh leeches, and cannot represent the real state of leechcraft in Wales in the 16th and 17th centuries. In Wales the practice of leechcraft was, as in Ireland, hereditary in certain families, who held land by the tenure of medical service. The rank and privileges of the family leech to the king are given in the Welsh laws; and in Wales he was obliged, as in Ireland, to take a guarantee from the kindred of his patient equal to the sum which should be paid for the homicide of a man of his rank, in case he might happen to die from his treatment, otherwise he should answer for his death. The music book, published in the *Myvyrian Archaiology*, which is believed to contain some of the ancient music of Wales, and a peculiar system of musical notation, contains merely the music of the lute or some stringed instrument, perhaps the Welsh *Crwth* or Crowd, with the notation in common use for such instruments in every part of Europe, and there is no evidence that it contains any of the ancient music of Wales.

Medicine.

Music.

The literature of the Cornish dialect of the British, which

CORNISH LITERATURE.

was once the spoken language of the centre and south of England, is very limited indeed. There is first the *Pascon Agan Arluth*, The Passion of our Lord, consisting of 259 stanzas, each of which is a quatrain of four double lines, in rhyme, or eight single heptasyllabic lines with alternate rhymes, the final vowel and consonant in the rhymes being almost always the same in each stanza. This important monument of the Cornish language has been printed with a translation by Mr. Whitley Stokes. Secondly, there is the *Ordinalia*, a MS. of which is in the Bodleian Library, Oxford. It forms a dramatic trilogy, consisting of three miracle plays—the Beginning of the World, the Passion, and the Resurrection of our Lord. The latter piece is divided into the Resurrection and the Ascension, with a curious interlude of the putting of Pilate to death. These dramas are founded on the Gospels, the Acts of the Apostles, the apocryphal Gospel of Nicodemus or Acts of Pilate, and several legends which were current all over Europe in the Middle Ages. They are probably translations or adaptations of French miracle plays of the end of the 14th century. The metre is syllabic, with few exceptions, each line having seven syllables, like the lines of the poem of the Passion. A great many of those lines are arranged in stanzas of eight or of four lines, with alternate rhymes, as in the poem just mentioned; others in stanzas of six, in which the third rhymes with the sixth, and the others together or in pairs. Occasionally there are eight-lined stanzas, in which the first, second, and third lines, and the fifth, sixth, and seventh lines form triplets, rhyming together or separately, and the fourth and eighth lines rhyming together. In lyric and declamatory passages, the lines are occasionally only tetrasyllabic. There are many other varieties of metre, but those here described make up more than three-fourths of the whole. The late Mr. Edwin Norris published the *Ordinalia* with a translation under the title of the "Ancient Cornish Drama." The third relic of the Cornish language is a miracle play founded upon the life of St. *Meriasek*, son of a duke of Brittany, and called in Breton *St. Meriadec*. This piece, which was written in 1504, was found a few years ago by Mr. Whitley Stokes among the Hengwrt manuscripts at Peniarth. The language is newer than that of the *Ordinalia*, the admixture of English being also greater; the metre employed is, however, much the same. The fourth work is also a miracle play, The Creation of the World, with Noah's Flood, written in 1611 by one William Jordan. It is written in a more corrupt language than those above mentioned, is full of English words, and imitates, in some instances almost copying, passages in the *Ordinalia*. The remaining literature consists of two versions of the Lord's Prayer, the Commandments, and the Creed, and two indifferent versions of the first chapter of Genesis, a few songs, a short tale, and a few proverbs, and lastly a Cornish Glossary, explanatory of Latin words. The oldest copies of the poem on the Passion is a vellum manuscript in the British Museum of the 15th century; the age of the principal manuscript of the dramatic trilogy is about the same. The Glossary is the most ancient monument of the Cornish language, for the manuscript which contains it belongs probably to the end of the 12th or beginning of the 13th century; and it was copied into this from a more ancient MS. The miracle plays, as we learn from Carew's *Survey of Cornwall*, printed in 1602, were played down to the beginning of the 17th century, in earthen amphitheatres in the open fields as in France and Germany, which in the 18th century, when Borlase wrote, were popularly known as "Rounds."

ARMORIC OR BRETON LITERATURE.

Armoric like Welsh is a living language, but no monument of the old form of the language exists, and the relics of Middle-Breton literature consist of two miracle plays, a prayer-book or "Hours," a dictionary, and the chartularies of two monasteries. Of this small list only one of the plays and the dictionary are known to exist in early manuscript originals or copies. The play, which is founded on the life of St. Nonna or Nonita, is in a paper manuscript, which has been purchased by the National Library at Paris, and is believed by Zeuss to belong to the 14th century. This piece, which, with the chartularies of Rhedon and Landevin, was the principal source whence Zeuss drew the materials for the Armoric part of the *Grammatica Celtica*, was published together with a translation in 1837, under the title of *Buhez Santez Nonn*. The second play, the *Burzud braz Jezuz*, the Great Mystery or Miracle of Jesus, is also referred to the 14th century, but no manuscript of it is known to exist. M. Hersart de la Villemarqué has reprinted it from copies, probably unique, of two editions printed in Paris in the years 1530 and 1622. It consists of two parts—the Passion and the Resurrection, and is treated somewhat differently from the corresponding parts of the Cornish trilogy. It possesses some literary merit, which the elegant translation of the editor does ample justice to. Only two copies of the "Hours," printed apparently in 1524, are known. From these Mr. Whitley Stokes has recently reprinted it, adding extracts from a missal printed in 1526, and a catechism printed in 1576. One of the most valuable of the Middle-Breton documents is the Breton-French and Latin Dictionary of Jean Lagadeuc or Lagadec, curé of Ploegonen, a manuscript of which, extending to the middle of the letter P, dated 1464, is in the National Library of Paris. Under the title of *Le Catholicon* it has been printed several times, the earliest edition being that of 1499.

Miracle-plays died out in France and England in the 16th century, but in Cornwall, as we have seen, they continued to be played down to the beginning of the 17th century, and in Brittany almost down to our own time. The Great Mystery of Jesus, modernized and otherwise altered, was in great repute in the 18th century. One of the widest known and most popular mysteries which have come down to modern times is that of St. Tryphine and King Arthur, which M. Luzel has published. The language is more modern than in the two plays above mentioned, and is largely mixed with French expressions, hence we did not include it among Middle-Breton documents. The Breton miracle-plays, as well as the Cornish ones, are free to a great extent from the disgusting realism, coarse expressions, and indecent buffooneries of the English and French plays of the 15th century.

Although modern Breton literature, like modern Welsh literature, is outside the scope of this article, we should except from this category popular poems and tales, for, though modern in form, they contain materials for comparative mythology and linguistic studies, and exhibit the whole intellectual life, belief, and customs of the people, and the impressions which the events of their history have left on the popular mind. Of such collections the most important is M. de la Villemarqué's *Barzaz Breiz*, the fruit of many years' labor in every part of Lower Brittany. This collection consists of *gwers*, or short heroic, historical, or mythological ballads; *sons*, or love and festive songs; and religious poems. The language is, of course, modern, but is full of archaisms, showing very well how old poetic material becomes modified in the current of popular tradition. The Breton text is accompanied by an elegant translation into French, an introduction and notes, and in the sixth edition all the pieces have the original airs noted. Mr. Tom Taylor published in 1865 a translation of the *Barzaz Breiz*. M. M. F. Luzel, already well known as the author of a volume of excellent Breton poetry (*Bepred Breizad*, Morlaix, 1865), and by his edition of *Sainte Tryphine et le roi Arthur*, published in 1868 a volume of *gwers* or popular ballads collected in a part of the ancient diocese of Tréguier, under the name of *Gwerzion Breiztzel*. Similar collections have been made in other parts of Brittany, especially by MM. Penguern, G. Milin, Goulven-Denis, &c., which have not, so far as we know, been yet published. M. Luzel has also published some popular tales in the Tréguier dialect, and Colonel A. Troude and G. Milin an interesting collection of seven in the Léon dialect.

In concluding what we have had to say on the literature of the respective dialects, it may be well to add a few words on a subject which belongs to all alike, upon which M. de la Villemarqué has given a short essay by way of introduction to his edition of *Le Grand Mystère de Jesus*, and upon which M. Luzel has also some remarks in his *Sainte Tryphine et le roi Arthur*, namely, the theatre of the Celts. M. de la Villemarqué assumes that there is no evidence of a drama among the Goidelic branch of the Celts, but he thinks that it existed among the British branch, at least in an embryonic state, and refers to the Welsh poems in dialogue as evidence. Mr. Stephens had already[1] drawn attention to these poetic dialogues, *e.g.*, those between *Arthur* and *Gwenhwyvar*, *Gwalchmai* and *Trystan*, *Taliessin* and *Myrtin* (*Myrdin* or Merlin), &c., and given it as his opinion that written dialogue seems

[1] *Literature of the Kymry*, p. 82.

to indicate the existence of drama of some sort, and that dialogues such as those referred to are inexplicable on any other hypothesis. If this argument were admissible, we cannot see how the existence of the dramatic form should be denied to the Irish, inasmuch as dialogue is very frequent in Irish poems and tales. Indeed, the "Fight of *Ferdiad* and *Cúchulaind*," and other episodes of the *Táin Bó Cuailnge*, the *Briáthar chath ban Ulad*, or "Wordy War of the Women of Ulster," the *Siabur charpat Conculaind*, or "Phantom Chariot of *Cúchulaind*," possess as much of the character of incipient drama as any poetic or prose dialogues in Welsh literature. The truth is, however, neither the Welsh nor the Irish had the drama in the proper sense of the word, for the sufficient reason that though, like other Aryan peoples, they may have possessed the germ, it could not be developed among a people who had no civic life. The miracle-plays of the Cornish and Bretons are of foreign and ecclesiastical origin, and merely prove that there existed a closer contact between their churches and the great body of the church in Europe than between the latter and the Irish and Welsh churches. No Welsh miracle-play is known, if there ever was one; nevertheless, it is possible that the words *hud a lledrith*, which are explained "illusion," "phantasm," may have really referred to some exhibition of the kind, though the explanation of those words given in the *Iolo* MSS., upon the authority of a certain *Ieuan Vawr ap y Diwliths*, who, according to Mr. Edward Williams (*Iolo Morganwg*), wrote his treatise on Welsh metres about the year 1180, looks very suspicious. M. de la Villemarqué also alludes to a rustic fête, known as *le jeu de printemps et de la jeunesse*, in which three characters, two young men and one maiden, acted, while the spectators formed the chorus, and repeated the dialogued chants of the principal actors while dancing. Although this fête seems to be a survival of pagan times, and to possess to some extent the elements of an incipient drama, yet in the absence of written monuments or ancient evidence, no argument as to the existence of a native drama among the Celts can be legitimately drawn from it.

Influence of Celtic literature on modern literature.

Celtic literature, although it has no great masterpiece of its own to point to, has exercised a considerable amount of influence on the creations of modern European literature. This influence was exerted by several distinct currents of legends. The first is that of the legends of the *Aes Síde* and those of Queen *Medb* or Mab and the heroic period; of these the existing Irish legends, and the modified form of them in the Welsh *Mabinogion*, give us one type. In Britain this first current, modified and mixed with foreign and especially Teutonic elements, has gone on altering, growing, and decaying until the traces of its origin are almost unrecognizable. It is from this source that much of our fairy mythology is derived, and that Chaucer and Spenser obtained materials. To it also may be traced the legends which formed the groundwork of Shakespeare's immediate sources for King Lear and Midsummer Night's Dream. The legends of the second stream were in reality but modifications of those of the first—all secondary streams of legend must be necessarily but branches of the primitive stream. These legends were translated into Latin at an early period, and thus, while they spread far and wide, and passed into every language of Europe, we are better able to follow the current up to its first sources. These legends are the Irish *Immrams* or Wanderings and the *Físa* or Visions which we described above. The idea of a land without winter, of never-ending day, in which the flowers of spring and summer should coexist with the fruits of autumn, and in which bodily ills and old age should be unknown, is common to all lands and to all times. The belief in perpetual youth and especially of abundance of fruit at all times was spread over all Western Europe, and found expression in the popular legends of *Schlauraffenlande*, *Pays de Cocaigne*, &c. The Irish idea of this kingdom of the dead, an idea common to all the branches of the Celtic race, and to the Teutonic races also, is given us in the descriptions of *Tir Tairngire*, the Land of Promise; *Magh Mell*, the Plain of Honey; and the Country of the *Side*. Thither went several of the heroes of romance —*Cúchulaind*, *Find*, *Conn*, and his son *Art*.

In some legends the land of the *Aes Síde* was reached through caves, as in Virgil's Cave of the Sibyl; in others, and more usually, by water,—it being conceived in such cases as an island. In the legends of *Conn* and *Art* this island lay to the eastward, that being the direction in which all the expeditions of the Irish went, the direction in which lay the wealth of the Roman towns of Britain and the metals for bronze of Cornwall. In early Christian times asceticism carried many to the headlands and islands along the west and south-west coast, and the Land of Promise followed the setting sun. A comparison between the Irish pagan and Christian legends of *Tir Tairngire*, the *terra repromissionis* of the Latin mediæval writers, and those of the Teutonic *Glasberg*, or heaven, shows very clearly the common origin of the two streams. The individual features of the Celtic and Teutonic notions of the kingdom of the dead are the same, though their combinations may differ according to age and other circumstances. The great sea cat and the island of cats in St. Brendan's voyage—the island being also met with in other *Immrams*—are connected with the sacred animal of *Freyja* or *Holda*; the island of black faced dwarfs of the Irish legends reminds us of the dwarfs dwelling in *Glasberg*. Like *Holda*'s soul-kingdom, *Tir Tairngire* was an island hidden in a cloud-mantle, enjoying never-ending day and perpetual fogless summer, full of fine mansions surrounded by grassy, flower-bedecked lawns, whose flowers never wither, abounding in apple trees, bearing at the same time flowers and fruit—a land rich in milk, ale, and pork, whose air was ever filled with sweet music, and whose inhabitants enjoying perpetual youth were of spotless innocence, free from blemish, disease, or death. Of all the qualities of *Tir Tairngire* abundance of apples, the only important fruit known to the northern nations, seems to have been the one which conveyed the highest notion of enjoyment. Hence the soul-kingdom was called by the Welsh the island of apples, *Ynys yr Avallon*, and sometimes *Ynysvitrin* or *Ynysgutrin*, Glass Island, a name which identifies it with the Teutonic *Glasberg*. When these names passed into other languages untranslated, so that their meaning became obscured or forgotten, the kingdom of the dead was localized at Glastonbury, the Anglo-Saxon *Glæstinga burh*. There, according to legend, Arthur lies buried, but another popular tradition has it that he was carried away to the island of *Avallon* by his sister, the fairy *Morgana*, the *Morgue la Fae* of French romance. This *Morgana* is the *Becuma*, "the fair skinned" daughter of *Morgan*, in search of whom *Art*, "the lone man," visits *Tir Tairngire*, as already mentioned. When *Art* reaches the Land of Promise, the lady he finds is *Crede*, "the ever beautiful." In the romance of *Ogier le Danois*, when *Ogier*, who *Morgue la Fae* determines shall be her lover, arrives at the palace of *Avallon*, he finds there besides *Morgana*, her brother King Arthur, and her brother *Auberon*, the Oberon of fairy romance, and *Mallabron*, a sprite of the sea. A curious legend in the vellum manuscript called the Book of Lismore connects *Brendan* with *Crede*. According to this legend a certain tribe king named *Doburchu*, whose wife's name was *Crede*, was transformed through the curse of *St. Brendan* into an otter. Another link in the chain which connects all these legends with Celtic mythology is the introduction of *Brendan* into the curious legend of the irruption of Loch Neagh, beneath which lived in her sun-house *Liban*, probably the same as *Becuma*, and therefore as *Morgana*, whose lapdog was transformed into an otter when she herself became a salmon. In the Christian *Immrams* or Wanderings the pagan soul-kingdom was simply changed into a place where souls were to await the final resurrection. It is probable, however, that a tradition of real wanderings among the rocky and inaccessible islands along the western coast of Ireland and Scotland, and on the ocean itself, served as a nucleus around which gathered and fused together the pagan and Christian notions of the kingdom of the dead. The islands of birds, and the whale serving as an island (in the Latin St. Brendan *Iasconius*, *i.e.*, Irish *iasc-inis*, fish-island), support this view.

The *Fisa*, or prophetic Visions, are merely a different type from the *Immrams* or Wanderings of the same fundamental legends; although perfectly pagan in their origin the better known ones belong to Christian times when the Celtic Soul-Kingdom, and the Christian story of the Day of Judgment, and the Elysium and Tartarus of the Romans, as depicted by Virgil in the sixth book of the *Æneid*, which became known to the Irish as early at least as the 6th century, were fused together. The visions when translated into Latin passed into European languages. The original Irish of some of them is not now known

perhaps some of them were first written in Latin; their thoroughly Irish character, however, and the existence in Irish only of one of the most perfect of them, the Vision of *Adamnán*, lead to the opposite conclusion. The Wandering of St. Brendan, the Purgatory of St. Patrick, and the Vision of Tundale represent three distinct types of the second stream of legends. The first is the way of getting at the soul-kingdom by water, the second by a cave, and the third by a *fís* or vision, which in pagan times would have formed part of the *Filidecht* of the poet. These three legends, which are to be found in every European language in the Middle Ages, constitute three out of the five main sources of the plot of Dante's great poem.[1] The effect of St. Brendan's Voyage upon geographical discovery does not come within our scope, and we shall therefore only add that his island, which was simply the Celtic soul-kingdom, is to be found on maps of the 17th century, and was the subject of an article in a treaty between Spain and Portugal in the 18th.

The third current we have already touched upon. It was formed by the fusion of the legends of *Art*, son of *Conn*, the necromancy of the *Aes Síde*, and the legendary history of the struggles of the Britons and Saxons in the North of England and the South of Scotland, which latter legends supplied heroes, a toponomy, and events. To this stream flowed afterwards, as we have pointed out, the Armorican tributary stream of the Round Table, and the Provençal stream of the St. Graal. The effects of this stream of legend, which in its early course belongs to South Wales, on the literatures of Europe is too well known to require discussion here further than to point to its threefold action:—(1) much of the romantic literature of Europe may be traced back directly or indirectly to those legends; (2) they helped as the vehicle of that element we call chivalry, which the church infused into them, to fashion and mould the rude soldiers of feudal times into Christian knights; and (3) they expanded the imagination, and incited the minds of men to inquiry beyond the conventional notions of things, and thus materially assisted in creating modern society.

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[1] See Villari, *Antiche legende e tradizioni che illustrano la Divina Commedia*, Pisa 1865.

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CEMENTS, substances employed to unite together by their solidification from a soft or liquid state, and without mechanical rivets, things of the same or of different kinds. Stony cements may be natural, as the lime employed for mortar, and the so-called Roman cements; or they may be artificial, as Portland cement, made by calcining mixtures of chalk with clay or river-mud (see Building, vol. iv. p. 411). Roman contains more clay than Portland cement, and sets more rapidly. A good artificial water cement is obtained by heating for some hours to redness a mixture of 3 parts of clay and 1 part of slaked lime by measure. Another hydraulic cement may be made by mixing powdered clay and oxide of iron with water. A very hard stone cement is prepared from 20 parts of clean river sand, 2 of litharge, 1 of quicklime, worked into a paste with linseed-oil. Paper-pulp, mixed with size and plaster of Paris, is used for moulded ornaments. *Keene's marble cement* is plaster of Paris which has been steeped in strong solution of alum or sulphate of potash, and calcined and ground. It is slaked with alum solution when used. In *Martin's cement*, pearl-ash is employed as well as alum. *Parian cement* contains borax. *Selenitic cement* is a mixture of calcined gypsum, sand, and hydraulic lime. A cement used for cracks in boilers is a mixture of clay 6 parts and iron filings 1 part with linseed-oil. For steam-joints, ox-blood thickened with quicklime is employed. The *iron-rust cement* consists of 100 parts of iron turnings, with 1 part of sal-ammoniac; this is an excellent cement for iron-work. For water-tight joints, equal parts of white and red lead are worked into a paste with linseed-oil. A serviceable packing for connecting pipes, making joints, filling cracks in retorts, &c., may be made by adding to asbestos powder enough of liquid silicate of soda to form a thick paste; the composition hardens rapidly, stands great heat, and prevents the escape of acid vapors. Cracks in glass vessels required to resist heat and moisture may be stopped by covering them with strips of hog's or bullock's bladder, which are affixed by means of a paste of caseine dissolved in cold saturated solution of borax; after drying, the repaired portions are made capable of withstanding heat by an outside coating of a mixture of concentrated solution of silicate of soda with plaster of Paris or quicklime.

A strong cement for alabaster and marble, which sets in a day, may be prepared by mixing 12 parts of Portland cement, 8 of fine sand, and 1 of infusorial earth, and making them into a thick paste with silicate of soda; the object to be cemented need not be heated. For stone, marble, and earthenware a strong cement, insoluble in water, can be made as follows: skimmed-milk cheese is boiled in water till of a gluey consistency, washed, kneaded well in cold water, and incorporated with quicklime; the composition is warmed for use. A similar cement is a mixture of dried fresh curd with $\frac{1}{10}$th of its weight of quicklime, and a little camphor; it is made into a paste with water when employed. A cement for Derbyshire spar and china, &c., is composed of 7 parts of resin and 1 of wax, with a little plaster of Paris; a small quantity only should be applied to the surfaces to be united, for, as a general rule, the thinner the stratum of a cement, the more powerful its action. Quicklime mixed with white of egg, hardened Canada balsam, and thick copal or mastic varnish are also useful for cementing broken china, which should be warmed before their application. For small articles, shell-lac dissolved in spirits of wine is a very convenient cement. Cements such as marine glue are mixtures of shell-lac and India-rubber, or of their solutions.

There are various cements for wood. For wooden cisterns a mixture is made of 4 parts of linseed-oil boiled with litharge, and 8 parts of melted glue; other strong cements for the same purpose are prepared by softening gelatine in cold water and dissolving it by heat in linseed-oil, or by mixing glue with $\frac{1}{4}$ of its weight of Venice turpentine. Solution of shell-lac in ammonia has been proposed by Mons. C. Mène for the attachment of caoutchouc to wood and metals. *Mahogany cement*, for filling up cracks in wood, consists of 4 parts of beeswax, 1 of Indian red, and yellow-ochre to give color. *Cutlers' cement* is made of equal parts of brick-dust and melted resin, and is used for fixing knife-blades in their hafts. A cement used in electrical apparatus is composed of 4 parts by weight each of red ochre and beeswax, 20 parts of resin, and 1 part of plaster of Paris; these are melted together till smooth. For covering bottle-corks a mixture of pitch, brick-dust, and resin is employed. A cheap cement, sometimes employed to fix iron rails in stone-work, is melted brimstone, or brimstone and brick-dust. *Japanese cement*, for uniting surfaces of paper, is made by mixing rice-flour with water and boiling it. *Jewellers' cement* contains 3 parts of isinglass made soft in water, and 1 part of gum ammoniacum; these are heated together till a drop of the mixture stiffens immediately on cooling. Gold and silver chasers keep their work firm by means of a cement of pitch and resin, a little tallow, and brick-dust to thicken. *Temporary cement* for lathe-work, such as the polishing and grinding of jewelry and optical glasses, is compounded thus:—resin, 4 oz.; whitening previously made red-hot, 4 oz.; wax, $\frac{1}{4}$ oz. Mastic alone is much employed for cementing and mending gems. In Turkey, jewelry for the ornamentation of weapons and trinkets is secured by a composition thus made:—two small bits of gum galbanum or gum ammoniacum are dissolved by trituration in 2 oz. of a glue prepared by digesting softened isinglass in spirits, and the mixture is incorporated at a gentle heat with a thick alcoholic solution of a little gum mastic. This cement is kept in closely-stoppered phials, which must be immersed in warm water when the cement is to be liquefied for use.

The following works may be consulted:—"On Hydraulic Lime and Cement Stones," in Knapp's *Chemistry applied to the*

Arts and Manufactures, vol. ii., p. 400, *et seq.* (1847); Burnell's *Rudimentary Treatise on Limes, Cements, &c.*, Weale's series (1866); Reid's *Practical Treatise on the Manufacture of Portland Cement* (1868); Cooley's *Cyclopædia of Practical Receipts*, edited by Tuson, pp. 305–311 (1872); Gwilt's *Encyclopædia of Architecture*, edited by Papworth, §§ 1863 *et seq.*, 2231i, 2251a *et seq.* (1876).

CEMETERY (*κοιμητήριον*, from *κοιμάω*, to sleep), literally a sleeping-place, was the name applied by the early Christians to the places set apart for the burial of their dead. These were generally extra-mural and unconnected with churches, the practice of interment in churches or churchyards being unknown in the first centuries of the Christian era. The term cemetery has, therefore, been appropriately applied in modern times to the burial grounds, generally extra-mural, which have been substituted for the overcrowded churchyards of populous parishes both urban and rural.

From 1840 to 1855, attention was repeatedly called to the condition of the London churchyards by correspondence in the press and by the reports of Parliamentary committees, the first of which, that of Mr. Chadwick, appeared in 1843. The vaults under the pavement of the churches, and the small spaces of open ground surrounding them, were literally crammed with coffins. In many of the buildings the air was so tainted with the products of corruption as to be a direct and palpable source of disease and death to those who frequented them. In the churchyards coffins were placed tier above tier in the graves until they were within a few feet (or sometimes even a few inches) of the surface, and the level of the ground was often raised to that of the lower windows of the church. To make room for fresh interments the sextons had recourse to the surreptitious removal of bones and partially-decayed remains, and in some cases the contents of the graves were systematically transferred to pits adjacent to the site, the grave-diggers appropriating the coffin-plates, handles, and nails to be sold as waste metal. The daily papers of thirty years ago contain numerous records of scandals of this kind; while from the official reports it appears that the neighborhood of the churchyards was always unhealthy, the air being vitiated by the gaseous emanations from the graves, and the water, wherever it was obtained from wells, containing organic matter, the source of which could not be mistaken. The vaults of many of the London churches are still crowded with coffins deposited in them during this period of intramural interments. In the vault of Bow Church, Cheapside, the leaden coffins form a huge mass 30 feet high, covered with fungi and cobwebs. In all the other large towns the evil prevailed in a greater or less degree, but in London, on account of the immense population and the consequent mortality, it forced itself more readily upon public attention, and after more than one partial measure of relief had been passed the churchyards were, with a few exceptions, finally closed by the Act of 1855, and the cemeteries which now occupy a large extent of ground to the north, south, east, and west, became henceforth the burial places of the metropolis. Several of them had been already established by private enterprise before the passing of the Burial Act of 1855 (Kensal Green Cemetery dates from 1832), but that enactment forms the epoch from which the general development of cemeteries in Great Britain and Ireland began. Burial within the limits of cities and towns is now almost everywhere abolished, and where it is still in use it is surrounded by such safeguards as make it practically innocuous. At a large expenditure of money London and most of our chief provincial cities and towns have been provided with spacious and well-situated cemeteries, which are under the supervision of the Local Burial Boards and of the inspectors appointed by Government, and anything like a recurrence to the scandalous state of things which existed as late as twenty-five years ago is now impossible.

But though there need be no fear of retrogression there may be a change in another direction. Our present system of burial has been made the subject of very severe strictures on the part of Sir Henry Thomson and others, and it has been proposed that we should abandon inhumation altogether and return to the ancient practice of cremation. We shall not discuss this proposal here, as the importance of the subject requires a separate treatment, but we must briefly refer to the criticisms upon our cemeteries to which it gave rise. The practice of burial has been very ably defended by Mr. Holland, M.R.C.S., who as Medical Inspector of Burials for England and Wales has perhaps a greater practical knowledge of the subject than any other man living, and on the same side were found Dr. Richardson and Mr. Seymour Haden, who proposed, however, some important modifications of the system with a view to its improvement. Amongst the objections urged against the present practice, it is alleged that in three ways our cemeteries are a source of danger to the health of the living, viz.:—(1) by the gases rising from the surface of the soil causing air-pollution; (2) by their drainage introducing noxious matter into wells used for drinking purposes; (3) by the possibility that the reopening of ground in which persons who have died of an infectious disease are interred might sometimes be the means of reproducing an epidemic. Now there is really no evidence in support of these serious allegations; on the contrary there is much concurrent testimony which tends to completely discredit them. Of course it is not for a moment contended that cemeteries may not be mismanaged so as to become a source of danger. But this is beside and beyond the question, for in a matter of this kind we cannot argue from individual cases of abuse against the general use, and under the existing system of inspection and superintendence, with local authorities in every district specially charged with the care of the public health, it is difficult to see how any dangerous case of mismanagement could be allowed to develop itself without becoming the subject of immediate investigation and reform. Only very ordinary precautions are required to render a cemetery perfectly safe. "If," says Mr. Holland, "no more dead be buried in the soil than the free oxygen contained in rain and dew carried through it will decompose, and if such soil be left undisturbed until the process of decay is completed, and if, as is almost certain to be the case, the use of such ground for burial be discontinued at latest when it becomes full of the remains that do not decay, and probably long before, such places will be neither harmful while they are used for burial, nor anything but beneficial when such use of them is discontinued, as then they will become large decorative gardens or small parks —reservoirs of fresh air." With regard to the alleged peril from air-pollution, it may be replied that there can be no danger so long as the dead are laid in a sufficient space of properly planted ground, and at a moderate distance from any considerable number of houses, and for this purpose a mile is quite sufficient. The gases evolved are to a great extent absorbed by the vegetable produce of the soil, and what little does filter upwards and escape from the surface of the ground cannot accumulate to any pernicious extent, and must necessarily be dispersed and diluted in the air. Who ever perceives any unpleasant odor in a well-kept cemetery? Yet if danger were present the sense of smell would give unmistakable warning of it. As to the question of water-pollution, especial care is always taken to study the drainage of our cemeteries with reference to the neighboring sources of water supply. Shallow surface wells near a cemetery are open to suspicion, as the water may be tainted by organic matter filtering through the soil, but suspected wells can be closed by the authorities, and it must be remembered that shallow wells are nearly always dangerous whether they are near cemeteries or not. Deep wells are almost invariably safe even near a cemetery, and in most places the water is brought from a distance in mains in such a way that pollution from cemeteries is impossible. As to the danger of infection, if it existed anywhere, assuredly we should have some practical evidence of it from the great cemeteries of the metropolis. Yet there is not a particle of such evidence forthcoming. On the contrary, it is now very generally conceded that there need be little if any fear of infection from a dead body. Undertakers and their assistants who are continually at work among the dead are notoriously free from contagious disease, and, *a fortiori*, there can be no danger once the body is laid in the earth. It is only in very exceptional cases that it can be disturbed until many years have elapsed, and then all cause for apprehension is gone. Many of the plague-pits in the London churchyards have been reopened in places where the plague-stricken dead once lay piled in layers, and scarcely any human remains have been found, and these in such a condition that it would be impossible to imagine any infection or contagion from them.

The changes in our cemetery system which have been

suggested by Mr. Seymour Haden and others have all the one common object of increasing the security of safety to the public health, by facilitating and rendering perfect the decay of the buried dead, and it is proposed to accomplish this less by the use of any direct agency for accelerating the natural process, than by removing the obstacles that are at present placed in its way. Mr. Seymour Haden tells us that a well-made wooden coffin is practically indestructible, and though it cannot prevent decomposition, yet it arrests it, and keeps the process long incomplete, thus considerably increasing the aggregate of decaying matter at any one time present in a cemetery, and preventing the return of "earth to earth." As a remedy he proposes that we should use wicker coffins, of the present shape, made of white or stained (but unvarnished) osiers, with large open meshes. The contents of such a receptacle could be concealed during the funeral by a graceful covering of ferns or flowers, and in cases of infectious disease, or where decomposition might commence immediately after death, the coffin could be made double with a space of two or three inches between the inner and outer basket to be filled with charcoal or some other disinfectant. Models of such coffins were exhibited by Mr. Seymour Haden at Stafford House, London, the town residence of the duke of Sutherland, in June, 1875, and there is no doubt that if they were generally employed, the natural process of decay in our cemeteries would take place in a way that would leave even less room than at present for any evil resulting from carelessness or mismanagement on the part of the authorities charged with their superintendence, and the number of bodies actually decaying in any given cemetery would be comparatively few, so surely and effectually would the process be completed in a great majority of cases. The abandonment of the practice of burial in vaults, brick graves, and catacombs, such as those which are to be seen in many of the London cemeteries, is of course a corollary of this proposal; and whether Mr. Seymour Haden's plan is adopted or not, it is quite certain that our cemeteries would be greatly improved by no more brick graves being made in them, and by the open catacombs being closed wherever they exist. Such places are very difficult to ventilate, and must frequently be the source of malarious exhalations.

Amongst other proposals which have been made it has been suggested, that when a good natural soil containing carbon does not exist the site of the proposed cemetery should be excavated to the depth of about 12 feet, and then filled up with an artificial soil composed of carbon, lime, and sand. The existence of carbon in the soil would remove any danger of water pollution through filtration from the cemetery, while the lime would tend to accelerate the resolution of the decaying matter into its original elements. This is Dr. Richardson's proposal, and he further adds that the cemetery should be planted with quick-growing shrubs and ornamental grasses, the trees being confined to an encircling belt of wood, and a series of memorial tablets in an adjacent edifice being substituted for tombstones and monuments. He further points out that with such a method the cemetery might be renovated after a certain number of years by substituting freshly prepared soil for the old. But there does not seem to be any advantage in this. There must always be open spaces in and around our cities for the sake of fresh air, and a cemetery in which interments have ceased for some years, and in which the ornamental plantations were kept in good order, would form a useful park or garden. In the disposal of our dead feeling must always be allowed to be a considerable factor in the arguments for the adoption of any given plan, and it appears that in Great Britain and Ireland there would be an amount of dislike to any method which did not assign to our dead something like a lasting place of interment. This feeling does not by any means exist in some of the countries of the Continent. In one of the cemeteries of Naples numerous burials take place in a series of 365 pits. One pit is opened each day, the dead are laid in it, and it is filled with an earth containing a large quantity of lime. A year after the pit is reopened, the earth with its contents, now almost entirely decayed, is removed, fresh earth is placed in its stead, and the pit is again ready for new interments.

The chief cemeteries of London are Kensal Green Cemetery on the Harrow Road, about 2½ miles from Paddington, which has an area of 18 acres and already contains the remains of 70,000 dead; Highgate Cemetery, which occupies a considerable portion of the slope of Highgate Hill, and commands one of the best views of London; the cemetery at Abney Park (once the residence of Dr. Watts), which is adorned with very fine plantations of old growth; the Norwood and Nunhead cemeteries to the south of London; the West London Cemetery at Brompton; the cemeteries at Ilford and Leytonstone in Essex; the Victoria Cemetery and the Tower Hamlets Cemetery in East London; and at a still greater distance, and generally accessible only by railway, the great cemetery at Woking near Guildford in Surrey, and the cemetery at Colney Hatch. The general plan of all these cemeteries is the same, a park with broad paths either laid out in curved lines as at Kensal Green and Highgate, or crossing each other at right

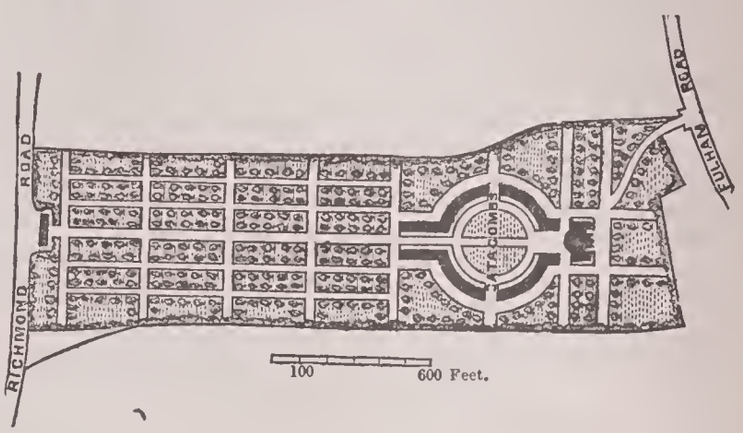


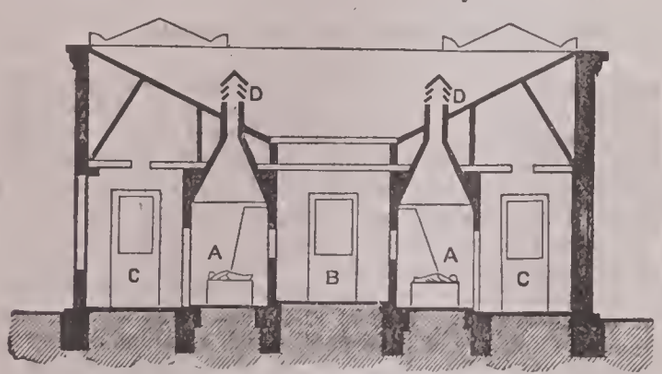
Fig. 1.—West London Cemetery, Brompton.

angles as in the case of the West London Cemetery. The ground on each side of these paths is marked off into grave spaces, and trees and shrubs are planted in the intervals between them. The buildings consist of a curator's residence and one or more chapels, and usually there is also a range of catacombs, massive structures containing in their corridors recesses for the reception of coffins, generally closed only by an iron grating. The provincial cemeteries in the main features of their arrangements resemble those of the metropolis. One of the most remarkable is St. James's Cemetery at Liverpool, which occupies a deserted quarry. The face of the eastern side of the quarry is traversed by ascending gradients off which open catacombs formed in the living rock,—a soft sandstone; the ground below is planted with trees, amongst which stand hundreds of gravestones. The main approach on the north side is through a tunnel, above which, on a projecting rock, stands the cemetery chapel, built in the form of a small Doric temple with tetrastyle porticoes. Its situation, though very picturesque, is an objectionable one, for no cemetery should ever be constructed in a deep hollow. Many of the cities of America possess very fine cemeteries. One of the largest is that of Mount Auburn near Boston, which occupies upwards of 110 acres of undulating ground on the bank of the Charles River. It is formed out of an old and well-wooded estate, and consequently, unlike most modern cemeteries, its plantations consist of large well-grown trees.

The chief cemetery of Paris is that of Père la Chaise, the prototype of the garden cemeteries of Western Europe. It takes its name from the celebrated confessor of Louis XIV., to whom as rector of the Jesuits of Paris it once belonged. It was laid out as a cemetery in 1804. It has an area of about 200 acres, and contains 16,000 monuments, including those of all the great men of France of the present century—marshals, generals, ministers, poets, painters, men of science and letters, actors, and musicians. Twice the cemetery and the adjacent heights have been the scene of a desperate struggle; in 1814 they were stormed by a Russian column during the attack on Paris by the allies, and in 1871 the Communists made their last stand among the tombs of Père la Chaise; 900 of them fell in the defence of the cemetery or were shot there after its capture, and 200 of them were buried in quicklime in one huge grave, and 700 in another. There are other cemeteries at Mont Parnasse and Montmartre, besides the minor burying-

grounds at Auteuil, Batignolles, Passy, La Villette, &c. In consequence of all these cemeteries being more or less crowded, a great cemetery was laid out in 1874 on the plateau of Mèry sur Oise, 16 miles to the north of Paris, with which it is connected by a railway line. It includes within its circuit fully two square miles of ground. The French cemetery system differs in many respects from the English. Every city and town is required by law to provide a burial-ground beyond its barriers, properly laid out and planted, and situated if possible on a rising ground. Each interment must take place in a separate grave. This, however, does not apply to Paris, where the dead are buried, forty or fifty at a time, in the *fosses communes*, the poor being interred gratuitously, and a charge of 20 francs being made in all other cases. The *fosse* is filled and left undisturbed for five years, then all crosses and other memorials are removed, the level of the ground is raised 4 or 5 feet by fresh earth and interments begin again. For a fee of 50 francs a *concession temporaire* for ten years can be obtained, but where it is desired to erect a permanent monument the ground must be bought by the executors of the deceased. In Paris the undertakers' trade is the monopoly of a company, the *Société des pompes funèbres*, which in return for its privileges is required to give a free burial to the poor.

The *Leichenhaüser*, or dead-houses, of Frankfort and Munich form a remarkable feature of the cemeteries of these cities. The object of their founders was twofold—(1) to obviate even the remotest danger of premature interment, and (2) to offer a respectable place for the reception of the dead, in order to remove the corpse from the confined dwellings of the survivors. At Frankfort the dead-house (fig. 2) occupies one of the wings of the propylæum, which forms the main entrance to the cemetery. It consists of



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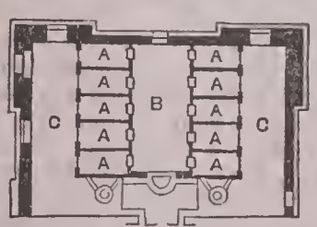


Plan.

Fig. 2.—Dead-house, Frankfort Cemetery.

the warder's room B, where an attendant is always on duty, on each side of which there are five rooms A, A, well ventilated, kept at an even temperature, and each provided with a bier on which a corpse can be laid. On one of the fingers is placed a ring connected by a light cord with a bell which hangs outside in the warder's room. The use of the dead-house is voluntary. The bodies deposited there are inspected at regular intervals by a medical officer, and the warder is always on the watch for the ringing of the warning bell. One revival, that of a child, has taken place at Frankfort. The Leichenhaus of Munich is situated in the southern cemetery outside the Sendling Gate. At one end of the cemetery there is a semi-circular building with an open colonnade in front and a projection behind, which contains three large rooms for the reception of the dead. At both Frankfort and Munich great care is taken that the attendants receive the dead confided to them with respect, and no interment is permitted until the first signs of decomposition appear; the relatives then assemble in one of the halls adjoining the Leichenhaus, and the funeral takes place. In any case there is, with ordinary care, little fear of premature interment, but in another way such places of deposit for the dead are of great use in large towns, as they prevent the evil effects which result from the prolonged retention of the dead among the living. Mortuaries for this purpose are now established in many places in England.

Of the cemeteries still in use in Southern Europe the catacombs of Sicily are the most curious. There is one of these under the old Capuchin monastery of Ziza near Palermo, where in four large airy subterranean corridors 2000 corpses are ranged in niches in the wall, many of them shrunk up into the most grotesque attitudes, or hanging with pendent limbs and heads from their places. As a preparation for the niche the body is desiccated in a kind of oven, and then dressed as in life and raised into its place in the wall. At the end of the principal corridor at Ziza there is an altar strangely ornamented with a kind of mosaic of human skulls and bones.

Cemeteries have been in use among many Eastern nations from time immemorial. In China, the high grounds near Canton and Macao are crowded with tombs, many of them being in the form of small tumuli, with a low encircling wall, forcibly recalling the ringed barrows of Western Europe. But the most picturesque cemeteries in the world are those of the Turks. From them it was, perhaps, that the first idea of the modern cemetery, with its ornamental plantations, was derived. Around Constantinople the cemeteries form vast tracts of cypress woods, under whose branches stand thousands of tombstones. A grave is never reopened; a new resting-place is formed for every one, and so the dead now occupy a wider territory than that which is covered by the homes of the living. The Turks believe that till the body is buried the soul is in a state of discomfort, and the funeral, therefore, takes place as soon as possible after death. No coffin is used, the body is laid in the grave, a few boards are arranged round it, and then the earth is shovelled in, care being taken to leave a small opening extending from the head of the corpse to the surface of the ground, an opening not unfrequently enlarged by dogs and other beasts which plunder the grave. A tombstone of white marble is then erected, surmounted by a carved turban in the case of a man, and ornamented by a palm branch in low relief if the grave is that of a woman. The turban by its varying form indicates not only the rank of the sleeper below, but also the period of his death, for the fashion of the Turkish head-dress is always changing. A cypress is usually planted beside the grave, its odor being supposed to neutralize any noxious exhalations from the ground, and thus every cemetery is a forest, where by day hundreds of turtle-doves are on the wing or perching on the trees, and where bats and owls swarm undisturbed at night. Especially for the Turkish women the cemeteries are a favorite resort, and some of them are always to be seen praying beside the narrow openings that lead down into a parent's, a husband's, or a brother's grave. Some of the other cemeteries of Constantinople contrast rather unfavorably with the simple dignity of those which belong to the Turks. That of the Armenians abounds with bas-reliefs which show the manner of the death of whoever is buried below, and on these singular tombstones there are frequent representations of men being decapitated or hanging on the gallows.

See on this subject various parliamentary papers issued since 1843, Loudon on *Cemetery Interment*, the reports of the chief cemetery companies, and the discussions on our cemetery system in reference to cremation in the *Contemporary Review* and other periodicals (1874–1875). Books of travel contain numerous descriptions of remarkable foreign cemeteries. (A. H. A.)

CENCI, Beatrice (1583–1599), called "The Fair Parricide," was the daughter of Francesco Cenci (1527–1598), a Roman gentleman, no less notorious for his wealth and talents than for the shameless depravity of his life and character. Born during the sack of Rome by the troops of the Constable Bourbon, Francesco Cenci began early to be talked of as a man who cared little for law and less for public opinion, and whom it were better to serve than to offend. He was the son of a Cardinal Cenci, who, as financial minister under Pius V., had contrived in that capacity to amass an immense fortune. This enabled his heir to defy the law; condemned on several occasions for murders and unnatural crimes, Francesco Cenci had always managed to escape sentence by the timely administration of enormous bribes. He was, therefore, a very profitable

criminal, and one with whom several popes in succession found it to their interest to deal gently. A man of great force of character and at the same time of boundless passions, in the service of which his fine intellect and indomitable courage were wholly employed, he was one of those personalities, interesting by sheer weight of depravity, in which the Italy of the Renaissance abounded. He is distinguishable, however, from his rivals in villainy by an entire absence of ambition except of a sensual kind.

The pampering of his every appetite would seem to have induced in him its natural result,—the infinite perversity known to psychologists as a common consequence of the weariness that follows satiety. Francesco Cenci was twice married; by his first wife he had had seven children, one of whom had died in infancy; his second wife, Lucrezia Petroni, was childless. One of the strangest sides of his horrible character was the intensity of hatred with which he regarded his surviving children. The three eldest, Giacomo, Cristoforo, and Rocco, he had sent to a Spanish university, where he kept them penniless and starving, till they could bear no more, and returned. His conduct towards them remained unchanged. Shortly before the commencement of that episode of his life with which the name of his daughter Beatrice is inseparably connected, he was imprisoned for the third and last time, and his three sons presented a petition to the Pope regnant, Clement VIII., imploring him, for the sake of the honor of their house, to make an end of their father. Clement, however, wanted money, and Francesco Cenci was released. His hate for his children was by no means lessened by this circumstance. Of his sons he never spoke but with curses; his two daughters he was in the habit of beating violently. The elder sister, however, found means to get a petition presented to Clement, in which she prayed to be removed to a convent. The Pope took pity on her, and gave her in marriage to a gentleman of Gubbio, obliging her father to dower her largely. Cenci was furious. He shut his daughter Beatrice, then aged fourteen, in a lonely room, where he visited her to bring her food, to beat her, and to revile her with her sister's flight. It is said that it was in this place and under these circumstances that Francesco Cenci conceived the monstrous passion that resulted in his death.

Meanwhile Rocco Cenci had been assassinated, and a year afterwards his brother Cristoforo met with a like fate. Thereafter Francesco Cenci, whose joy at the news of his sons' death is recorded to have been awful, ceased not to torture his unhappy wife and unhappier daughter to the utmost. The ordeal must indeed have been a terrible one that could have transformed the gay light-hearted girl-humorist into the grand woman who was afterwards to play such a notable part in crime and expiation. The accounts of Cenci's conduct with her are not to be repeated. Meanwhile, however, a certain cardinal, Monsignor Guerra, one of the handsomest men in Rome, had fallen in love with her, and was in the habit of visiting the Palazzo Cenci whenever Francesco left it. Maddened by the failure of a petition for the redress of their wrongs, which they had addressed to Clement, and which had miscarried, Lucrezia and Beatrice turned for aid to the cardinal, and communicated to him their design of ending their troubles by the murder of the author of them. The cardinal allowed himself to be persuaded; he lost no time in sounding Giacomo Cenci, the elder brother, and, after Francesco, head of the house, without whose consent nothing could be attempted. Meetings were held in a room in the cardinal's palace, and the advice of Lucrezia and Beatrice was taken on all points. For the execution of the design determined on, choice was made of two of Cenci's vassals, Olimpio and Marzio, both of whom were violently incensed against their master,—Marzio out of pity for his mistresses, and Olimpio for his own wrong's sake. It was at first proposed to cloak the murder in an attack and robbery by banditti. A dozen men were to be held in readiness to stop Francesco Cenci on his way to Petrella, a fief within the Neapolitan frontier, whither he was wont to betake himself in the summer. An enormous ransom was to be asked, with the alternative of death; the mother and daughter were to return to Rome to obtain the sum; and the assassins were to carry their threat into execution. But the scheme miscarried; Francesco reached Petrella in safety, and the conspirators were forced to arrange other combinations.

The old man's treatment of his wife and daughter grew worse daily. He is said to have pretended that he believed them pleased and happy in his gray hairs and declining years, and to have tormented them with an incomparable ingenuity and ferocity. Beatrice at last found means to communicate with Monsignor Guerra, and it was agreed that, for the sum of a thousand piastres, one-third to be paid by the cardinal and the rest by Beatrice and Lucrezia, Olimpio and Marzio should enter the castle and kill Francesco in his bed. On September 9, 1588, accordingly, a strong opiate having been dextrously administered to the tyrant, the assassins were introduced into his chamber by Beatrice herself. Here they were overtaken with remorse; the spectacle of the old man sleeping was too much for them; and they retreated without accomplishing their intent. Beatrice, however, whose magnificent personality had risen to the occasion, received them with such indignation, that they returned and slew the sleeper, much as Jael had slain Sisera, by driving a long nail through the eye into the brain, making assurance doubly sure by driving another through the throat. When this was done Beatrice presented them with a purse of money, and clothed Marzio in a mantle laced with gold, which had belonged to her father. She and Lucrezia then withdrew the nails from the corpse, which they folded in a sheet, and dragged through several rooms to a gallery looking into an unused garden, whence they flung it into the branches of a great elder tree that grew thereby. This gallery was used for such a purpose as would lend reality to the story they intended to tell, of Cenci's leaving his bed to repair thither, and of his slipping and falling accidentally into the branches below.

Everything occurred as Beatrice and her mother had foreseen. The alarm was great, but Francesco's death was accounted for naturally enough; his remains received an honorable burial, and the two women returned to Rome, and lived tranquilly there for several months. Suspicion, however, had been excited in Naples by the circumstances of the event, and a magistrate was sent to Petrella, who arrested all the people employed about the castle. Among them was a washerwoman to whom Beatrice had given the soiled linen from Cenci's bed, with a story accounting in quite a natural way for the presence of so much blood. The woman, interrogated as to the credibility of the story, threw doubts upon it, basing her opinion on the unusual brightness of color of the marks. Details of the interrogatory were sent to Rome, but no notice was taken, and Lucrezia and her children remained undisturbed. Meanwhile, however, Monsignor Guerra, as soon as he was informed of what was passing at Naples, had sent out emissaries charged with the murder of Francesco Cenci's assassins. Olimpio alone had been despatched. Marzio, arrested by the Neapolitan Government several months after the murder, was taken to Naples; he confessed everything.

On information being conveyed to Rome, Lucrezia and her three step-children, Giacomo, Bernardo, and Beatrice Cenci, were arrested. Lucrezia, Giacomo, and Bernardo were taken to the Corte Savella prison, while Beatrice was confined to the Cenci Palace, and guarded strictly by a troop of sbirri. Marzio, meanwhile, was brought from Naples, and confronted in the Corte Savella with Lucrezia and her daughter. The majesty and strength of Beatrice in this interview were such that the old vassal withdrew his confession, and chose rather to expire under torture than to incriminate his mistresses further. In the absence of any other proof, the whole of the Cenci family were relegated to Sant' Angelo, where they remained for several months. At the end of that time Olimpio's assassin was arrested, and confessed as much as he knew. Monsignor Guerra fled from Rome, disguised as a charcoal-burner, and Lucrezia and her children were taken back again to the Corte Savella.

Put to the torture, Giacomo and Bernardo at once confessed the crime and their share in it. Lucrezia, too, who was of a luxurious habit of body, was not able to endure the torture of the cord, and acknowledged her complicity also. But Beatrice was not made of such penetrable stuff. The cord made no impression on her whatever, and her genius and force of will so confounded Moscati, the judge charged with her interrogatory, that he made her the subject of a special report to the Pope. The examination was committed to a second of sterner reputa-

tion, and Beatrice was questioned by suspension by the hair. While in this posture her brothers and Lucrezia were introduced into the apartment. All of them urged her to confess. She reproached them with their little care for the honor of the family, but at last consented. She then answered the judge's questions, denying the false and explaining the true. On the release of Beatrice from the torture and the examination, the four dined and spent the evening cheerfully together. Next day the two brothers were taken to the Tor di Nono, the women remaining in the Corte Savella; the Pope having read the papers, had sentenced them to immediate death.

Immense efforts were made to obtain a commutation of the sentence, but a respite of twenty-five days was all that could be got. On the twenty-fifth day a body of advocates, among whom was the celebrated jurist Farinacci, presented themselves before Clement, to plead the cause of the accused; the Pope, however, refused to listen to them, and Farinacci alone was allowed to speak. They left their briefs, which Clement spent the night in reading. The next day all four prisoners were ordered to be confined *au secret*, and great hopes were entertained of pardon. But a scandalous case of matricide intervened; the assassin fled, and the Cenci were immolated in his stead, Farinacci succeeding after great efforts in saving the life of Bernardo, the youngest boy.

On the 11th of September, 1599, the four prisoners were conveyed to the scaffold. Lucrezia and Beatrice were on foot; Giacomo was drawn in a cart, and was subjected the whole way to the torture of the pincers, which he bore with great fortitude. Bernardo, who was young and long-haired, was extremely agitated, and was several times mistaken for Beatrice, who indeed was far from sharing her brother's weakness. The heat was intense, the excitement unparalleled, the crowd enormous; several deaths from fever and sunstroke are said to have occurred during the day. Lucrezia and Beatrice were beheaded, and were afterwards buried, the one in the church of San Giorgio, the other in that of San Pietro in Montario. Giacomo was *mazzolato*—killed with a mace. Bernardo, who fainted several times, was removed to a convent,—"Oriental precautions" being taken, it is said, to prevent his disturbing the new owners in their possession of the confiscated estates of his house.

Part of these estates, conveyed to a cardinal nephew of Clement, became the Villa Borghese. Therein are still preserved the portraits of Lucrezia Petroni and of Beatrice Cenci, the latter of which is said to be by Guido Reni. Shelley's fine tragedy is well known; the poet has dealt freely with much of his material, but the result is of unapproachable excellence. See also the *Chroniques et Nouvelles* of H. Beyle, whose account of the Cenci forms a remarkable page in a remarkable book.

CENEDA, a district in the province of Treviso, Northern Italy, so called from the city of the same name. Its population has varied as follows:—1807, 22,718; 1844, 18,986; 1855, 37,510; 1862, 38,443. It is a highly picturesque region at the foot of the Alps, fertile in corn and wine, the white kind of which has considerable local celebrity. The olives which formerly abounded have almost disappeared. There are saline springs near the town, which are among the richest in iodine of any known, the proportion being 0·4032 of iodine in 10,000 parts of water. They are much used by the inhabitants of the neighboring districts. The little city of Ceneda is charmingly situated on the last slope of the hills inclined from west to east, and has the reputation of being especially healthy. The Emperor Berengarius held a court of justice here, when he gave by diploma to the bishop of Ceneda, which had its own body of statutes compiled in 1339 and published in 1609, the jurisdiction of the whole territory lying between the rivers Piave and Livenza from the Alps to the sea. In the cathedral, a building of the middle of the last century on the site of an older one, there are some not very remarkable paintings of Palma Giovine, Bonifacio, and Tintoretto. The town hall has some good frescoes of Pomponio Amalteo in its "loggia," and a curious series of portraits within of the bishops of Ceneda, and another of the *Podestàs*, with the arms of each. The origin of the city, which very numerous finds of urns, inscriptions, coins, lachrymatories, and other objects prove to have existed under the Romans, is uncertain. At the period of the Gothic and Lombard invasions it was a place of some military importance. Alaric fortified it strongly. The Emperor Honorius subsequently gave it with the title of county to one Marcellus. Attila devastated it in 450. The sovereignty of the district was the subject of long contests between the neighboring counts of Camino and the bishops, with the gradual result of subjecting the city and its district to the republic of Venice, which, however, permitted the bishops and the ancient council of notables to exercise some rights of sovereignty even down to 1776.

It should be added that Ceneda has recently changed its name to Vittorio. This absurd abnegation of its past history has had some little show of reason to excuse it. Ceneda and the neighboring commune of Serravalle were for many generations hereditary enemies. When the province of Venice was restored to Italy it was determined, among other festive and fraternizing doings, that these two communes should henceforth form but one, to be known as Vittorio,—an appellation which seems to have succeeded in supplanting the old historical name more entirely than usually occurs in similar cases.

CENSOR (from *censere*, to estimate), the title of two magistrates of the highest importance in the Roman republic. It was their duty to take a census of the citizens, to estimate their property and impose taxes in proportion to what each possessed, and to punish offences not only against morality, but against the conventional requirements of Roman custom. They took cognizance of bad cultivation of the land, of the carrying on of any occupation which was considered disgraceful, of luxuriousness, of celibacy, and of many other matters of a similar kind. If the offender was a senator, they might remove him from the senate; if *eques*, they might take from him his horse, they might expel him from his tribe, and they might lower him to ærarian rank. There was, however, an appeal from their decisions to an assembly of the people; and they could only punish a citizen for some definite fault, which they were bound to declare in their list. The censors also appointed the *princeps senatus*, and filled up all vacancies in the senate. At first this was done at their own discretion, but afterwards they were controlled by the *lex Ovinia*, which bound them to choose ex-magistrates in the order of their rank. The censors also let out the taxes to farm; and they took charge of all public buildings, roads, and aqueducts, and undertook the construction of new public works.

At first the duration of the censorship was five years, but in 433 B.C. the dictator Mamercinus made a law restricting it to a year and a half. Upon the death of either censor the other resigned, and a new election was held. Originally patricians alone were eligible; but in 351 B.C., the plebeians were admitted. The censorship was instituted in 443 B.C.; and the office continued to the time of the emperors Vespasian and his son took the title; and the last who bore it was the brother of Constantine. The emperor generally assumed censorial power under the title of *morum præfecti*.

CENSUS is now almost solely used to denote that enumeration of the people made at intervals in most European countries, and in the United Kingdom and the British Colonies decennially. The term had its origin in Rome, where a group of the many functions performed by the high officer called censor received the name of *census*. An enumeration of the people was only one of them, but they were chiefly of a statistical character. They were especially directed to fiscal objects; and it does not appear that the enumeration of the people was then deemed of value as a source of statistical knowledge which might influence morals and legislation. It was connected with the Servian constitution, which apportioned the rights and duties of citizens to the amount of property, dividing them into six classes, which were subdivided into centuries by a mixed ratio of wealth and numbers. Had the enumeration been deemed of value for any such other purposes, besides the adjustment of rights and obligations, as those for which statistical knowledge is now deemed so valuable, the notices preserved of the vast collection of statistical facts thus made would have been less scanty and meagre, and we should not have found it so impracticable to come to any conclusion about the population and extent of the city of Rome itself. The Roman census must have been minute and full. It indicated not only the number and respective classes of all free persons, but their domestic position as husbands and wives, fathers and mothers and sons and

daughters. The slaves and freedmen were indicated in connection with the possessions of the head of the house, and landed property was analyzed into several classes according to its character and produce. The important practical effect of the census caused it to be conducted at intervals generally so frequent as every fifth year. It was followed by a sacrifice of purification or lustration, whence the term of five years came to be designated a lustrum. There were highly penal consequences to the citizen who neglected his registration for the census, to whom as an unregistered person the name of *incensus* was given. From the mixed functions to which it was applied we have the word used among the Romans to signify the patrimony or property qualification of a particular grade—as *census senatorius* and *census equester;* and we have it employed in later times to indicate taxation. Hence *census dominicatus*, implying a feudal tax to the superior, and *census duplicatus*, a double tax or feudal casualty; and the word *cense*, used by old English writers, was abbreviated in modern use into *cess*.

While the word census was thus applied to the taxation of the Middle Ages, it will readily be understood that in its modern sense it received no practical application, since neither taxation nor the adjustment of social rank required a numbering of the people; and the statistic or economic ends of such a process were as little known as they had been to the Romans. Under the despotic Governments of the Continent, however, the tendency to central organization for purposes of administration and police prepared the way for statistical inquiries into the numbers of the inhabitants of particular areas whenever there should occur an occasion for enumerating them. It was in Britain, with its abstinent Government and unrestrained people, that the want of population statistics became most flagrantly conspicuous. It is difficult at present to realize the idea that, long after Adam Smith's time, the number of the inhabitants of the British empire could only be guessed at as the populousness of China is at the present day; and as in all matters of statistics, which have their own simple solution through specific inquiry, the guesses about the population of the empire were not only vague but extravagantly contradictory. During the 18th century, the most trustworthy geographers were generally those who did not venture on an estimate of the population even in those European states which had the best means of enumeration at their command.

The first effort to take a census of the population of Great Britain was made in 1801; it did not then extend to Ireland. The success which attended this and the two succeeding efforts was mainly owing to the zeal and ability of Mr. Rickman, the assistant clerk of the House of Commons. Where there is an organization like that of many in the European states for preserving a constant official record of all the fluctuations of the population, not only in their absolute numbers throughout a whole territory, but in the relative numbers in its respective parts as they may be affected by fluctuations, systematic arrangements are thus prepared not only for obtaining a general census at any one moment, but for checking its accuracy and classifying its elements. But to deal at once with the raw material in the self-governed British empire required great ingenuity and sagacity. A census, to be accurate, must be taken on a uniform system, and must be taken simultaneously. Any enumeration going over a tract of time, were it but two days, must be more or less inaccurate, and destitute of the means of correcting its own inaccuracies. Besides the mere abstract numbers of the people, there is much collateral information to be recorded. This, besides its own intrinsic value, is necessary as a check on the numbers; since a distribution into elements according to sex, age, social condition, occupation, and the like, affords a self-acting control on the accuracy of mere figures. In a census, indeed, it is a simple rule, that the information returned should be extended as far beyond the main facts as with safety to these it can be carried. The tendency towards complexity in the nature of the returns must always be checked by the liability of the people at large to make blunders and create confusion where they are required to attest facts not of the most obvious nature, and by the difficulty of getting a number of subordinate officers to understand and carry out a complex classification. Hence there was great difficulty in obtaining a classification according to occupation, from its complex intermixture with the classification according to families. Thus, in the first census, there was an attempt to classify the people under three divisions—(1) persons chiefly employed in agriculture, (2) persons chiefly employed in trade, manufactures, or handicraft, and (3) all other persons not comprised in the two preceding classes. But Mr. Rickman found the returns unsatisfactory, from the difficulty of deciding "whether the females of the family, children, and servants were to be classed as of no occupation, or of the occupation of the adult males of the family." In the two subsequent enumerations, the rule adopted was to record the occupation of the head of the family; but here comes a new element of confusion, in the difficulty of defining the head of a family. Experience, and an anxious desire to combine simplicity and comprehensiveness in the returns, were the only means by which such difficulties could be mitigated.

The enumerations of 1841 and 1851 in England were much facilitated by the uniform system of registration of births, marriages, and deaths which came into operation on 1st July, 1837, and which not only afforded the means of checking the accuracy of the returns, but provided a prompt and skilled machinery accustomed to statistical work. Far more dependence could now be placed on the discretion and skill of the officers to whom the local duties were committed; and the returns were made more minute and complete. In Scotland it was necessary to adopt the method of employing the parish schoolmasters to perform the local duty of enumerating the population in the country districts. In Ireland the first attempt at a general census was made in 1811, but it was decidedly unsuccessful. It was repeated in 1821, but went no further than a bare enumeration of doubtful accuracy. The census taken there in 1831 was subject to correction in 1834, to make it the basis of the new system of national education. In the two subsequent enumerations the aid of the admirable constabulary force, and the use of an ordnance survey, nearly complete in 1841, went far to supply the want of permanent local statistical machinery.

The census of 1851 was taken on the 31st day of March, the previously distributed schedules being then collected. They embraced a return of the local and other conditions of the population during the preceding night.

"At the present census," say the commissioners, "it was resolved to exhibit, not merely the statistics, as before, of parishes, and more completely of parliamentary and municipal boroughs, but also of such other large towns in England and Scotland as appeared sufficiently important for separate mention, and of all the ecclesiastical districts and new ecclesiastical parishes which, under the provision of various Acts of Parliament, have, during the last forty years, been created in England and Wales. In addition also to the inquiry concerning the occupation, age, and birthplace of the population, it was determined to ascertain the various relationships (such as husband, wife, son, daughter), the civil condition (as married, unmarried, widower, or widow), and the number of persons blind, deaf, and dumb."

Another novel feature in the census of 1851 was an attempt to supply the statistics of the ecclesiastical and educational condition of the country. It stated the amount of church accommodation at the command of each religious denomination; while a return was procured of those in attendance in the several churches on Sunday, 30th March. The attendance throughout thirty-five religious communities in England on that forenoon was returned as 4,428,338, of which the proportion assigned to the Church of England was 2,371,732. The returns for Scotland, admittedly very imperfect, give a total of 943,951, of which 351,454 belonged to the Established Church. The English report was accompanied by an elaborate history of the several religious communities.

The enumerations in Ireland exhibit statistical novelties of a totally different kind. In 1841 it was resolved, as that country so totally depended on the amount of its agricultural produce, to obtain the statistics of its rural economy. The surface of the country was divided under five heads—arable, plantations, uncultivated, towns, and water; and, with a view to these divisions, a return was made of the character of each farm or other agricultural allotment, with the quantity of live-stock and other relevant facts. The attempt was found so successful, that it was renewed with more full effect in 1851, producing 727 tabular folio pages of very valuable information.

Census of 1861.

The enumeration in 1861 was the seventh census of England, and was taken under the superintendence of the Registrar-General, under the powers conferred by three Acts of Parliament, applicable respectively to England, Scotland, and Ireland. By this census it was found that the population of the United Kingdom was 29,321,288, and that of each of the four divisions of the kingdom was as follows:—England and Wales, 20,228,497; Scotland, 3,096,808; Ireland, 5,850,309; islands in the British seas, 145,674. The population of England and Wales, excluding the portion of the army, navy, and merchant seamen abroad, was 20,066,224. The annual rate of increase per cent. of the population in the United Kingdom, in the ten years 1851–61, was 0·55, viz.:—England and Wales, 1·14; Scotland, 0·58; Ireland (decrease), 1·23; and islands in the British seas, 0·02.

The local machinery by means of which the census of England was taken in 1861 differed in no material respect from that employed in 1851. In subdividing the country the registrars were to see that the enumeration districts were not too extensive or too populous; they were not to contain more than 200 houses in towns, so that they could be enumerated by an active man within the compass of a single day. An important feature consisted of the publication of the number of houses and population in "civil counties" and in lieutenancy subdivisions. The number of blind and of deaf and dumb from birth, the number of foreigners, and the number of naturalized British subjects, were shown in 1861 for the first time. In the case of Scotland, the enumeration was for the first time required to be made apart from that of England, under the superintendence of the Registrar-General of Scotland. From 1855 Scotland had the advantage of a national system of registration, and the census of 1861 was therefore no longer taken through the agency of the sheriffs in counties, and of the provosts or chief magistrates in the royal and parliamentary burghs, but through the agency of 1001 local registrars of births, deaths, and marriages, assisted by 8075 enumerators. The forms and instructions issued were all based on, and in most cases virtually the same as, those used in England in the census of 1851. "Flats" were not reckoned as houses in Scotland in 1861. All the details as to population, &c., in 1851, were for civil parishes and civil counties only. In 1861 the returns were for registration districts and registration counties. The novel features in 1861 for Scotland, which merit special notice, were the number of families in every parish and county, the number of houses having windows, and the number of children between the ages of five and fifteen years in attendance at school. In 1861 it was ascertained that the islands in Scotland amounted to 787 in number, and of these 186 were inhabited by one or more persons on the census day.

The tables in 1861 relating to the ages, conjugal conditions, birthplaces, blind, deaf and dumb, and to the occupations combined with ages, were published uniformly with those in 1851. A comparison can be made of the occupations at the different ages with the death registers, and the comparative mortality prevailing among the different classes and ranks of society can now be ascertained, as well as the comparative healthiness of each occupation or trade.

Ireland, 1861.—The enumeration of the people of Ireland in 1861 was effected for the first time altogether (excepting the metropolis) by the officers and men of the constabulary force. The returns show—for provinces, counties, baronies, parishes, towns, and parliamentary boroughs—the area, population, and number of houses, the number of families with their pursuits and the means upon which they were dependent, also the religious professions and education of the inhabitants, the number of families living in each house, and the amount of their accommodation by counties in rural and civic districts, the birthplaces of the people, their condition as to marriage, and their occupations for each county, also tabular summaries relating to vital statistics.

The ages of the people in Ireland were incorrectly returned in 1861, and in the tables of the occupations of the people a large number are left unclassified.

In the Channel Islands and the Isle of Man, the census was taken in conformity with instructions from the Home Office, by the respective Lieutenant-Governors acting in conjunction with the English central office.

First Imperial Census, 1871.

In 1871 the first *Imperial* census of the British empire was taken, and the population was found to amount to 234,762,593, living upon 7,769,449 square miles of territory; comprising England and Wales, with a population of 22,856,164; Scotland, 3,392,559; Ireland, 5,449,186; islands in the British seas, 147,470; and British Colonies and Possessions (exclusive of the army, navy, and merchant seamen abroad, as they are included in the populations just quoted), 202,917,214. The population of England and Wales, excluding the portion of the army, navy, and merchant seamen abroad, was 22,712,266. The annual rate of increase per cent. of the population in the United Kingdom in the ten years 1861–71 was 0·83, viz.:—in England and Wales, 1·23; Scotland, 0·92; Ireland (decrease), 0·71; islands in the British seas, 0·12.

In this great undertaking the work was subdivided for convenience of execution. In conformity with the Act of Parliament the census of England and Wales was taken by the Registrar-General, assisted by Dr. Farr and J. T. Hammick. The population was enumerated *in one day* (3d April, 1871) by 32,543 enumerators, employed under 2195 registrars and 626 superintendent registrars.

Instructions were issued to the superintendent registrars, and to the registrars of births and deaths, for their guidance in taking the census, and one of the duties requiring their earliest attention was the division of the country into enumeration districts, and just here the registrar had an important duty to fulfil, for he was directed to see that the boundaries of parishes, townships, ecclesiastical districts, municipal and parliamentary cities and boroughs, urban sanitary districts, and all other of the various conflicting and confusing territorial subdivisions of the country, were duly indicated. Most of the registrars laid down the boundaries of their enumeration districts on maps, so as to ensure that no part of their districts was omitted.

These plans of division were first submitted to the various superintendent registrars, and finally to the Registrar-General for approval. The 32,543 enumerators were required to be intelligent, trustworthy, and active, to write well, and to have some knowledge of arithmetic. They were not to be infirm or of weak health, not younger than 18 years, nor older than 65; and they were required to be persons likely to conduct themselves with strict propriety and civility. 627 of the public or charitable institutions were enumerated by the masters or chief resident officers.

In order to facilitate the proper designation of all roads, streets, and houses, a circular was addressed to the mayor of each municipal city and borough, and to the chairman of every local board, suggesting that previous to the census all unnamed roads and streets should be named, and all houses numbered. Circulars were also addressed to the press explaining the objects and uses of the census, so as to aid in securing complete and correct returns.

The enumeration of 1871 was a "*nominal*" census.

The householders' schedules were delivered by the enumerators prior to 3d April. Every separate occupier received a schedule, and this schedule was so prepared in accordance with the 4th section of the Census Act, that, as shown in the example on p. 293, the name, sex, age, rank, profession or occupation, conjugal condition, relation to head of family, and birthplace of every person who abode in any house, on the night of Sunday, 2d April, 1871, might be returned; the blind, deaf, and dumb, imbecile, or lunatic were distinguished. At the census of 1871 the numbers of lunatics out of asylums and of imbeciles or idiots were ascertained for the first time.

The despatch of forms and instructions began as soon as the office in Craig's Court was opened, and included 6,500,000 householders' schedules, weighing about 41 tons. The enumeration books and forms sent out weighed in the aggregate about 54 tons. But in addition to these there were sent out from the central office no less than 115 different descriptions of printed instructions, forms, and circulars, including a calendar, so that certain operations might be summarized.

The metropolitan, the municipal, and the county police afforded help in enumerating the houseless population. The strength of the navy, in forms prepared for the purpose, was returned by the Admiralty; the merchant seamen, in port or out at sea, by Her Majesty's Customs, and by the Registrar-General of merchant seamen; and His Royal Highness the Field-Marshal Commanding-in-chief

	Name and Surname.	Relation to Head of Family.	Condition.	Sex.	Age (last Birth-day).	Rank, Profession, or Occupation.	Where Born.	If (1) Deaf-and-Dumb. (2) Blind. (3) Imbecile or Idiot. (4) Lunatic.
1	George Wood.....	Head of family..	Married	M.	48	Farmer (of 317 acres, employing 8 laborers, and 3 boys).....	Surrey, Godstone.....	...
2	Maria Wood.....	Wife.....	Married	F.	44	Farmer's Wife.....	Scotland	...
3	Alan Wood.....	Son	Unmarried	M.	20	Farmer's Son.....	Surrey, Godstone..	...
4	Flora Jane Wood...	Daughter.....	...	F.	12	Scholar.....	Kent, Ramsgate.....	...
5	Ellen Wood.....	Mother.....	Widow.....	F.	71	Annuitant.....	Canada	Lunatic.
6	Eliza Edwards.....	Servant	Unmarried	F.	24	General Servant (domestic)..	Middlesex, Paddington..	...
7	Ann Young.....	Servant	Unmarried	F.	22	Dairymaid	Surrey, Croydon.....	...
8	Thomas Jones.....	Servant	Unmarried	M.	21	Farm Servant.....	Essex, Epping.....	...

supplied full returns of the various particulars respecting the army. The numbers of British subjects in foreign states and in India and the population of the Colonies were obtained through Her Majesty's Secretaries of State for Foreign Affairs, India, and the Colonies.

Welsh schedules were issued for the use of a certain number of the Welsh people, and it was found that in 17,276 of these the particulars were inserted in the Welsh language, and had to be translated.

The enumerators were instructed to consider a house as comprising all the space within the external and party walls of a building, whether occupied by only one family, or by several families living in distinct stories or apartments; and they were also instructed, when delivering their schedules, to make a record, in a "memorandum book" supplied for the purpose, of the road or street in which every house was situated, and of the name or number of each house, and to state the number of schedules left at each house. Uninhabited houses, houses building, churches, chapels, and all other public buildings were likewise noticed in this book. With the assistance of the police, the enumerator had to make or procure returns of all persons not dwelling in houses, but sleeping in barns, sheds, caravans, or tents, or in the open air.

Special schedules were printed for the enumeration of persons in public institutions, on board vessels, or in charge of boats and barges employed in inland navigation.

Persons travelling during the night of Sunday, 2d April, were to be included in the schedule of the proprietor or manager of the hotel or inn, or in the schedule of the occupier of the house at which they arrived on the morning of Monday, 3d April. Persons engaged in work away from home during the night of Sunday, 2d April, were to be included in schedules left at their houses.

The cause of an unusual number of persons being temporarily absent or present was to be noted.

When the enumerators had collected and arranged their schedules, they were copied into enumeration books provided for this purpose, and a summary was made of the population of each civil parish, township, or place, and these books were delivered to the registrar on or before 10th April, by whom they were examined and corrected, and forwarded on or before 24th April to the superintendent registrar.

The enumeration books were then revised by the superintendent registrar, who was at this stage required to fill up a printed form, showing a summary of the houses and population in each sub-district, municipal or parliamentary city or borough, &c., and transmit the whole to the Census Office in Craig's Court.

On receipt of the books and summaries by the Registrar-General, the abstract required by the 9th section of the Census Act was prepared and laid before Parliament on 20th June, 1871.

As soon as the preliminary report, consisting of 137 pages, was published, the work commenced at the central office of revising the enumeration books so as to ascertain the correct number of houses and population in each of the various subdivisions of the country, and in order to ensure accuracy in the preparation of this work, statements of the houses and population of ecclesiastical districts and other local subdivisions were submitted to the clergy and to the various local authorities for approval. The registrars were required to state the cause of any remarkable increase or decrease of population, and a proof of the tables relating to each county was submitted to the clerk of the peace for correction and approval.

The abstracts relating to the occupations and ages of the people were a great work. It was considered desirable not only to take out the number of persons of each sex in each occupation, but the number at each quinquennial period of age; for without this information the relative salubrity of the professions, and a great variety of other important questions, could not be determined.

In this arrangement of the people according to occupations and ages, they had not only to be classified in different orders, but it was necessary to find a place for every one of the 23 millions of population, so as to be enabled to pass them rapidly and distinctly in review.

The classification of the living according to their professions and occupations in combination with age has opened up a new field of inquiry, and the question can now be determined for sanitary purposes, and for life insurance, what effects the different professions and occupations have on health at different ages. Formerly, the mean age at death was taken to show the healthiness or insalubrity of certain occupations. But the mean age at death depends upon many circumstances besides health, and among others, upon the ages of the living, which vary in proportion in almost every profession, according as it is a profession that people enter early or later in life. Insurance offices and friendly societies will find the results of the third volume of the Census of England in 1871—in conjunction with the 14th Annual Report, and the two Supplements to the 25th and 35th Annual Reports of the Registrar-General, recording the mortality of persons at different occupations—of great use to them in their transactions, for it is evident that the lives of farmers, for example, may be safely insured at much lower rates than the lives of licensed victuallers.

Many important results for "civil counties" were published in 1871 that will not be found in the census returns of 1861, such as a description of the territorial, executive, and ecclesiastical divisions in each county, more exact areas from the ordnance survey, additional columns showing the houses under three headings, and distinguishing the sexes of the population, additional columns showing area, number of electors, and of members within the parliamentary limits, including and excluding represented boroughs, petty sessional divisions, wards of municipal boroughs, comparative tables of houses and population in 1861 and 1871, tables showing the number of families in each civil parish and township, and results showing the residue of area and population in mother parishes.

Also under "registration counties" many new particulars were published in 1871, such as maps of counties and districts, showing the population of large towns, and the particulars as to reformatory and industrial schools, and as to Her Majesty's ships.

The census of Ireland in 1871 was taken by the Registrar-General of Ireland, assisted by two other commissioners, W. R. Wilde and G. W. Abraham. The enumeration (except in the metropolis, in which 178 of the Dublin Metropolitan police discharged that duty) was effected by 4536 members of the Royal Irish Constabulary, whose local knowledge and previous experience as enumerators on three former occasions rendered them peculiarly well suited for this undertaking. The country was divided into 248 districts, each under the charge of a sub-inspector. Printed instructions were furnished, and, when necessary, the enumerators were supplied with maps, conveyances, boats, and in the Irish-speaking districts with interpreters also. In conformity with the Census Act an abstract of the census of Ireland was published on 14th June, 1871, showing the number of houses, families, and population in each county and city, and in certain corporate towns in Ireland. The numbers in the different religious professions were also returned as directed by the Act. The revised and final numbers for Ireland record the population in 1871 at 5,412,377, show-

ing a decrease since 1861 of 386,590 or 6·67 per cent. In the previous decenniad, 1851–61, the population had decreased by 753,418, or 11·50 per cent. The decrease in the population of 1871 is stated to be chiefly attributable to emigration. From 1st May, 1851, to 31st March, 1871, the loss by emigration amounted to 2,024,609. Results relating to the ages, civil conditions, occupations, birthplaces, religion and education of the people are published in the census returns for Ireland; and instructions were issued by the Government, directing that the results of the census of 1871 for each of the three divisions of the kingdom should be published, with a view to uniformity. Some of the principal results have thus been assimilated in 1871, but there is still a considerable want of uniformity, especially as regards the ages of children in Ireland. A volume devoted entirely to vital statistics is not the least interesting of the results of the census of Ireland in 1871.

As regards Scotland, the results of the census of 1871 are nearly uniform with those of England. In addition to the ordinary particulars, inquiries were made as to the number of children from five to thirteen years of age receiving education, and the number of rooms with windows. This census was taken by the Registrar-General of Scotland and Dr. Stark, through the agency of 1016 local registrars, assisted by 8342 enumerators, whose appointments were approved by the sheriffs in counties, and by the chief magistrates in boroughs. The returns for Scotland in 1871 contain some new features, such as the ecclesiastical subdivisions of civil counties, grouping the population of each civil county into three great divisions, according as they inhabited towns, villages, or rural parts; the particulars as to houses, families, and population relative to parliamentary constituencies of counties are also new. As there were no registration districts in 1851, no attempt was made in 1861 to show the relative increase or decrease of the population from 1851. But in the census of 1871, this want was supplied by giving the number of the population in each district for 1861, for comparison with that of 1871. The number of children from five to thirteen years of age in the receipt of education also appears for the first time in the returns for 1871.

The census of the Island of Man and of the Channel Islands was taken by the lieutenant-governors according to directions issued by the Secretary of State for the Home Department, but the forms and instructions were issued by the Registrar-General of England. The population of these islands on the aggregate in 1871 was 144,638, viz.:—Isle of Man 54,042, Jersey 56,627, and Guernsey and adjacent islands 33,969. No census of the Isle of Man was taken earlier than that of 1821, when 40,081 persons were enumerated. Enumerations of the inhabitants of Jersey were made in 1806 and in 1815, in which years the population was respectively returned as 22,855 and 22,763. The first census of Guernsey, &c., was taken in 1821, and was 20,302. The population of these islands has remained nearly stationary at the last three censuses.

The cost of the census, incurred at the central office, and in payment of local officers in each of the three countries in 1871, was £5, 5s. 7¾d. per 1000 of the population for England and Wales, £8, 1s. 4d. for Scotland, and £7, 2s. 7d. for Ireland.

The results of the census of 1871 are multitudinous, and it is impossible here to enumerate all the facts of interest which the returns disclose. Those relating to parliamentary constituencies show that of 95 counties, or divisions of counties, the population had increased in 1861 in 82, while in 13 the population had decreased. Out of 198 boroughs which returned members to Parliament the population had increased in 156, while in 31 the population had decreased. In the year 1868 the boundaries of 68 boroughs were altered, and in some of these the increase of population may be due to enlarged area. Eleven boroughs had been formed since 1861. Some of the elaborate results afford the means of solving important questions relating to the industrial organization of the country, and to show to what extent there has been a diminution in the numbers employed in the cultivation of the soil, and to what extent there has been a consolidation of farms, affecting the average size of the holdings. Other results show the ages of the married and unmarried population, and these, combined with the returns of the ages at marriage, furnish the means of determining very important questions, such as the probable duration of the joint lives of husband and wife, the annual rate of marriage at different ages, and so on Tables showing the number of foreigners resident in England and Wales, and the number of British residents abroad, throw much light on many points relating to the social condition of the people. Not the least useful of the results is an interpolated table of the population at each year of age, furnishing school-boards with the means of ascertaining the proportional number of children at the school ages, and enabling life insurance officers and scientific and other authorities to solve many important problems.

(W. F.)

Census of the United States.

The census of the United States is a political necessity. To this, and not to the general appreciation of the claims of statistical science, is due the fact that the systematic periodical enumeration of inhabitants was there undertaken earlier even than in England.

Had the government set up in 1787 been a pure confederation, like that which preceded it, into which the States entered as equal bodies, the census would not have been a condition of its existence; while rude estimates founded on the number of the natural militia, the arms-bearing population, or on the number of horses, or on the records of births and deaths, might long have answered all administrative purposes. On the other hand, had the Constitution of 1787 erected a single, self-sufficient government, a simple sovereignty, the census need not have been provided for in that instrument. Representative power might have been apportioned approximately according to common fame, or numbers might have been rejected as the measure of political power, as in England, and even as in Connecticut, alone of all the States of the American Union, to-day.

But the mixed form of government established by that constitution, the only form of government which was then possible, by which the pre-existing States maintained their right to exist and to act for themselves in all strictly internal affairs, while for all national purposes political power was to be exercised by a double rule, partly through the States acting as equal bodies, and partly according to population irrespective of State lines, positively required, not as a means of administrative efficiency, but as an essential condition of its own existence, that the inhabitants of the United States should be periodically enumerated. Accordingly, we find in the Constitution of 1787 a provision for a census to be taken every ten years, the first enumeration to be made "within three years after the first meeting of the Congress of the United States."

It would appear from this brief review that the eulogium of Moreau de Jonnès was scarcely merited when he declared that the United States present a phenomenon without parallel in history,—"that of a people who instituted the statistics of their country on the very day when they founded their government, and who regulated by the same instrument the census of inhabitants, their civil and political rights, and the destinies of the nation." As a matter of undoubted history, the provision for a national census was incorporated in the constitution solely from political, not at all from philosophical, considerations. Pending the actual accomplishment of the first enumeration, an estimate of the population of the several States was adopted as a provisional basis of representation in Congress.

The first census was taken in 1790, the returns all being referred to the 1st of August of that year, although the work of canvassing was extended over a considerable period. As was the case with the first British census eleven years later, and as is likely to be the case with the first census of any community, great disappointment was felt at the result, and dissatisfaction at the methods of enumeration was loudly expressed. Mr. Jefferson, then Secretary of State, was careful in sending abroad copies of the published tables, to impress it on the minds of his correspondents that the returns fell far short of the truth, and even went so far as to supply the omissions which he assumed to exist. The results of later censuses, however, have established the substantial accuracy of the first enumeration, and shown that the dissatisfaction felt at the time was but the inevitable disappointment of over-strained anticipations. "To count," says Dr. Johnson, "is a modern practice; the ancient method was to guess; and where numbers are guessed, they are always magnified." General censuses were taken in 1800, 1810, and 1820, with exact intervals of ten years. In 1830 the date of enumera-

tion was fixed on the 1st of June. This change made the interval between the fourth and fifth censuses nine years and ten months only, reducing the nominal ratio of increase between 1820 and 1830, by about two-thirds of 1 per cent. The succession of census was then resumed with exact intervals of ten years. The ninth census was taken as of date June 1, 1870.

Peculiarities of the Constitution of the United States have been spoken of which rendered the census a political necessity, and secured its adoption there earlier than in countries far more advanced in statistical science and in the arts of administration. To the same peculiarities are attributable the features by which the census of the United States has come to differ from the census of other countries. The reservation by the States of all rights not granted to the general Government makes it fairly a matter of question whether purely statistical inquiries, other than for the single purpose of apportioning representation, could be initiated by any other authority than that of the States themselves. That large party which advocates a strict and jealous construction of the constitution would certainly oppose any independent legislation by the national Congress for providing a registration of births, marriages, and deaths, or for obtaining social and industrial statistics, whether for the satisfaction of the publicist, or for the guidance of the legislature. Even though the supreme court should decide such legislation to be within the grant of powers to the general Government, the distrust and opposition, on constitutional grounds, of so large a portion of the people, could not but go far to defeat the object sought.

In this political difficulty, the unquestionable provision of the constitution for a decennial census has been taken advantage of by all parties to secure much statistical information, which is not usually, and perhaps is not properly, connected with a census. Nor can there be any doubt that the introduction of new schedules of inquiries has, since 1850, somewhat impaired the efficiency of the census in its original constitutional function of making a count of the inhabitants of the several parts of the country for the purpose of distributing representation in Congress. As the census has widened, it has weakened. More has been put upon the enumerator than he could well carry. His attention has been distracted by the multiplicity of objects presented; the great number of inquiries has also perplexed and irritated the body of citizens; while the result of protracting the canvass to obtain additional information has, in the incessant changes of population, especially in cities and in manufacturing villages, allowed not a few to escape enumeration altogether.

The first enlargement of the scope of the census was in 1810, when the agents of the census were by law required to take an account of the several manufacturing establishments and manufactories within their several districts. The same requirement was contained in the Act for the census of 1820; but the results proved of so little value that the attempt was altogether abandoned in 1830. In 1840 a manufacturers' schedule was used, and inquiries respecting schools were incorporated. It was at the seventh census, 1850, however, that the main enlargement was effected. By the Act of May 23 of that year, the census was extended to cover the several subjects of mortality, agriculture, productive industry, schools, churches, newspapers, &c., &c.

The agencies and methods of enumeration in the census of the United States have been but little changed from the first, and are to-day antiquated and ineffective in a high degree. By the Act of 1790, it was made the duty of the marshals of the United States courts in the several judicial districts to take the enumeration, appointing therefor as many assistants as they should deem necessary. The enumeration was to commence August 1, and to close within nine calendar months thereafter; the returns were to be filed with the clerks of the several courts, while the marshals were to forward to the president "the aggregate amount of each description of persons within their respective districts." In 1800 the supervision of the census was placed with the Secretary of State. The machinery of enumeration remained until 1850 the same as in 1790.

In 1810 the agents of the census were placed under the direction of the Secretary of the Treasury as to the enumeration of manufactures required; but in 1820 the entire charge remained with the Secretary of State. In 1850, the supervision of the census was committed to the newly created Department of the Interior, and the period allowed for enumeration was restricted to five months. As a matter of fact, no enumeration has been completed within that time. The United States marshals and their assistants remained the agents of the census office; and a superintendent of census was appointed. In preparation for the census of 1870, a committee of the House of Representatives, under the chairmanship of General James A. Garfield of Ohio, presented a bill which sought to bring the census as nearly up to the demands of modern statistical science as the peculiar conditions of settlement and occupation in the United States would allow. The report of the committee dwelt strongly on the essential viciousness of a protracted enumeration, and on the general unfitness of the marshals of the courts to perform the duty. The bill, however, did not propose a single-day enumeration, but allowed a month for its completion. The schedules of inquiries were largely increased in recognition of the impossibility of obtaining statistical information under authority of the United States Government, except under cover of the constitutional provision for a decennial census. The rank and power of the superintendent of census were increased.

The bill of the committee was carried through the House of Representatives by large majorities, but failed in the Senate. The census of 1870 was consequently taken under the Act of 1850 with two or three inconsiderable amendments.

The cost of each census has been as follows:—

	Dollars.		Dollars.
1790	44,377	1840	833,371
1800	66,609	1850	1,318,028
1810	178,445	1860	1,917,540
1820	208,526	1870	3,360,884
1830	378,543		

In the census of 1870 the work of enumeration was performed by 6572 assistant marshals, supervised by 61 marshals of United States Courts.

Prior schedules so called, that is, schedules to be left at the residence in advance of the enumeration, to be filled up by the head of the family, have never been used in a census of the United States, though adopted in nearly every European country. (F. A. W.)

CENTAURS (Κένταυροι), in Greek mythology, were beings part horse part man, *i.e.*, a horse had its neck and head replaced by the head and body of a man down to the waist. The oldest form was that of a man altogether in front with the body and hind legs of a horse attached to his back. In peopling solitary and wild places with imaginary beings it was usual to assign to these beings a bodily form in some obvious way consistent with the features of the locality; thus, Pan, the spirit of rocky hills, was imagined as having goat's legs, and Scylla, the spirit of sea-storms, as having the body and tail of a fish. In most cases the animal adjunct was made to supersede the human legs, as if the first consideration had been that the spirit should have a non-human means of locomotion. In the case of the Centaurs whose home was in mountainous and wooded regions with wild torrents, chiefly in Thessaly and Arcadia, the horse may have been chosen either as symbolic of the impetuosity of streams and winds, or from the circumstance of such districts being favorable for horse rearing. One of the Centaurs, Chiron, who lived in a cave on Mount Pelion, was a friend of gods and heroes, skilled in medicine and music, and as an instructor of youth; but as a race they were best known for their battle with the Lapithæ, which arose at the marriage of Peirithous and Deidamia, when the Centaurs, excited with wine, attempted to carry off the bride, but were overpowered by the help of Theseus, who was present; hence this subject, generally suitable for sculpture, was a favorite with Athenian artists. The Centaurs formed part of the retinue of Bacchus. No satisfactory derivation of the name has yet been given.

CENTIPEDES AND MILLEPEDES, the popular names of the two orders of Articulate animals which until lately formed the entire class *Myriopoda*. They were formerly classed with insects, which they resemble in their jointed limbs and antennæ, and in their respiratory system, but they have also points of contact with annelid worms, with crustaceans, and with spiders, by which they are

marked as a transition group, intermediate between the lower and higher Articulata. Myriapods (*μυριάς*, ten thousand, and *πούς*, a foot) are elongated worm-like creatures, cylindrical or flattened, and composed of numerous segments, each bearing one or two pairs of jointed legs,—those on the anterior segments being modified, as in the Crustacea, so as to form the organs of the mouth. The fang-like, prehensile jaws of the centipede, perforated at their extremities to allow of the passage of the liquid venom into the wound they have inflicted, are thus simply modifications of a pair of legs. The eyes consist of a number of *ocelli*, congregated together on the head, and, with a single exception, are never compound, as in insects. Like the latter, they breathe by means of tracheal tubes, opening by stigmata placed on both sides, behind the insertion of the legs, and kept permanently open by a spiral chitinous fibre. They are unisexual, the organs of generation being, however, differently placed in the two groups, occurring anteriorly in millepedes, and posteriorly in centipedes. The young of many species closely resemble their parents from the time they leave the egg, only with fewer limbs and segments; these, however, increase with each successive moulting until the normal number of the adult is reached. Other species, as those of the family *Julidæ*, undergo, during their period of growth, modifications closely resembling the metamorphoses of insects. Their larvæ at first either are destitute of legs, or have only three pairs situated anteriorly; and it is only after a long series of moultings, extending in some cases over two years, that their maturity is signalized by the appearance of sexual organs.

Myriapods have been usually divided into the two orders *Chilognatha* or Millepedes and *Chilopoda* or Centipedes; but recently a small myriapod, $\frac{1}{20}$th of an inch in length, was discovered by Sir J. Lubbock, among decomposing vegetable matter, differing from the other members of the class in the absence of tracheæ, apparently absorbing air through its semi-transparent skin, in the smaller number of its legs (nine pairs), and in the bifid character of its antennæ; and this has been made the type of a third order—*Pauropidæ*. *Pauropus Huxleyi* Lubbock describes as an active, cleanly little creature, with a look of cheerful intelligence, in marked contrast to the dull stupidity of the *Julidæ*, or the melancholy ferocity of the centipede. Millepedes, or "Thousand-Legs," are readily distinguished from the other group by their antennæ, which are always six or seven jointed, by the generally cylindrical shape of the body, and by the possession of two pairs of legs on each segment—the last posterior segments and a few anterior excepted. Each segment also bears a pair of stigmata or tracheal openings, instead of every alternate one, as in centipedes; and this fact, taken in connection with the double quantity of legs, has led to the belief that each segment in the millepede has been formed by the union of two, a view further strengthened by the presence of a distinct transverse groove down the centre of each. The legs of millepedes though numerous are exceedingly weak, and in moving they appear to glide along like footless worms. They are most frequently found among damp moss, and beneath masses of decaying vegetable matter on which they feed; and when in danger they roll themselves into a ball. The British species are few, and the largest of these does not exceed 2 inches in length; but there is an American form which attains a length of 8 inches. All are equally harmless, the prehensile jaws being rudimentary, while the other parts of the mouth are modified to suit their purely vegetable diet.

Centipedes, or "Hundred-Legs," have their segments flattened, and covered with a leathery skin, and have one pair of legs on each segment, the posterior pair being directed backwards and elongated so as to resemble a couple of jointed tails. Their antennæ have not less than fourteen and rarely more than forty joints, while the body segments do not usually exceed twenty. The organs of the mouth are masticatory, and are admirably adapted to the carnivorous habits of the centipede. It feeds principally on insects, seizing them with its powerful prehensile organs, and injecting at the same time its venom into the wound. The bite of the larger forms, as *Scolopendra morsitans*, occurring in tropical countries, is exceedingly painful, and is described by those who have suffered from it "as similar to what might be produced by contact with a red-hot iron," giving rise to swelling, throbbing pains, and febrile symptoms (Dr. Collingwood's *Naturalist's Rambles in the China Seas*). These, however, yield readily to an application of ammonia. Centipedes seldom exceed a foot in length. They are exceedingly active in pursuit of their prey, insinuating their many-jointed and flattened bodies under stones, beneath the bark of trees, and wherever insects usually lurk. *Lithobius forcipatus*, the commonest British species, is 2 inches long, and quite harmless, although when seized it attempts to fix its jaws into the skin of its captor. The species belonging to the genus *Geophilus* are said to be luminous in the dark Upwards of twenty species of fossil Myriapoda are known,—the oldest from the Coal Measures of North America, and belonging to the millepede or vegetable-eating division. One of these, *Xylobius sigillaria*, was found in the hollow trunks of the fossil *Sigillaria*.

CENTLIVRE, Susanna (1667–1723), a dramatic writer, was born in 1667, or perhaps a year or two later, probably in Ireland, whither her father, Mr. Freeman, a Lincolnshire gentleman, had been forced to flee at the Restoration on account of his Parliamentarian principles. Being left an orphan about the age of eleven she came to London, where, at the age of sixteen, she married a nephew of Sir Stephen Fox. About twelve months afterwards her husband died; and she then married a military officer named Carrol. Carrol was killed in a duel about a year and a half after their marriage, and his widow was left to support herself by her pen and by acting. Her first attempt was a tragedy called the *Perjured Husband;* but almost all her subsequent pieces were comedies, several of which, through their liveliness, enjoyed very considerable popularity, as for example the well-known *Busibody* (which has been represented within the last few years), *A Bold Stroke for a Wife*, *The Basset-Table*, *The Wonder—a Woman keeps a Secret*, *Love at a Venture*. Her wit and personal attractions also gained her the support of Steele, Farquhar, Rowe, and many others of high position in literature and society. In 1706 she married Mr. Joseph Centlivre, principal cook to Queen Anne, with whom she lived till her death in 1723. Her dramatic works were published, with a biography, in 3 vols. 12mo, 1761, reprinted 1872.

CENTO, a town of Italy, in the province of Ferrara, 16 miles north by west of Bologna, situated in a fertile plain near the Reno. It is the seat of a bishop, has a cathedral and several fine buildings, and carries on a trade in grain and hemp; but it is chiefly remarkable as the birthplace of the painter Guercino, several of whose works are to be seen in the churches of St. Biagio and the Madonna del Rosario. His house is still preserved, and a statue has been erected to his memory in the middle of the town. Population about 19,000.

CENTO (Greek *κέντρων*, Latin *cento*, patchwork), a composition made up of passages from other works. The Byzantine Greeks manufactured several out of the poems of Homer, among which may be mentioned the life of Christ by the famous Empress Eudoxia, and a version of the Biblical history of Eden and the Fall. The Romans of the later empire and the monks of the Middle Ages were fond of constructing poems out of the verse of Virgil. Such were the ancient *Cento Nuptialis* of Ausonius, the sketch of Biblical history which was compiled in the 4th century by Proba Falconia, wife of a Roman proconsul, and the hymns in honor of St. Quirinus taken from Virgil and Horace by Metellus, a monk of Tegernsee, in the latter half of the 12th century. Specimens may be found in the work of Aldus Manutius (Venice, 1504; Frankfort, 1541, 1544). In 1535 Lælius Capitulus produced from Virgil an attack upon the dissolute lives of the monks; in 1536 there appeared at Venice a *Petrarca Spirituale;* and in 1634 Alexander Ross (a Scotchman, and one of the chaplains of Charles I.) published a *Virgilius Evangelizans, seu Historia Domini nostri Jesu Christi Virgilianis verbis et versibus descripta*.

CENTORBI, or Centuripe, the ancient *Centuripa*, a town of Sicily, on a rugged mountain, in the province of Catania, and 20 miles W.N.W. of the city of that name. At a very early period Centuripa was an important town of the Siculi; and through various vicissitudes it succeeded in maintaining its independence until the first Punic war, when it was besieged by the consuls Otacilius and Valerius Messala. In the time of Cicero it was one of the most flourishing places in the island, and had a population of

about 10,000. In 1233 it was destroyed by Frederick II. Extensive remains of the ancient city still exist. The new town has a population of upwards of 7000.

CENTRAL AMERICA, as a geographical division, would naturally include the whole stretch of territory from the Isthmus of Tehuantepec to the Isthmus of Darien, which forms the nexus between the two great masses of North and South America; but political arrangements have so affected the use of the name that it only includes the portion corresponding to the five independent North American republics of Costa Rica, Nicaragua, Honduras, San Salvador, and Guatemala, while the Isthmus of Panama is assigned to South America as a part of New Granada, and the Isthmus of Tehuantepec and the Peninsula of Yucatan are incorporated with North America as parts of Mexico. Central America thus lies between 7° and 18° of N. lat., extends about 800 or 900 miles in length, and has a varying breadth of from 30 to 300 miles. For details the reader is referred to separate articles on the five republics mentioned above, which formed a federal republic from 1823 to 1839, and have frequently endeavored since then to effect a restoration of their union.

CENTRAL INDIA POLITICAL AGENCY, the official name for a group of feudatory states in the middle of India. Roughly speaking, they are bounded on the N. by Rájputáná, the North-Western Provinces, and Oudh; on the E. by the Chhotá Nágpur division of Bengal, on the S. by the Central Provinces, and on the W. by Bombay. The total area of these states is not accurately known, but is probably not less than 90,000 square miles, and the population is computed at over 8,000,000 souls. The individual states which make the group have nothing in common with one another, apart from the diplomatic link which connects them all with the British power through the person of the agent to the Governor-General. The principal of the feudatories are Gwaliar (Scindiah), Indor (Holkar), Rewah, and Bhopál. Each of these states will be found noticed in its respective place in alphabetical order. The total number of states, great and small, comprising the Central India Political Agency is 71.

CENTRAL PROVINCES, a Chief Commissionership of British India, situated between 17° 50′ and 24° 30′ N. lat., and between 76° and 85° E. long., comprising an area of 84,078 square miles, and a population returned by the census of 1872 at 8,201,519. The Chief-Commissionership was constituted in 1861, when the territories previously known as the Nágpur Province and the Ságar and Nerbudda Territories were united under the name of the Central Provinces. This large tract, comprising almost every variety of soil and of physical aspect, and inhabited by races of very diverse origin, is bounded on the N. by the feudatory state of Rewah, by the small native states of Bundelkhand, and by the district of Lálatpur in the North-Western Provinces; on the N. and E. by the Chhotá Nágpur division, the Orissa tributary states, and the northern districts of Madras; on the S. by the Godávarí district; and on the S.W., W., and N.W. by the Nizám's dominions, the Berar districts, and the states comprising the Central India Agency. The Central Provinces are divided into four divisions or commissionerships,—Nágpur, Jabalpur, Nerbudda, and Chhatísgarh, comprising 19 British districts. Two districts, Ságar and Damoh, lie parallel to each other upon the Vindhyan table-land. To the south of them, in the valley of the Nerbudda and its tributaries, are the districts of Mandlá, Jabalpur, Narsinhpur, Hoshangábád, and a part of Nimár, the rest of it being in the valley of the Tapti. The next range of districts continuing southwards includes Betul, Chhindwárá, Seoni, and Bálághát, occupying the Sátpurá table-land, and attaining a height of about 2000 feet. Still further to the south is the great Nágpur plain, formed by the valleys of the Wardhá and Waingangá, and comprising the districts of Nágpur, Wardhá, Bhandárá, and Chándá. To the east is the Chhatísgarh plain, a low plateau of red soil, containing the districts of Ráipur, Biláspur, and Sambalpur. Last of all, in the extreme south, and almost cut off by forests and wild semi-independent states, is a long strip of territory lining the left bank of the Godávarí, and known as the Upper Godávarí district.

Physical Geography and Scenery.—The official compiler of the statistical account of the Central Provinces thus describes the physical aspects of the country:—"Within comparatively narrow limits, a plateau and a plain follow each other, and again, in similar sequence, a larger plateau and a larger plain, ending in a mass of hill and forest, which is probably the wildest part of the whole Indian peninsula. Even the continuously level portions of this area are broken by isolated peaks and struggling hill ranges; while its rugged formation and rapid slopes give to the greatest rivers which rise in it, such as the Nerbudda and Tapti, something of the character of mountain torrents. Though the scenery is on too small a scale to compare in sublimity with that of the Himálayas, it is on the other hand as far removed from the monotony of the plains of Hindustán. Not only is it characterized by a constant variety of form and level, but it possesses a diversity of color peculiar to itself. In no other part of India are the changes of soil and vegetation more rapid and marked than in the Nerbudda country. In the pleasant winter months, the eye may range over miles of green corn lands, only broken by low, black, boundary ridges or dark twisting footpaths. The horizon is bounded here and there by hill ranges, which seem to rise abruptly from the plains, but on coming nearer to them, the heavy green of their slopes is found to be divided from the softer hues of the young wheat by broad belts of gravelly soil studded with fine trees. On the Sátpurá plateau the alternations of scenery are even more frequent than in the low country. The hills are higher and more abrupt, the black soil deposits are deeper, and the water supply more abundant. Hence in the midst of the grim rolling plateaus of basalt, there may often be found little valleys cultivated like gardens,—oases of sugar-cane and opium, which, but for their inaccessibility, would tempt away the best cultivators of the plains. It is thought that in some of these upland basins, tea, coffee, and other delicate plants might be raised with success, but the obstacles which have so long retarded the settlement of these plateaus, though partially smoothed away, still exist, and can only be surmounted by patient and continued energy. Much has been done to open out the country of late years. Railways from both coasts now connect the plateau with the eastern and western seaboards, and form the central link of communication between Calcutta and Bombay."

The principal rivers of the Central Provinces are the Nerbudda, Tapti, Wardhá, and Waingangá, but, owing to falls and rocky rapids, they are navigable only at certain times of the year and for short distances. As a means of communication they are practically useless. The chief lines of road are the following:—

(1) From Jabalpur to Ságar *via* Damoh, 116 miles; (2) from Jabalpur to Ráipur *via* Mandlá, 203 miles; (3) from Ságar to Karelí on the Great Indian Peninsular Railway, 76 miles; (4) from Narsinhpur to Chhindwárá, 91 miles; (5) from Hoshangabad to Betul, 68¼ miles; (6) from Nágpur to Ráipur, 174 miles; (7) from Nágpur to Chhindwárá, 78 miles; (8) from Nágpur to Betul, 104¼ miles; (9) from Nágpur to Chándá, 96 miles; (10) from Ráipur to Sambalpur, 167 miles; (11) from Chándá to Sironchá, 121 miles.

The country is intersected by the Great Indian Peninsular and East Indian Railways. The Great Indian Peninsular Railway from Bombay enters the Central Provinces near Barhanpur, and runs north-east to Jabalpur, where it joins the East India line from Allahábád and Calcutta. A branch of the Great Indian Peninsular Railway which leaves the main line at Bhasáwal in Kandesh, enters the Central Provinces at Wardhá, and runs to Nágpur. A state line is in course of construction to connect this railway with the newly-opened coal-fields of Chándá.

The population of the 19 districts of the Central Provinces was returned by the census of 1872 at 8,201,519, made up as follows:—Hindus, 5,879,950, or 71·69 per cent. of the total population; Muhammadans, 233,247, or 2·84 per cent.; Buddhists and Jains, 36,569, or 0·45 per cent.; Christians, 10,477, or 0·13 per cent.; and "others" (consisting chiefly of Gonds and the original inhabitants of the country before they were driven back by their Hindu conquerors), 2,041,276, or 24·89 per cent. The census report of 1872 returns 39 towns containing upwards of 5000 inhabitants. Of these 26 have less than 10,000 inhabitants; 5 between 10,000 and 15,000; 3 between 15,000 and 20,000; 3 (Burhanpur, Ságar, and Kamthí) between 20,000 and 50,000; and only 2 (Nágpur and Jabalpur) over 50,000, the former having a population of 84,441, and the latter of 55,188.

Of the total surveyed and assessed area of the British

territory 12,352,473 acres were returned in 1873–74 as actually under cultivation, 12,220,845 acres as cultivable but not under tillage, 1,365,071 acres as grazing lands, and 10,885,296 as uncultivable waste. Wheat, rice, and cotton are the principal agricultural staples. The recently-discovered coal-fields and iron-beds in the Wardhá Valley and the Chándá district promise to open a new era of prosperity for the country.

The improved means of communication afforded by the railways and roads have rapidly developed the trade of the Central Provinces. In 1863–64 the imports and exports were valued at about four millions sterling. In 1868–69 their value had risen to six and three-quarter millions sterling. In 1873–74 the ascertained imports of the Central Provinces amounted to 117,761 tons, value £4,399,134, and the exports to 209,157 tons, value £3,148,598; total of imports and exports 326,918 tons, value £7,547,732.

Administration.—The executive authority at Nágpur vests in the chief-commissioner and agent to the Governor-General. He is assisted by a secretary and staff, a judicial commissioner, a settlement commissioner, a sanitary commissioner, a commissioner of customs, four commissioners of revenue and circuit, an inspector-general of police, an inspector-general of public instruction, an inspector-general of jails and dispensaries, a conservator of forests, and a registrar-general of assurances, who is also commissioner of excise and superintendent of stamps. A commissioner presides over each of the four divisions, with a deputy-commissioner and assistants in each of the nineteen districts, all subordinate to the chief-commissioner at Nágpur. The total revenue of the Central Provinces in 1873–74 amounted to £1,260,977, of which £1,057,021 was derived from imperial, and £203,956 from provincial taxation. The civil expenditure in the same year amounted to £904,670, of which £440,232 was on imperial, and £464,438 on provincial account. Of the total revenue £603,056, or just one-half, was derived from the land. There were 196 criminal and 119 civil courts at work in 1873–74. The regular police consisted of a force of 7539 officers and men, besides a municipal police of 988. The total cost of the regular and municipal police in 1873–74 amounted to £130,674. The troops quartered in the Central Provinces are as follows:—Europeans—3 batteries of artillery (with 18 guns), and 2 regiments and 1 company of infantry; natives—2 regiments of cavalry and 6¾ regiments of infantry. The European troops numbered 2462, and the native troops 5475, giving a total of 7937 officers and men, kept up at a cost of £277,781. For the education of the people Government maintains, or subsidizes under its grant-in-aid system, 1532 schools, attended in 1873–74 by 76,781 pupils, and maintained at a total cost of £55,734, to which the state contributed £31,628, or over one-half. These schools are exclusive of private institutions not receiving support from the state.

Besides the 19 British districts of the Central Provinces described in the foregoing paragraphs, and to which alone the above statistics refer, there are also 15 small feudatory states, comprising a total area of 28,834 square miles, with a population of 1,049,710 souls, made up as follows:—Hindus, 638,187; Muhammadans, 7718; Buddhists and Jains, 14; Christians, 5; and "others" (consisting of aboriginal tribes), 403,786. The following are the details of area, population, revenue, &c., of each of these states as officially returned in 1874–5:—(1.) Bastár: area, 13,062 square miles; population, 78,856; supposed gross revenue, £9213, 10s.; annual tribute to the British Government, £305, 12s. (2.) Karond: area, 3745 square miles; population, 133,483; estimated revenue, £2000; tribute, £355. (3.) Ráigarh-Bargarh: area, 1486 square miles; population, 63,304; estimated revenue, £750; tribute, £40. (4.) Sarangarh: area, 540 square miles; population, 37,091; estimated revenue, £800; tribute, £135. (5.) Pátná (under British management): area, 2399 square miles; population, 98,636; estimated revenue, £2500; tribute, £60. (6.) Sonpur: area, 906 square miles; population, 130,713; estimated revenue, £1800; tribute, £500. (7.) Rairá Khol: area, 833 square miles; population, 12,660; estimated revenue, £600; tribute, £58. (8.) Bámrá: area, 1988 square miles; population, 53,613; estimated revenue, £600; tribute, £35. (9.) Sakti: area, 115 square miles; population, 8394; estimated revenue, £813; tribute, £35. (10.) Kawardo: area, 887 square miles; population, 75,462; estimated revenue, £5356; tribute, £1600. (11.) Kondá or Chhuikhádán: area, 174 square miles; population, 29,590; estimated revenue, £2203; tribute, £1100. (12.) Kánker: area, 1000 square miles; population, 43,552; estimated revenue, £1500; pays no tribute. (13.) Khairágarh (under British management): area, 940 square miles; population, 122,264; estimated revenue, £11,763; tribute, £4700. (14.) Nandgáon: area, 884 square miles; population, 148,454; estimated revenue, £8595; tribute, £4600. (15.) Makrái: area, 215 square miles; population, 13,648; estimated revenue, £2200; pays no tribute.

Including the 19 British districts and the 15 small feudatory states, the Central Provinces comprise a total area of 113,797 square miles, and have a population of 9,251,229 souls, made up as follows:—Hindus, 6,518,137, or 70·46 per cent.; Muhammadans, 240,965, or 2·60 per cent.; Buddhists and Jains, 36,583, or 0·40 per cent.; Christians, 10,482, or 0·11 per cent.; and "others," 2,445,062, or 26·43 per cent. (W. W. H.)

CENTUMVIRI, among the Romans, were judges appointed to decide common causes among the people, of whom three were chosen out of each tribe. The extent of their powers has not been exactly ascertained. It is not unlikely that they were originally intended to deal with questions concerning quiritian ownership, which determined the status of the citizens. Hollweg asserted that their jurisdiction was confined to civil cases; but this is doubtful. (See Hollweg, *Ueber die Competenz des Centum viralgerichts;* Tigerström, *De Judicibus apud Romanos.*)

CENTURION, among the Romans, an officer in the infantry who commanded originally a hundred men (whence the name), but afterwards an indefinite number—the sixtieth part of a legion. Centurions were of two grades, and were chosen by the tribunes. Their duties were to drill the soldiers and appoint their tasks, and they had power to punish minor offences.

CEOS (Κέως), the modern Zea or Tzia, an island in the Ægean Sea, belonging to the group of the Cyclades and the eparchy of Syra, 14 miles off the coast of Attica. Its greatest length is about 13 miles, and its breadth about 8. It gradually rises towards the centre, where it culminates in Mount Elias, 1860 feet high. Among its natural productions are lemons, citrons, olives, wine, and honey; and it also exports a considerable quantity of valonia. There were formerly four towns of some importance in the island:—Iulis, about three miles from the north-west shore; Coressia, the harbor of Iulis, with a temple of Apollo Smintheus in the neighborhood; Carthæa in the south-east; and Poieëssa in the south-west. Of these Iulis is represented by the town of Zea, and Carthæa by the village of 'S tais Polais; and traces of the other two can still be made out. In ancient times Iulis was the birthplace of the lyric poets Simonides and Bacchylides, the philosophers Prodicus and Ariston, and the physician Erasistratus; and the excellence of its laws was so generally recognized that the title of Cean Laws passed into a proverb. One of them, which forbade a citizen to protract his life beyond sixty years, affords a curious instance of the application of utilitarian principles. The present population of the island is about 8000, of which the capital has about 4300.

CEPHALONIA, or CEFALONIA, the ancient *Cephallenia*, an island belonging to the kingdom of Greece, and the largest of those known as the Ionian Islands, is situated on the west side of the mainland, almost directly opposite the Gulf of Corinth. Its extreme length is 31 miles, and its breadth varies from about 20 miles in the southern portion to three or less in the projecting part, which runs parallel with the island of Ithaca, at a distance of about four miles across the strait of Guiscardo or Viscaro. The whole island, with its area of 348 English square miles, is covered with rocky hills of varying elevation, the main range running from north-west to south-east. The ancient mount Ænos, now Elato, Monte Negro, or the Black Mountain, has a height of 5300 feet, and frequently retains the snow for several months. It is not only the loftiest part of the sierra, but also the highest land in the whole Ionian group. The name "Black" was given from the darkness of the pine woods which still constitute the most striking feature in Cephalonian scenery, although their extent has been greatly curtailed by fire. On the summit there is still to be seen an ancient altar, surrounded by the bones of former sacrifice. The island is ill supplied with fresh water; there are few permanent streams except the Rakli, and springs are apt to fail in dry summers. In the western part of the island a gulf runs up from the south a distance of about seven miles; on its east side stands the chief town Argostoli, with about 9000 inhabitants, and on its west side the rival city of Lixuri, with 6000.

About five miles from Argostoli is the castle of St. George, a building of Venetian origin, and the strongest fortification in the island; and between St. George and the village of Mataxata, where Byron at one time resided, are several large catacombs. On an eminence east-south-east of Argostoli are the ruins of the ancient Cranii, and Lixuri is close to or upon those of Pale; while on the other side of the island are the remains of Samos on the bay of the same name, of Proni or Pronni, further south above the vale of Rakli and its blossoming oleanders, and of an unknown city near the village of Scala. The ruins of this city include Roman baths, a brick-built temple, rock-cut tombs, and tessellated pavements; and Cranii, Proni, and Samos are remarkable for stretches of Cyclopean and Hellenic walls, partly of the most irregular construction, and partly preserving almost unimpaired the results of the most perfect skill. The inhabitants of Cephalonia have all along been extremely active; and no slight amount of toil has been expended in the construction of terraces on the steep sides of the hills. Owing to the thinness of the population, however, but a small proportion of the soil is under cultivation, and the quantity of grain grown in the island is comparatively meagre. The staple is the currant, in the production of which the island surpasses Zante. The fruit is smaller than that of the Morea, and has a peculiar flavor; it finds a market mainly in Holland, Belgium, and Germany. The grape vine is also grown, and the manufacture of wine is a rising industry. The olive crop is of considerable importance, and within recent years the culture of cotton in the low grounds has been successfully attempted. Manufactures are few and undeveloped, but lace from the aloe fibre, Turkey carpets, and basket-work are produced by the villagers, and boats are built at both the principal towns. Among recent improvements may be mentioned the erection of two steam-mills and the introduction of steam-boat communication between Argostoli and Lixuri. In 1873 there were exported from the island 19,603,933 lb of native currants, of the value of £123,176; and in the same year the re-exportation of Morea currants was 4,567,192 lb, valued at £25,728. The total imports, which consist mainly of wheat, maize, barley, and rye, amounted to £287,493. Of all the seven islands Cephalonia and Zante are most purely Greek; and the inhabitants display great mental activity. Of several contributors to the national literature may be mentioned Bishop Maniati, author of a treatise on the schism of the Eastern and Western churches, and Andrea Lascarato, a vigorous political writer and keen defender of the British protectorate, who brought himself into great trouble by the freedom of his attacks in his *Mysteries of Cephalonia.*

In the Homeric poems, Cephalonia is mentioned under the name of Same, and its inhabitants, among the subjects of Ulysses, are designated Cephallenes. In the Persian war they took but little part; in the Peloponnesian they sided with the Athenians. The town of Pale was vainly besieged by Philip of Macedon in 218 B.C., because it had supported the Ætolian cause. In 189 B.C. all the cities surrendered to the Romans, but Same afterwards revolted, and was only reduced after a siege of four months. The island was presented by Hadrian to Athens, but it appears again at a later date as "free and autonomous." After the division of the Roman empire, it continued attached to Byzantium till 1082, when it was captured by Robert Guiscard, who died, however, before he could repress the revolt of 1085. In 1204 it was assigned to Gaius, prince of Tarentum, who accepted the protection of Venice in 1215; and after 1225 it was held along with Santa Maria and Zante by a succession of five counts of the Tocco family at Naples. Formally made over to Venice in 1350 by the prince of Tarentum, it was afterwards captured by the Turks in 1479; but the Hispanico-Venetian fleet under Benedetto Pessaro and Gonsalvo of Cordova effected their expulsion in 1500, and the island continued in Venetian possession till the fall of the republic. For some time it was administered for the French Government, but in 1809 it was taken by the English under Collingwood. Till 1813 it was in the hands of Major de Bosset, a Swiss in the British service, who displayed an industry and energy in the repression of injustice and development of civilization only outdone by the despotic vigor of Sir Charles Napier, who held the same office for the nine years from 1818–1827. During the British protectorate the island made undoubted advances in material prosperity, but was several times the scene of political disturbances. It retained longer than the sister islands traces of feudal influence exerted by the landed proprietors, but has been gradually becoming more democratic. Under the Venetians it was divided into eight districts, and an elaborate system of police was in force; since its annexation to Greece it has been broken up into twenty demarchias, each with its separate jurisdiction and revenues, and the police system has been abolished.

A special treatise on the antiquities of Cephalonia was written by Petrus Maurocenus. See also Holland's *Travels*, 1815; Ansted's *Ionian Islands*, 1863; Viscount Kirkwall's *Four Years in Ionian Islands*, 1864; Wiebel's *Die Insel Kephalonia;* and Parliamentary papers.

CERAM, or SIRANG, an island of the East Indian Archipelago, situated to the west of New Guinea, and belonging to the Dutch Government of the Moluccas. It lies between 2° 45′ 30″ and 3° 30′ 30″ S. lat., and extends from 128° to 131° 10′ E. long.; its greatest length is about 200 miles, its greatest breadth about 50, and its area upwards of 6000 square miles. It is divided into two parts, Great Ceram and Little Ceram or Huvamohel, united by the isthmus of Taruno; and, for administrative purposes, the eastern portion is assigned to the residency of Banda, while the western belongs to that of Amboyna. A chain of mountains traverses the island from east to west, and attains in various parts a height of upwards of 8000 feet. The loftiest summit—Nusa Keli—has an elevation of 9500 feet; and others of mark are Salagor, Trier, and Tomaehe. The coast is for the most part rocky and precipitous; but it is broken in several places by considerable bays, of which the most important are Hatuvi and Savaai on the north, and Huvamohel, Amahay, Nusa Laut, and Selan on the south. The country is well watered with streams, which are of very little use, however, for navigation or systematic irrigation. Several hot springs have been discovered, and earthquakes are not unfrequent. A large part of the interior is covered with dense and gloomy forests, and except along the coasts the population is very scant. For the naturalist Ceram is a comparatively uninteresting island, without any characteristic species or abundance of specimens. The Bandanese pay occasional visits to shoot bears and deer; there are numbers of wild goats and cattle; and among the birds are mentioned cassowaries, cockatoos, birds of paradise, and the swallows that furnish the edible nests. A large number of fish are to be found in the various rivers; and as early as 1860 no fewer than 213 species were described by Dr. Bleeker in the *Natuurkundig Tijdschrift v. N. I.* The most valuable timber trees are the iron-wood and the makila. Rice, maize, cocoa-nuts, sugar-cane, and a variety of fruits are grown; but by far the most important production is the sago palm, which grows abundantly in the swampy districts, especially of Eastern Ceram, and furnishes a vast supply of food, not only to Ceram itself, but to other islands to the east. The Dutch settlers at Amboyna have recently established cocoa plantations at various points, and the Government encourages their formation. The inhabitants are mostly gathered in villages along the coast; they are partly native Alfuroes and partly immigrant Malays, with a considerable intermixture of Buginese, Macassars, Balinese, and other races of the archipelago. Christianity has been introduced in various districts, especially along the southern coast, but as yet with but little practical benefit. A baneful influence has been exerted by a secret society called the Kakian Union, to which pagans, Mahometans, and Christians indiscriminately attached themselves; and it has several times cost the Dutch authorities considerable efforts to frustrate their machinations. A full account of the union will be found in the fifth year of the *Tijdschrift van Ned. Ind.* The total population is estimated at 195,000, of whom the lands on the south coast contain 65,000, the lands on the north coast 40,000, and the south-western peninsula a large portion of the remainder. There was a Dutch fort at Kambello, on the west side of Little Ceram, as early as 1646. See Wallace's *Malay Archipelago*, and Bickmore's *Eastern Archipelago.*

CERBERUS (Κέρβερος) in Greek mythology, the dog which guarded the entrance to Hades, not against incomers, but against whoever might seek to escape. In Hesiod (*Theog.* 310) he is a many-headed monster with a fearful bark, but usually he was represented with three heads and the body of a dog such as haunted battlefields,—sometimes also with the tail of a snake. The same number of heads occurs in other beings connected with the lower world, as in Hecate "triformis" and Hermes "trikephalos." The most difficult of the labors imposed on Hercules was to bring Cerberus to the upper world, and in this he was forbidden

by Pluto to use any weapons. Of the various suggested derivations of the name perhaps the most satisfactory is that which connects it with ἔρεβος, the darkness of Hades.

CERDONIANS, a Gnostic sect, founded by Cerdo, a Syrian, who came to Rome about 140, but concerning whose history little is known. They held that there are two first causes—the perfectly good and the perfectly evil. The latter is also the creator of the world, the god of the Jews, and the author of the Old Testament. Jesus Christ is the son of the good deity; he was sent into the world to oppose the evil; but his incarnation, and therefore his sufferings were a mere appearance. Regarding the body as the work of the evil deity, the Cerdonians formed a moral system of great severity, prohibiting marriage, wine, and the eating of flesh, and advocating fasting and other austerities. Origen attributes to Cerdo the opinion,—which was certainly held by the more famous Marcion, his contemporary and, in some respects at least, his follower,—that there are three first causes—the perfectly good, the perfectly evil, and the imperfect, whom Marcion calls "the just" (τὸ δίκαιον), and who is the creator of the world and the god of the Jews. Besides the Old Testament, Cerdo rejected also the New, except part of Luke's Gospel and of St. Paul's Epistles. See MARCION and GNOSTICS.

CERES, in Mythology, was the Roman goddess of seed and harvest, worshipped jointly with Liber (Bacchus) and Libera (Proserpine). No special myth or personal history is known to have been attached to her. But early in the times of the republic, when Greek deities were introduced into Rome on the advice of the Sibylline books, Demeter, the Greek goddess of seed and harvest, whose worship was largely spread in Sicily and Lower Italy, usurped in Rome the divine position which Ceres held before; or rather to Ceres were added the religious rites which the Greeks paid to Demeter, and the mythological incidents which originated with her. These rites were Greek in their language and forms, the priestesses were Greeks, and the temple was Greek in its architecture. Her principal festivals were (1) the *Cerealia* (April 12–19), corresponding in the main idea with the Eleusinia, and (2) the *Jejunium Cereris* (October 4), corresponding to the Thesmophoria of Demeter. The Cerealia included the spectacle of hunting a fox with a torch attached to his tail. Her temple in Rome had been destroyed by fire, and was rebuilt by Augustus. Claudius attempted to introduce the mysteries of Eleusis into Rome in connection with her worship.

As regards the Greek goddess, the chief interest of her worshippers was concentrated on the myth which told how her only daughter Persephone (Proserpine) had been carried off in a chariot by Pluto, the god of the lower world, from the fields of Enna in Sicily, where she was gathering flowers; other districts also were assigned for this incident, but the Romans naturally preferred Enna as being the nearest. Demeter wandered over the earth searching for her daughter in vain, in her anguish refusing food or drink, and threatening a famine for mankind, till Zeus agreed to allow Persephone in future to live half the year with her mother on the earth. The other half she must remain with Pluto in the lower world. From the myth so far it was an obvious step to think of Demeter as a mother always anxious for her child, yearning through half the year to see her again, and sad through the other half at the prospect of her leaving again. But a deeper meaning appears to have been found in the myth by those who were initiated into the mysteries of Eleusis, in which seems to have been taught the principle of a new life after death, founded on the return of Persephone to the upper world, or rather on the process of nature by which seed sown in the ground must first die and rot before it can yield new life, a process which the annual going and coming of Persephone was designed to illustrate. To make more explicit this connection of Demeter with seed-sowing, the myth tells how, in searching for her daughter, she was hospitably received among other places at Eleusis in Attica, and how, when leaving Eleusis, she gave to Triptolemus, the king's son, her chariot drawn by winged snakes, with the injunction to travel over the world teaching men to cultivate grain as she had then begun to teach them. At the Thesmophoria, a festival in which only married women took part, Demeter was regarded as having instituted certain laws (θεσμοί) for regulating life, in particular the married life of women. In the Cretan myth of Demeter she was connected with a hero Jasion, said to have been the first to sow grain, to whom she bore a son, Plutos. Poseidon, the god of the sea, appears as repugnant to her in the myth, according to which she took the form of a horse to escape him, but was overtaken, and finally bore to him the winged horse Arion. It may have been with reference to this that she was figured in an ancient image at Phigaleia as having a horse's in place of a human head. Her attributes were a veil and diadem on her head, ears of corn or poppies in her hand. Her principal sacrifice consisted of pigs. Demeter was a daughter of Kronos and Rhea. Zeus was the father of Persephone.

CERIGNOLA, a town of Italy, in the south of the Neapolitan province of Capitanata, 24 miles S.E. of Foggia, pleasantly situated on an eminence which commands an extensive view. The surrounding plain is well cultivated, and produces large quantities of almonds and cotton. Linen is manufactured by the inhabitants. Cerignola is divided into an old and new town, and contains a hospital, a college, and several convents. Here, on the 28th April, 1503, the Spaniards, under Gonsalvo de Cordova, defeated the French, when the leader of the latter, the Duc de Nemours, was slain. In the neighborhood, to the west of the Lago di Salpi, are the ruins of the ancient Apulian town Salapia. Population about 17,500.

CERIGO, the ancient *Cythera* (Κύθηρα), one of the Ionian islands, situated at a distance of not less than 150 miles from Zante, but only about 8 miles from Cape Malea on the southern coast of Greece. Its length from N. to S. is nearly 20 miles, and its greatest breadth about 12; its area is 114 square miles. The general character of the surface is rocky and broken; but streams abound, and there are various parts of considerable fertility. Two caves, of imposing dimensions, and adorned with stalactites of great beauty, are the most notable among its natural peculiarities; one is situated at the seaward end of the glen of the Mylopotamus, and the other, named Santa Sophia, about two hours' ride from Capsali. Less of the ground is cultivated and more of it is in pasture land than in any other of the seven islands. Some wine and corn are produced, and the quality of the olive oil is good. The honey is still highly prized, as it was in remote antiquity; and a considerable quantity of cheese is manufactured from the milk of the goat. Salt, flax, cotton, and currants are also mentioned among the produce. The people are industrious, and many of them go to seek employment as laborers in the Morea and Asia Minor. Unfortunately the island has hardly a regular harbor on any part of the coast; and from its situation at the meeting as it were of seas, the currents in the neighborhood are strong, and storms are very frequent. The best anchorage is at San Nicolo, at the middle of the eastern side of the island. The principal village is Capsali, a place of about 1500 inhabitants, at the southern extremity, with a bishop, and several convents and churches; the lesser hamlets are Modari, Potamo, and San Nicolo. There are comparatively few traces of antiquity, and the identification of the ancient cities has not been satisfactorily accomplished. The capital bore the same name as the island, and consisted of a maritime and an inland portion, distant from each other about 10 stadia. The site of the upper city is probably at Paleopoli, about three miles from the present port of Avlemona; but no trace can be discovered of the famous shrine of the Venus of Cythera, whose worship had been introduced from Syria, and ultimately spread over Greece. The present inhabitants of the island are very badly educated. The number of priests is out of all proportion to the population, and no fewer than 260 churches or chapels have been counted. Spiridion Vlandi, author of an Italian and Romaic lexicon, published at Venice in 1806, is one of the few Cerigotes who have made appearance in literature. In 1857 the total population was 13,256, the excess of females being 1028; it appears now to number about 10,000. At a very early date Cythera was the seat of a Phœnician settlement, established in connection with the purple fishery of the neighboring coast. For a time dependent on Argos, it became afterwards an important possession of the Spartans, who annually despatched a governor named the Cytherodices. In the Peloponnesian War, Nicias occupied the island, and in 393 it was captured by Conon the Athenian. By Augustus it was bestowed on Eurycles. Its modern history has been very much the same as that of the other

Ionian Islands; but it was subject to Venice for a much shorter period—from 1717 to 1797. See the works referred to under CEPHALONIA.

CERIGOTTO, an island of Greece, belonging to the Ionian group, and situated between Cerigo and Crete in 35° 50′ N. lat. and 23° 20′ E. long. It was anciently known as *Ægilia*, and is now called by its inhabitants Lius. With an area of about 10 square miles it supports a population of about 300, who are mainly Cretan refugees, and in favorable seasons exports a quantity of good wheat. It was long a favorite resort of Greek pirates.

CERINTHUS was the founder of one of the earliest heretical sects of the Christians. He was brought up in Egypt (Theod. *Hær. Fab.* ii. 3), but removed to Asia Minor, where he propagated his doctrines. He flourished, according to Eusebius (*Hist. Eccl.* iii. 28), in the time of Trajan (98–117). Irenæus relates a story which represents him as a contemporary of the apostle John (*Contra Hær.* iii. 3, 4). He says that John, the disciple of the Lord, when in Ephesus went to bathe, and when he saw Cerinthus inside, he leaped from the bath without bathing, crying out, "Let us flee, lest the bath fall, for Cerinthus the enemy of the truth is within." Irenæus heard this story from some people who heard it from Polycarp, who may have heard it directly, or more likely at second-hand, from some of the friends of St. John. The same story is told in regard to Ebion, but not on so good authority. We know nothing of the death of Cerinthus.

We possess three different authorities for the opinions of Cerinthus, to some extent inconsistent with each other—Irenæus, Caius the Roman presbyter, and the third unknown. Lipsius has tried to prove that the third was Hippolytus.

According to Irenæus (*Contra Hær.* i. 26), Cerinthus taught "that the world was not made by the supreme God, but by a certain power which was separated and distant from the supreme authority, which is over all, and which was ignorant of the God over all." He also maintained "that Jesus was not born of a virgin, but was the offspring of Joseph and Mary, born like all other human beings, and that he was juster and wiser and more prudent than all." He affirmed also "that after his baptism the Christ came down into him in the form of a dove from the Lord, who is above all, and that then he proclaimed the unknown Father and performed miracles, but towards the end the Christ flew away from Jesus, and that Jesus suffered and was raised up, but that the Christ remained impassible, being spiritual." The same information is given in the treatise *The Refutation of Heresies*, first ascribed to Origen, and now to Hippolytus (lib. vii. c. 33), in the very words of Irenæus, and the writer repeats it in his summary (x. 21), with the addition that it was by an angelic power that the world was made. Irenæus (iii. xi. 7, see also Jerome, *De Viris Ill.* c. 9) also informs us that the gospel of St. John contained statements which were specially intended to remove the error of Cerinthus, and of the Nicolaitanes who held the opinion before him, that the maker of the world and the supreme God were different.

From Caius the Roman presbyter our information is as follows. "Cerinthus, by means of revelations which pretend to be written by a great apostle, speaking falsely, introduces wonders which he speaks of as if they had been shown to him by angels, saying that after the resurrection the kingdom of Christ was to be on earth, and that again men in bodily form would live in Jerusalem and be subject to lusts and pleasures. And being an enemy to the Scriptures, and wishing to lead astray, he affirms that a thousand years will be spent in marriage feasting" (Eus. *Hist. Eccl.* iii. 28). It is plain from this passage that Caius derived his opinion of the character of the millennium in which Cerinthus believed from the revelations which Cerinthus wrote in the name of a great apostle. Dionysius, bishop of Alexandria, affirms that some maintained that the Apocalypse was not the production of the apostle John, not even of a saint, but of Cerinthus, who established the sect called Cerinthian from him, and who wished to give a respectable name to his own fiction (Eus. *Hist. Eccl.* vii. 25). The context proves conclusively that Dionysius refers specially to Caius, whose words he partly quotes and partly paraphrases. The paraphrase shows how easy it is to invent a discreditable character and doctrine for a heretic. He says that Cerinthus believed "that the kingdom of Christ would be on earth, and that being fond of the body and altogether carnal, he dreamt that he would revel in these delights for which he longed—the satisfaction of the stomach and the parts below it, that is, in foods, and drinks, and marriages, and the means by which he thought that he could more decently procure these, namely, feasts and sacrifices and the slaying of victims." It is barely possible that Dionysius may have had access to other sources of information than the statement of Caius, but the probability is all on the other side. He was a determined antagonist of millenarianism, and was prepared to see gross sensuality in the adherents of the doctrine; but there is no good evidence that Cerinthus was sensual. We cannot even affirm that he was a millenarian, for Caius evidently formed his opinion on this matter in consequence of his belief that Cerinthus wrote the Revelation ascribed to St. John—a belief which others seem to have shared with him (Epiph. *Hær.* li., 3).

Our third source is not extant in its original form, but is to be traced in Epiphanius (*Hær.* xxviii.), and in almost all the Latin writers on heresy contained in Oehler's first volume of his *Corpus Hæresiologicum*, but most markedly in Philastrius (c. 36) and Pseudo-Augustinus (c. 8). According to Irenæus, Cerinthus carefully distinguished between the historical man Jesus and the æon Christ. This source evidently represented Jesus and Christ as the same, and it was the descent of the Holy Ghost after his baptism that rendered Jesus Christ capable of performing miracles. Jesus Christ was the son of Joseph and Mary, and was for the short time of his ministry miraculously endowed through the descent of the Holy Ghost, but the Holy Ghost left him before he suffered, and he died and did not rise again, but will rise again when the general resurrection takes place.

Cerinthus, according to these authorities, affirmed that the world was made by angels, and that the law and the prophets were given by one of the angels who made the world. Philastrius thus sums up the other features of the heresy. "He taught circumcision and the observance of the Sabbath. . . . He does not receive the apostle Paul, he honors Judas the traitor, he receives the gospel according to Matthew, he despises three gospels, he rejects the Acts of the Apostles, he blasphemes the blessed martyrs." Epiphanius makes him accept only a portion of the gospel of St. Matthew. He thinks that he was one of those Judaic Christians referred to in Acts xv. 24, that he also found fault with the apostle Peter for going to Cornelius (Acts xi. 3) and created a commotion against Paul in connection with Titus (Acts xxi. 28), and that St. Paul alludes to a practice of Cerinthians in noticing baptism for the dead.

Most of these statements are probably incorrect, and some of them are to be rejected without hesitation for chronological reasons. Some of the writers mention a Merinthus, who was either the same as Cerinthus or was confounded with him. It is likely that this is not the only confusion in these accounts, and we may well doubt whether either Justin or Hippolytus could be the source from which they were drawn, or that the account contained in it was more accurate than that of Irenæus.

Cerinthus is mentioned in nearly all the historians of early Christianity, but special reference may be made to Lardner's works, vol. viii. (Kippis's edition); Mansel's *Gnostic Heresies* (London, 1875); Lipsius's "Gnosticismus," in Ersch and Gruber, p. 257; his *Zur Quellenkritik des Epiphanios* (Vienna, 1865), p. 115, and his *Die Quellen der ältesten Ketzergeschichte* (Leipsic, 1875), p. 39; and Adolf Harnack's *Zur Quellenkritik der Geschichte des Gnosticismus* (Leipsic, 1873), p. 46. (J. D.)

CERRETO, a town of Italy, in the Neapolitan province of Benevento, on the Cusano. It is well-built, is agreeably situated on the slope of Monte Matese, and has a fine cathedral, collegiate church, and seminary. With Telese it forms the see of a bishop. There are several cloth manufactories, and excellent wine is produced in the neighborhood. The town suffered greatly from the plague in 1656, and from an earthquake in 1688. Population, 7000.

CERRO DE PASCO, a town of Peru, in the department of Junin, on the table-land of Bombon, 14,280 feet above sea-level. The houses are ill-built, and there are no public buildings of importance. Living is dear, the neighborhood is unfertile, and the climate is cold and stormy. The silver mines, discovered in 1630, are numerous, but not so productive as in past times. Population, consisting chiefly of Indians and a mongrel race, about 13,000.

CERTALDO, a market-town of Tuscany, on the right bank of the Elsa, in the province of Florence, and 15 miles south-west of that city. It was the birthplace of Boccaccio, whose house, repaired in 1823 by the Marchesa Lenzoni Medici, is still to be seen. One of the rooms contains, besides some of the ancient furniture, the remnants of the poet's tomb, his autograph, and his picture. Not far from the house stands the Church of St. Michael and St. James, from which Boccaccio's remains were removed in 1783. In December, 1875, a monument to his memory was erected by the authorities of the town. The older part of Certaldo is on the summit of a steep and conical hill, and contains the building which was once the stronghold of the Counts Alberti, the lords of the place before it became subject to Florence. There also dwelt the vicars of Certaldo, who ruled the town and district for Florence, till the reign of the reformer Peter Leopold. The new burgh is situated along the course of a road that skirts the foot of the hill. Population about 2000.

CERVANTES-SAAVEDRA, Miguel de (1547–1616), the author of *Don Quixote*, was born at Alcalá de Henares, the ancient *Complutum*, a small town in the province of New Castile, in 1547. The day of his birth is not known, but as he was baptized on the 9th of October it is conjectured from his Christian name that he was born on St. Michaelmas day preceding. The place of his nativity also remained in doubt until the year 1748, when Don Juan de Yriarte found in the Royal Library of Madrid a manuscript entitled *La Verdadera Patria de Miguel de Cervantes*, written by the learned Benedictine Martin Sarmiento. Till then seven cities, Madrid, Seville, Lucena, Toledo, Esquivias, Alcazar de San Juan, and Consuegra, had contended for the honor of being his birthplace, although in the *Topography of Algiers*, by Father Hædo, published in 1612, mention was made of Cervantes as a native of Alcalá de Henares and the genealogist Mendez de Silva, in his tract on Nuño Alfonso, published in 1648, had also spoken of him as a noble Castilian gentleman of the same town. All doubts on the subject, their long ignorance as to which is one of the many proofs of the carelessness with which the Spaniards have treasured what belongs to the memory of their illustrious countryman, were finally resolved by the discovery of the petition for an inquiry into his conduct at Algiers addressed by Cervantes to the Government in 1580. The family of Cervantes, which had for some generations attached to their patronymic the name of Saavedra, was of respectable if not noble origin. The patriotic zeal of some later biographers has even claimed for it affinity to the royal blood of Castile. The cradle of the race was Galicia, from which province the ancestors of Cervantes emigrated at an early date. Members of the family accompanied Ferdinand III. on his expedition against the Moorish kingdom of Seville and obtained a share of the conquered territory. The grandfather of Miguel was Juan de Cervantes, a knight of some distinction, who held the office of *corregidor* of Ossuna at the beginning of the 16th century. His son Rodrigo married in 1540 Leonora de Cortinas, a lady of Esquivias, of birth equal to his own but, it is presumed, of no greater fortune. There were four children of the marriage, two sons, Rodrigo and Miguel, and two daughters. Although ranking themselves with the *hidalgos*, the parents must have been, at the birth of their younger son, in humble circumstances. The biographers have been able to glean but few details of the early life of our hero, and for these they are indebted almost entirely to the chance allusions in Cervantes's own writings. He studied grammar and the humanities under a master of some repute, Lopez de Hoyos, and, according to a doubtful tradition, spent two years at the university of Salamanca, residing in the Calle de Moros. That he received a fair education according to the standard of the age, and had an extensive though not exact knowledge of classical and general literature, his works bear witness. When a boy he describes himself as having attended the representations of the first regular company of Spanish actors under Lope de Rueda, the founder of the dramatic art in Spain. Upon the occasion of the magnificent obsequies held in honor of Isabel de Valois, the wife of Philip II., in 1568, the most advanced scholars of Lopez de Hoyos competed in the literary exercises, in Latin and in Spanish, which formed part of the funeral ceremony; and chief among the victors was Miguel de Cervantes, who is mentioned by his master in the most affectionate and laudatory terms as his "dear and beloved pupil." These compositions, among which were sonnets, *letrillas*, and *redondillas*, have perished together with many of the early poetical essays of their author, probably with no loss to the world or to his reputation. In his *Journey to Parnassus* Cervantes speaks of these effusions of his youthful muse with characteristic modesty and candor, averring that "from his tenderest years he had loved the sweet art of poesy," and had composed endless ballads and sonnets, good and bad, but confessing with a touching humility that heaven had not granted him the poet's grace. Among the lost works belonging to this period, of which their author speaks with more complacency, was *Filena*, a pastoral poem, esteemed sufficiently good by his contemporaries to earn for the author a place among the multitude of those who wrote themselves poets in that fruitful harvest-time of Spanish literature.

Birth at Alcalá de Henares, 1547.

Early works.

In 1568 there came to Madrid—charged with a message of condolence from the Pope to Philip II., on the death of his son Don Carlos, and with sundry complaints respecting default of allegiance to Rome—the Cardinal Acquaviva, who, though only in his twenty-fifth year, had already earned a name for culture and a good disposition to letters. With him Cervantes took service as a *camarero* or page,—an employment held to be no humiliation in that age even to young men of noble birth,—returning in the suite of his patron to Rome by way of Valencia, Barcelona, and the south of France. Apparently the post was not to the taste of one in whom the sight of Italy—then for the greater part a fief of Spain—awakened more of warlike than of poetic ambition. In the beginning of 1570 the cardinal's page exchanged his livery for the soldier's uniform, enlisting in the company of the famous Captain Don Diego de Urbina of the regiment of Don Miguel de Moncada. It was the period when the military glory of Spain was at its highest, and the profession of arms the surest road to advancement. The first campaign of Cervantes was made at sea, his regiment being engaged in the expedition which, in the summer of 1570, under the orders of the Papal general, Marco Antonio Colonna, made an ineffectual attempt to relieve the Island of Cyprus, then hotly besieged by the Turks. The capture of Nicosia by the Mahometans, and the fall of the island, which spread consternation throughout Christendom, gave rise to the memorable Holy League against Selim II. Through the exhortations of the Pope, Pius V., Spain and Venice were induced to lay aside for a time their old dissensions and to unite with Rome in an attempt to bridle the Ottomans, then in the flush and vigor of their genius. The pact between these Christian powers was formally ratified on the 25th of May, 1571, the confederates binding themselves to "make perpetual war" not only against the Turks, but against the Moors of Algiers, Tunis, and Tripoli.

Journey to Rome.

The armament provided—the expenses of which were distributed among the three states in the proportion of three-sixths to Spain, two-sixths to Venice, and one-sixth to Rome—was to consist of 200 galleys of war, with 100 store-ships, 50,000 infantry, 4500 light horse, and a sufficient supply of artillery and ammunition. The generalissimo whom the unanimous voice of the allies called to the command of this fleet—the most formidable which had ever been assembled in the Mediterranean—was Don John of Austria, the natural son of Charles V., then in his twenty-fourth year,—a youth not more recommended by his near connection with the Spanish king than by his brilliant talents, amiable character, and great popularity. The mutual jealousies and fears of the allied princes, and the hesitation of Philip II. to entrust so important a command to his half-brother, the object of his secret envy and distrust, caused many delays in the assembling of the Christian forces, and gave the Turks ample time for preparation. The Armada, after rendezvousing at Messina, put to sea finally in quest of the enemy on the 15th of September. The company in which Cervantes still served as a private soldier was embarked in the galley "La Marquesa," commanded by Francisco San Pietro. After relieving and provisioning Corfu, Don John came up with the Turkish fleet on the 7th of October, drawn up in order of battle in the Gulf of Lepanto. The Christians advanced in three divisions, their right commanded by the Genoese admiral, Juan Andrea Doria,

Battle of Lepanto.

the centre under Don John himself, and the left under Agostino Barbarigo, the Venetian Proveditore; the Marques de Santa Cruz, with his squadron, being in reserve. The "Marquesa" was on the left wing, having on board Miguel de Cervantes, who lay in his cabin ill of a fever. On coming into action, his ship being in the van of the squadron, Cervantes's captain and comrades besought him to remain quietly in his bed, but he, according to the sworn testimony of ear-witnesses, asked them what would they think of him if he did not do his duty, and declared his resolve to die fighting for God and his king, rather than remain under shelter and take care of his health. His entreaties to be allowed to share in the fighting having been granted, Cervantes was stationed with twelve soldiers under his command in what was reckoned the post of greatest danger, namely, in the boat which hung by the galley side, most exposed to the enemy's fire. Here he performed his part in that glorious day's work so valiantly as to attract the notice of his commanders, even of Don John himself. The vessel immediately opposed to the "Marquesa" was the galley of the Capitan Pasha of Alexandria, who commanded on the Turkish right, bearing the royal standard of Egypt. After a stubborn resistance, and the slaughter of 500 of her crew, she was compelled to surrender, her fate involving the flight or capture of the entire squadron, and contributing materially to the final defeat of the Turks. On their right wing the Christians were less successful,—Marco Antonio Colonna having to encounter the celebrated renegade, Uluch Ali, a sea-captain of great skill and experience, to whose good conduct and abilities Cervantes himself, with characteristic generosity, bears witness. The issue was highly honorable to the allied arms. The victory at Lepanto, though barren of results, and spoilt by the contentions among the Christian leaders, broke the spell of Turkish invincibility at sea, and is to be reckoned among the most glorious feats of arms ever performed by Spain when at the zenith of her greatness. In this battle, to the remembrance of which he ever fondly clung, which he loved to speak of as the proudest event of his life, Cervantes was severely wounded, receiving two gun-shot wounds in the chest and one in the left hand, which was maimed and rendered useless "for the greater glory of the right," as its owner said, holding this defect ever after to be his greatest ornament. Lepanto was to Spain what Salamis was to Athens. All Europe rang with the fame of "the man sent from God whose name was John," according to the fervent exclamation of the grateful Pope when he heard the news of the victory; and the exploits of Doria, Colonna, and Santa Cruz were on all men's tongues. But while generals and admirals are now forgotten, it is a striking evidence of the power of genius to override even the traditions of patriotism and of warlike glory that of all the memories which survive of this once renowned day, that which remains green and flourishing is of the private soldier who fought in the "Marquesa," of him whom his countrymen love to designate as *El Manco de Lepanto*. It would be absurd to attribute to the single arm of Miguel de Cervantes any appreciable share in the event of that day, but making all allowances for the partiality of his biographers, there can be no reason to doubt that Cervantes did earn a very extraordinary amount of renown for his behavior in the battle. As a private soldier he was not debarred, according to the fashion of the times, from receiving from his superiors those marks of consideration due to men of good birth and breeding; yet the extraordinary favors bestowed on him by Don John and the other leaders, the letters of credit which they gave him on his return to Spain, the numerous references to him by his contemporaries, and the influence he afterwards exercised among his fellow-captives at Algiers, are sufficient to prove that at this early period of his life Cervantes had attained to much distinction over and above what he had won as a man of letters.

After the battle of Lepanto the lateness of the season compelled Don John to return to Sicily, leaving the Turks leisure to recover from their losses and to recruit their strength. The wounded were tended at Messina, among whom Cervantes was visited in the hospital by Don John in person, receiving upon his recovery a special increase of pay to the amount of three crowns a month. From the company of Moncada our soldier was now transferred to that of Don Ponce de Leon, in the *Tercio de Figueroa*, the most distinguished of all the Spanish regiments of that period—of that famous infantry which sustained the Spanish dominion over half Europe, making, in the words of the chronicler, "the earth tremble with their muskets." The further enterprises of the League at sea were checked by the growing dissensions between Spain and Venice, and also by the quarrel now on foot between the former nation and its old rival France. The jealousies between the confederate princes extended to their commanders, and it was in vain that Don John urged upon his allies the necessity of striking another blow at the Turk before he had time to repair his shattered forces. It was not until the 9th of August, 1572, that the Christian fleet again set sail for the scene of its great exploit of the year previous. In this second campaign, through the supineness of the leaders, perhaps from some incapacity of the generalissimo, scarcely fitted by age or force of character to control so vast and incongruous a host, but chiefly from the superior skill and vigilance of the Turkish commander-in-chief, a post now held by Uluch Ali, the armada did nothing more than make a feeble demonstration against the enemy's fleet, which was found at anchor in Navarino Bay. Cervantes, who has given a minute account of this inglorious affair in his story of the captive in *Don Quixote*, served in this expedition in the squadron commanded by Antonio Colonna. Returning to Messina to winter, the armada was next year dispersed in consequence of the dissolution of the Holy League, the Venetians having concluded a separate peace with the Turks. In 1573 Cervantes took part in the expedition of Don John against Tunis and in the capture of the Goleta—his wounds being still unhealed, as we learn from his letter to Mateo Vasquez. That winter he was in garrison in Sardinia, and in the next spring in Lombardy, being ordered to Messina in August, 1574, and thence to Naples. On the 15th of June, 1575, he obtained leave of the viceroy, the Duke de Sesa, to visit Spain, and thus ended the first portion of his military career, with small profit but with much honor. During his five years' active service by land and sea, however, Cervantes had acquired that knowledge of men and life which was so useful to him in after years. He had visited the most famous cities of Italy, and had stored his mind with impressions of her art and literary culture, traces of which are to be found in all his writings, even to the extent of making him liable to the charge of introducing Italian idioms into his style. Of his intercourse with Italian men of letters there is no evidence, though his works furnish abundant testimony of his familiarity with the best models of Italian literature. That he had won the respect and esteem of his commanders as a good soldier is proved by the highly flattering letters which he received from Don John, recommending him to the king for promotion as a man of singular merit and of great services; also from the viceroy of Naples, speaking of him as a worthy but unfortunate soldier, who, "by his noble virtue and temper, had secured the goodwill of his comrades and officers." Furnished with these letters, which in the event were to prove to him so fatal a possession, Cervantes, with his brother Rodrigo, embarked at Naples in the galley "El Sol." On the 26th of September, when off the coast of Minorca, his vessel fell in with a squadron of Algerine cruisers under the command of the dreaded pirate captain, Arnaut Mami. Attacked by three of the enemy's ships, the Spanish galley, after an obstinate resistance, in which Cervantes bore a conspicuous part, was forced to surrender to overwhelming odds, and was brought in a prize to Algiers. On the division of the prisoners Cervantes fell to the lot of Déli Mami, a Greek renegade, noted for his ferocity and greed among the Algerines. The letters of Don John and the viceroy of Naples found on this Spanish soldier served but to mislead his captors as to his true rank, and therefore to stimulate their cupidity and to aggravate his sufferings. Being supposed to be able to purchase his liberty at a high price, Cervantes was guarded with special care, and that he might be induced the more quickly to ransom himself, he was loaded with chains and treated with extraordinary rigor. According to the testimony of Father Hædo, in whose curious and important work on the *Topography of Algiers*, published in 1612, we have the most valuable authority for this period of Cervantes's life, and who was an eye-witness of the cruelties practised in this pirates' den upon the Christian slaves, the captivity of Cervantes was one of the hardest ever known

Service against the Turks.

Capture by the Algerines.

in Algiers. It was borne with a courage and constancy which, had there been nothing else to make his name memorable, must have sufficed to rank Cervantes among the heroes of his age and country. No episode more romantic is contained in the books of chivalry. No adventures more strange were encountered by any knight-errant. Not Amadis nor Esplandian, nor any of those whose fabled deeds had kindled his youthful imagination, displayed a loftier spirit of honor or more worthily discharged his knightly *devoir* than did Miguel de Cervantes when in duresse at Algiers. A slave in the power of the bitter enemy of his creed and nation, cut off in the hey-day of his fame from the path of ambition which fortune seemed to have opened to him, no lot could be more cruel than that which in the prime of his manhood and genius fell to our hero. Nor is there any chapter of his life more honorable than the record of the singular daring, fortitude, patience, and cheerfulness with which he bore his fate during this miserable period of five years. With no other support than his own indomitable spirit, forgotten by those whom he had served, unable to receive any help from his friends, subjected to every kind of hardship which the tyranny or caprice of his masters might order, pursued by an unrelenting evil destiny which seemed in this, as in every other passage of his career, to mock at his efforts to live that high heroic life which he had conceived to himself, this poor maimed soldier was looked up to by that wretched colony of Christian captives, including among them many men of higher birth and rank, as their chief counseller, comforter, and guide. In the formal information laid before the commissary of the Spanish Government at Algiers, Father Juan Gil, of the order of the Redemptorists, very particular testimony is borne by Cervantes's fellow-captives to his character and conduct, as one who bore himself always as a faithful Christian, who cheered those who were despondent, who shared with the poor the little which he possessed, who helped the sick in their necessities, who risked every danger in the cause of the faith, behaving himself always like a true soldier of the king and a noble gentleman,—all which good record is confirmed by the honest father himself of his own personal knowledge.

Captivity in Algiers.

The captivity of Cervantes in Algiers lasted five years, during which period he never ceased to plot schemes of deliverance, which, however daringly conceived and skilfully planned, were doomed to be always foiled by accident or by treachery. On such occasions he was invariably the first to come forward to shield his associates and to take the whole blame upon himself, rendering himself liable to the barbarous punishments then inflicted by the Algerines upon such of their slaves as sought to escape from their chains. Twice was Cervantes brought into the king's presence, with a rope round his neck, to be hanged. Once he was ordered two thousand blows with a stick, the penalty being remitted at the last moment only through the prayers of the other captives. The king or viceroy of Algiers at this time was Hassan Pasha, a Venetian renegade, whose name was a terror throughout Christendom. Cervantes himself in *Don Quixote* calls him "the worst of the apostate race," and the "homicide of human kind." Hædo pronounces him "the most cruel tyrant of all those who had been kings in Algiers." Over this monster, who had purchased Cervantes from Déli Mami for 1500 crowns, our hero seems to have exercised an extraordinary influence. Though repeatedly menaced with death in the most horrible forms, and condemned to witness the torture and mutilation of his companions, Cervantes never actually suffered any ill-treatment in person, beyond being fettered, nor was ever abused by an ill-word, as he himself has borne testimony in *Don Quixote*. For this exceptional immunity it is not easy to account, even on the theory that his master took him for a person of greater consequence than he really was, and we must attribute it to the extraordinary influence acquired by Cervantes over the other captives, and to the respect engendered by his magnanimity and daring. Hassan Pasha, according to Hædo, was wont to say that "could he keep hold of that maimed Spaniard he would regard as secure his Christians, his ships, and his whole city." Hassan Pasha's fears were not wholly unwarranted, although the object of them was but a simple soldier, for Cervantes had conceived the design of a general rising of the captives in Algiers and the seizure of the city. "And assuredly," says Hædo, "the plan would have succeeded and Algiers would have been Christian, if his fortune had corresponded to his courage, his zeal, or the greatness of the undertaking." From the dungeons of Hassan Pasha Cervantes wrote to Mateo Vasquez, the secretary of Philip II., suggesting the enterprise as one befitting the arms of his royal master; nor was it so desperate as might appear, seeing that the number of Christian captives in that day was nearly 25,000. Philip, however, was then too much occupied in the conquest of the Christian kingdom of Portugal to bestow any attention on the daring project of Cervantes.

In the meantime, while the captive was wasting his heart away in chains and in fruitless struggles for liberty, his friends in Spain were not negleetful of his condition. His family were too poor to be able of their own resources to raise the sum demanded by Hassan Pasha for his ransom. At the prayer of his brother Rodrigo an official investigation was held upon the conduct of Cervantes and the circumstances of his captivity, and at the solicitation of the father and mother, the Duke de Sesa wrote a strong letter to King Philip on behalf of the soldier of Lepanto, recounting his services and entreating his majesty's assistance. No other response, however, was vouchsafed to this and other petitions which were addressed to the Court by Cervantes's mother (his father being now dead), save a gracious permission to Doña Leonora, dated the 17th of January, 1581, to export licensed goods from Valencia to Algiers to the value of 2000 ducats. The profit in this venture was only 60 ducats. The widow and her daughters having raised 300 more, a sum of 500 ducats was made up with the assistance of friends, and entrusted to the hands of Father Juan Gil, the Redemptorist, who embarked for Algiers in May, 1580. Hassan Pasha, however, would abate nothing of his demand, which was 1000 ducats, and threatened to take Cervantes with him to Constantinople, whither he was now recalled on the expiration of his term of government. Cervantes was actually embarked and chained to his place at the oar, when, finally, through the pious zeal of the good friar Juan Gil, aided by the liberality of some Christian merchants of Algiers, the sum required was made up. After a little delay in Algiers rendered necessary to clear himself of some false accusations made against him by his old enemy, Blanco de Paz, Cervantes had at last the joy of arriving, after a long captivity, safe and sound in his native country, landing in Spain towards the close of the year 1580.

Ransom and return to Spain.

The captivity in Algiers is worthy of more study than it has received from Cervantes's biographers. Not only did it turn the whole current of his life and influence all his subsequent career, but in it, as the period of his darkest adversity, may be discovered no little of the material on which his character, and even his literary work, was founded. In the hard school of an Algerine *bagnio*, amidst chains and misery and the constant sight of death in its most appalling forms, were learnt those lessons of humanity which, controlling his heroic spirit and tempering his romantic fancy, were turned to so memorable a use in *Don Quixote*. Like him of La Mancha our knight had started in his life's adventure with a mind nursed in the glowing visions of chivalry, impatient of wrong-doing, eager for the good, full of faith in manhood, and quick to believe in the ideals of honor which his imagination had conceived. He found himself amidst a generation which cared for none of these things, confronted by the stern realities of a commonplace age, tossed about and buffeted in a world in which chivalry had become already an anachronism. There is no need for us to search for the key to the parable of *Don Quixote*, knowing the life of the author. The experience was a bitter one, such as no man of letters ever had to endure; but from the long ordeal, which ended only with his life, Cervantes emerged sweetened and strengthened. The gay courage which was the essential attribute of his nature, the dauntless good humor—

> "That ever with a frolic welcome took
> The thunder and the sunshine,"

had to survive even greater trials than the five years slavery in Algiers. On his return to Spain Cervantes was destined to taste of miseries compared to which even the cruelty of Hassan Pasha was kindness. His services, his

works, his sufferings, were all forgotten. His absence of five years from the scene had been long enough to erase from the memories of the king and the Court the gallant soldier who had fought and bled at Lepanto. In 1580 Philip II. was marching his army into Portugal, and Cervantes rejoined his old regiment of Figueroa, in which his brother Rodrigo was also serving. The next year we find him engaged in the expedition against the Azores, where the partisans of Dom Antonio, known to history as the Prior of Ocrato, the rival claimant to the Portuguese throne, were holding out with the assistance of England and France. On the miscarriage of this enterprise through the dissensions between the military and naval commanders, the fleet returned to Lisbon. The next year it took the sea again under the command of Don Alvaro de Bazan, Marqués de Santa Cruz, celebrated by Cervantes in *Don Quixote* as "that thunderbolt of war, that father of his soldiers, that fortunate and invincible captain." In the victory gained by Santa Cruz over the allied squadrons off Terceira, on the 25th of July, 1582—one of the most brilliant achievements in the annals of the Spanish navy—Cervantes took a part, being on board the admiral's galleon, the "San Mateo," which bore the brunt of the fighting. It was not until the year following, however, that the Azores were finally reduced, Rodrigo Cervantes distinguishing himself greatly in the storm of Terceira. During his service and residence in Portugal, of which country and its people he ever spoke with a kindliness rare among Spaniards, Cervantes had some passages of love with a noble Portuguese lady, who bore him a daughter, Isabel, his only child, the object of her father's tenderest affection and a sharer in all his troubles till his death.

Battle of Terceira.

Of the next few years the record is a brief one. Towards the last months of 1583 we hear of Cervantes being at Mostagan, a Spanish post on the Algerine coast, probably still with his regiment, whence he was sent with despatches to the king, by whom he was ordered to return to Oran. He does not seem to have been employed again in any official capacity, and perhaps from this time he began to despair of that military preferment to which his services had given him so just a claim. Even if it were possible for one in his station to attract the personal notice of the king, we could not expect that such a man as Philip should recognize the merit of the future author of *Don Quixote*, nor could the morose tyrant who grudged the glory of Lepanto to his brother be particularly well disposed to one whose chief title to remembrance was his share in that victory. By the end of 1583 Cervantes appears to have quitted the profession of arms and returned to literature, being now in his thirty-sixth year. About this time he wrote *Galatea*, a prose pastoral interspersed with lyrics, inspired, according to the tradition, by love of the lady he was then courting, and who became his wife. Dedicated to Ascanio Colonna, son of Marco Antonio of that name, Cervantes's old commander, it appears to have been favorably received, and is not more unreadable than the books of that class so happily ridiculed by Cervantes himself in the 73d chapter of the second part of *Don Quixote*. As the author himself frankly informs his readers, his "shepherds and shepherdesses are many of them only such in their dress." Their names of Lauso, Tirsi, and Damon are but the grotesque disguises of celebrated poets of the time and friends of Cervantes—in Galatea being pictured his future wife and in Elisio himself. They talk high-flown sentiment and make stilted love after the manner of the school of Gil Polo in his *Diana Enamorada*, nor is their talk more insipid than is usual to the pastoral profession in fable. There is no better criticism of the book than that which Cervantes himself has given through the mouth of the priest in the scrutiny of Don Quixote's library. "What book is that?" "The *Galatea* of Miguel de Cervantes," said the barber. "'Tis many years since he has been a great friend of mine that Cervantes, and I know that he is rather versed in sorrow than in poetry. This book has some invention; it proposes something, and it concludes nothing; it behooves us to wait for the second part which he promises. Perhaps with his amendment he will obtain that entire pardon which is now denied to him; in the meantime, gossip, keep him a recluse in your chamber." This second part never appeared, perhaps with no loss to the author's reputation. Poor as the verse is in *Galatea*, it secured for Cervantes a place among the chief poets of the age, and there is evidence to show that it was held in esteem, even out of Spain, before and after the appearance of *Don Quixote*.

Publication of *Galatea*.

On the 12th of December, 1584, Cervantes added to his happiness if not to his fortune by a marriage with Doña Catalina de Palacios Salazar y Vozmediano, a lady of good family of Esquivias. The settlement on his wife of a hundred ducats, supposed to be one-tenth of his estate, and the inventory of his effects taken at this time, among which are included "45 hens, some chickens, and a cock," prove that the bridegroom was in but indifferent circumstances, even for a poor *hidalgo* of the time. Of the lady the records give us scarcely a glimpse, and indeed for some years after his marriage the life of Cervantes is wrapt in obscurity. All that is known is that he wrote poetry, and won many friends among the poets by his good nature and genial humor. He wrote for the stage also for a living, producing between twenty and thirty plays, chiefly comedies, of which only two survive, *La Numancia* and *El Trato de Argel*. There seems to be no reason to doubt Cervantes's own statement that as a playwright he gained considerable applause, and it has been proved that the payment he received was quite as high as that given to Lope de Vega. August Schlegel has assigned high rank to *La Numancia* as one of the most striking and original of modern tragedies, and *La Confusa*, a comedy now lost, is spoken of with much complacency by its author. The gifts of Cervantes, however, were not those of the dramatist, and such fame as he had begun to win paled before the rising star of that "monster of nature," Lope de Vega. Once more disappointed in his hopes of a livelihood, and having now to support his wife, his widowed sister, and his natural daughter, Cervantes was forced to seek for bread by other means than literature. For twenty years—the darkest period of his life—he ceased to write, or at least to publish. The poor crippled soldier had to drink of a cup even more bitter than loss of liberty among the Moors. A veil hangs over this portion of his career, which his countrymen, for their own sake no less than for his, are not too eager to lift, hiding, as it is only too certain that it does, penury, rags, almost beggary, misery of every kind except shame. Throughout all these trials what is known of Cervantes proves him at least to have retained undimmed his cheerfulness of spirit, his rare sweetness of disposition and faith in humanity, "as one in suffering all that suffers nothing." In 1588 he is found at Seville filling the humble place of a commissary under Don Antonio de Guevara, the Proveédor-General of the Indian fleets. In this capacity he had to assist in the victualling of the Invincible Armada, and documents preserved in the archives of Seville prove his activity in the purchase of grain, oil, and wine among the villages of Andalusia,—gleaning, besides naval stores, much of that knowledge of life and character of which he afterwards made such admirable use. In 1590 he petitioned the king for employment in the Indies, minutely recapitulating his past services, and naming four offices then vacant as those he was qualified to fill—the accountantship of New Granada, that of the galleys of Carthagena, the government of the province of Socomusco, in Guatemala, and the corregidorship of the city of La Paz. The petition was coldly received and bore no fruit, for which perhaps the ingratitude of the Government was not wholly to blame. The habits of unthrift and restlessness which he had acquired as a soldier, together with such weaknesses as were the natural defects of his virtues of extreme good nature and easiness of disposition, must have unfitted him to some extent for the sober pursuits of civil life; and Cervantes himself seems to hint, in a passage in *Don Quixote*, as well as in his *Journey to Parnassus*, at some imprudence which contributed to spoil his advancement. He continued for some years to hold his poor place of commissary, residing chiefly at Seville. At a poetical competition held at Saragossa in honor of the canonization of San Jacinto, in 1595, he was adjudged the first prize—three silver spoons. The next year, on the occasion of the sacking of Seville by the English under Essex, he wrote a sonnet, ridiculing with fine irony the behavior of the Duke of Medina-Celi, who, having a large force at his command for the defence of the city, only appeared on the scene when the English had

Marriage.

Dramatic works.

Commissary at Seville.

departed. Owing to the treachery and failure of an agent, through whom he had remitted to Madrid a sum of money, collected on account of the Government, Cervantes about this time became involved in a pecuniary difficulty, which continued to be a source of annoyance to him for some years, in addition to his other troubles. Being unable to repay the money at the king's mandate, he was cast into prison, but having succeeded in scraping together enough to reduce his debt to a few hundred reals, he was released after a few days' detention. Neither on this occasion, nor on two subsequent ones when he fell under the cognizance of the law, was there left any stain upon his honor, nor any fault alleged beyond that of carelessness or undue trustfulness. On the death of Philip II., in 1598, his obsequies were celebrated at Seville with such extravagant pomp and grandeur of decoration as to awake the ridicule of Cervantes, who, never a lover of the defunct monarch, gave vent to his feelings in a sonnet which is one of the happiest of his lighter effusions in this which was his true vein in poetry. At this period the author, in spite of his poverty and mean condition, seems to have enjoyed the society and friendship of his countrymen most famous in literature and art, among others of the celebrated poet Fernando de Herrera and the artists Pacheco and Jaureguy, by both of whom his portrait was painted. He wrote and circulated in manuscript some of those novels which many years later he completed and published; but like the poor poet whom he has described, half of his divine thoughts and imaginations were taken up in the study of the means of daily bread for himself and his family.

The four years succeeding 1598 are wholly a blank in the life of Cervantes. Tradition assigns to this period the visit to La Mancha where occurred that new trouble of which *Don Quixote* is supposed to be the vengeance. The story is, that Cervantes had a commission from the prior of St. John to collect his tithes in the district of Argamasilla, and that while he was employed in this ungrateful function the villagers set upon him, and after maltreating him threw him into prison, his place of imprisonment being a house still standing called *La Casa de Medrano*. Here, according to a general consensus of opinion, was conceived, if not written, the first part of *Don Quixote*, conformably to what the author says in the prologue of this "child of his wit" being "born in a jail."

At Valladolid. In 1603 Cervantes is found living at Valladolid, among the herd of starving soldiers and needy writers expectant of preferment which then filled the Court. The favors of Philip III., good natured and well disposed to literature, were dispensed by the Duke de Lerma, then at the height of his power, whose haughty, cold, and selfish nature was little likely to see merit in Cervantes. Once more disappointed in his hopes of preferment, Cervantes was reduced to the utmost straits of poverty, eking out a living by business agencies and humble literary employment, such as writing petitions and correcting manuscripts, aided by such small gains as the ladies of his household were able to earn by the labors of the needle. By the beginning of 1604 he had completed the work which was destined to give him, if not bread, immortality. The First Part of *Don Quixote*, begun, according to internal evidence, before the death of Philip II., was now ready for the press. The date is the same which the majority of Shakespearian critics have assigned to the first appearance of the second and perfect *Hamlet;* nor is this the only coincidence between the lives of these two great contemporaries. A patron being in that age as necessary to an author as a publisher, Cervantes with some difficulty found one in the Duke de Bejar, a nobleman of high rank and honor, ambitious of the name of a Mæcenas. The tradition which tells how the duke's scruples at connecting his name with a book of so novel a character and equivocal a purpose were surmounted is probably well founded. Instigated, it is said, by his confessor, who scented heresy, or at least a dangerous humor, in this book with a strange name, the Duke de Bejar withdrew the promise of patronage he had given and would not accept Cervantes's dedication. The author, however, begged hard for permission to read a chapter of his story before the duke, and pleased him so well that his objections were overcome. The license for publication was obtained on the 26th September, 1604, and in the beginning of the next year the first part of *Don Quixote* was printed at Madrid by Juan de la Cuesta, and published by Francisco de Robles, to whom Cervantes had sold the copyright for ten years. The theory that the book was received coldly at first, so that Cervantes was induced to write a tract called *El Buscapie*, in order to attract the attention of the public to *Don Quixote* and to stimulate their curiosity by hinting that the characters and incidents were not wholly imaginary, must be rejected as unsupported by a tittle of evidence and wholly opposed to the facts. There is no proof that any such tract as *El Buscapie* ever existed until Don Adolfo de Castro published in 1848 what all competent Spanish critics have pronounced to be a clumsy and impudent forgery. There could be no reason for such a publication by Cervantes, seeing that *Don Quixote* was received by the great mass of the public with marked and singular applause. Although certain great literary personages, and some of Cervantes's own friends, from suspicion that they were included in the satire or from jealousy of his success, professed to sneer at the book because of its vulgar style, its unbecoming subject, and its bizarre title, there can be no doubt of the extraordinary popularity achieved by *Don Quixote* on its first appearance. No fewer than six impressions of the first edition of 1605 are extant, of which two were issued at Madrid, two at Valencia, and two at Lisbon. There had appeared up to that date no book since the invention of printing, which had so many readers. To that artificial age, reared in the insipid extravagances of the successors of Amadis, *Don Quixote* was as the dawn of a new revelation. The humor, equally simple and deep, the easy, careless grace of the narrative, the fine wisdom and tenderness, the true charity, of this book which professed to be a burlesque of the romances of chivalry, were qualities as rare as they were delightful in Spanish literature. Even those who missed the allegory and were insensible to the satire could not but enjoy the story with its fresh and lively pictures of national life and character. That which has become, to use the phrase of Sainte-Beuve, "the book of humanity," was no less successful in its age as a book of popular recreation. The author himself was probably amazed at his own success. Like his great contemporary Shakespeare, while careful of his lesser works he seems to have abandoned his masterpiece to the printers with scarcely a thought of his literary reputation. All the first editions of *Don Quixote* swarm with blunders of the most extraordinary kind, proving that Cervantes could never have revised the printing, even if he had looked through his manuscript before committing it to the press. He is made to forget in one chapter what he had written in another. He confounds even the names of his characters, calling Sancho's wife Theresa in one place and Maria in another—the very blunders of which he afterwards accused his enemy Avellañeda. He makes Sancho ride his ass immediately after it had been stolen by Gines de Passamonte, and bewail its loss when it had been recovered. He confounded time, place, and persons, and abounds in inaccuracies and anachronisms, to the distraction of his readers, the perturbation of his critics, and the serious grief of his admirers. The style of this first part of *Don Quixote*, in spite of occasional passages of beauty which are among the models of the Castilian tongue, is loose, slovenly, and inartistic. Even in the second edition, published in 1608 and revised by the author, a great many patent blunders were suffered to stand, over which Cervantes himself makes merry in the second part. All this is unfavorable to the theory which some critics have formed that there was a purpose in the book other than what appears on the surface. There is no reason to doubt Cervantes's own declaration, several times repeated, that in writing *Don Quixote* he had no other design than to destroy the credit of those romances of chivalry whose reading was so pernicious to the taste and morals of the age, and to furnish "a pastime for melancholy and gloomy spirits." The idea of Byron that Cervantes "laughed Spain's chivalry away" is not more absurd than some recent conjectures that *Don Quixote* was intended as a satire upon certain leading personages of the Spanish court, especially upon the Duke de Lerma. The chivalry of Spain was already gone before Cervantes wrote. Had it not been gone *Don Quixote* would not have been written, nor would it have fallen to Cervantes, the most chivalrous of men, to deliver its death stroke. Not chivalry, but the foolish and extravagant romances of chivalry it was which Cervantes undertook to destroy;

Publication of the first part of *Don Quixote*.

and so completely was his work done that none of them appeared after 1604. There was no man of that age more deeply imbued, as his life bears witness, with the true chivalrous spirit, nor was there any better affected, as his book shows, to all the literature of chivalry. *Don Quixote* itself is a romance of chivalry, certainly not less inspired with the purest sentiment of honor, or furnishing a less exalted model of knighthood than Amadis of Gaul or Palmerin of England. Every passage of it proves how carefully and sympathetically Cervantes had studied his originals. For the romance of Amadis itself, as contained in the four first books of Garci-Ordoñez, Cervantes always professed a high respect. What he intended to ridicule was the continuation of Amadis in all the endless series of his descendants, each surpassing its predecessor in extravagance and folly. The theory that Cervantes wrote *Don Quixote* in order to revenge himself on the Duke de Lerma and his satellites, which has been revived in these latter days, scarcely deserves serious refutation. To those who are able to believe that in the character of the knight of La Mancha the author intended to portray his mortal enemy the more material improbabilities which surround this hypothesis will present no difficulty. In one sense *Don Quixote* is indeed a satire; but the follies it ridicules are those common to all humanity and to every age, and the satire is of that rare kind which moves not to depreciation but to love and pity of the object—to sympathy rather than to contempt, and to tears as well as laughter. Don Quixote and Sancho Panza are permanent types individualized. They are as true for all time as for the sixteenth century—for all the world as for Spain. The antithesis of the pure imagination without understanding and the commonplace good sense without imagination which these two represent is the eternal conflict which possesses the world. The secret of the marvellous success of *Don Quixote*, of the extraordinary popularity which makes it not only the great book of Spain but a book for all mankind, has been aptly described by Coleridge to lie in the rare combination of the permanent with the individual which the genius of the author has been enabled to achieve. Don Quixote is not only the perfect man of imagination, less the understanding, but he is a living picture of the Spanish *hidalgo* of the time of Philip II. Sancho is the ideal commonplace man of sense, less the imagination, and also the pure Manchegan peasant. In the carrying out of his happy conception Cervantes was doubtless careless of his own main purpose, so that this burlesque of romance has become a real picture of life—this caricature of chivalry the truest chivalric model—this life of a fool the wisest of books.

The fame acquired by the publication of the first part of *Don Quixote* does not appear to have contributed materially to the improvement of the author's fortunes. In 1605 he was still living at Valladolid, where, with his usual ill-luck, he was involved in a painful incident which brought him once more, though perfectly innocent, into collision with the authorities. A young nobleman of the court, being wounded in a street brawl, was carried into the house where Cervantes lodged to be tended, and died there of his hurts. Cervantes and his family, with the other inmates of the house, were cast into prison, according to the rough process of Spanish law, until they could be examined before the alcalde. From the depositions of the witnesses, which are extant, we learn that at this time Cervantes's household consisted of his wife, his natural daughter Isabel, over 20 years old, his widowed sister Andrea, with her daughter Constanza, and another sister, Magdalena, with one female servant; and that he made his living by writing and general agency. In May of this year there arrived at Madrid the earl of Huntingdon with a retinue of 600 persons from England, bearing a message of congratulation to the king on the birth of his heir, afterwards Philip IV., on which occasion were given a series of magnificent entertainments. On the strength of an allusion in a satirical sonnet by Gongara, a narrative of the festivities, published in 1605 and still extant, has been attributed to Cervantes, but it bears no marks of his style, and it is not probable that he would be employed on such a purpose. There is better evidence of his hand in a letter to Don Diego de Astudillo Carillo, discovered in the Bibliotheca Colombina at Seville in 1845, giving an account of a burlesque tourney or poetical joust held in the suburb of San Juan de Alfarache on the feast of St. Laurence. From this it would appear that Cervantes was on a visit to Seville in 1606, and on terms of familiar intercourse with many distinguished poets; also that allusions to *Don Quixote* and quotations from the book were familiar in the mouths of the wits of the time. Thenceforward to his death, Cervantes seems to have resided at Madrid, whither he had followed the court from Valladolid, with but little improvement in his worldly circumstances, supported chiefly by a pension from the archbishop of Toledo, and casual gratuities from his other patron the Count de Lemos. In 1608 was published the second edition of the first part of *Don Quixote*, with some corrections and additions by the author. The next year, following the fashion of the times, he entered as a lay brother into the Oratory of Cañizares, together with Lope de Vega, Quevedo, Espinel, and many other of his contemporaries and friends. In 1610, the Count de Lemos was appointed viceroy of Naples, and Cervantes seems to have been indulged with some promises of being made his secretary, but his advanced age and his dependent family were made the pretext for his being passed over in favor of his rival and pretended friend, Leonardo Argensola. In 1613, he gave to the world his *Novelas Exemplares*, some of which had been written many years before—a collection of tales of very various character, in a style till then unknown in Spain, owing little beyond their form to the Italian models These stories, undeservedly neglected out of their native country, must be reckoned as second in merit among Cervantes's writings, and even superior to *Don Quixote* in elegance of style. They are indeed the true originals, in the modern literature of Europe, of the novel, or story of real life, with plot, character, and scenery, and display in a very remarkable degree not only the versatility of their author's genius but his extreme familiarity with every type of Spanish society, especially of the lower orders of the people. In the charming story of *La Gitanella*, among some of the best of Cervantes's lyrics, is to be found the germs of all the gipsy romances, poems, and operas, which have since delighted the world, and in *Rinconete y Cortadillo* we have a picture of a Spanish Alsatia as vivid and real as anything by Defoe or Dickens. Indeed, these stories, rich in incident, character, and invention, have been a mine in which the novelists and dramatists of all countries have delved,—Scott himself, according to Lockhart, confessing that he first drew from them his idea of writing the *Waverley Novels*. In his dedication of the *Novelas* to the Count de Lemos, Cervantes speaks of being engaged on several other works, among them the second part of *Don Quixote;* and in the prologue, which contains some interesting details of his biography, he gives this portrait of himself in his 65th year:—"Of aquiline features, chestnut hair, a smooth and open forehead, with cheerful eyes, a nose curved though well proportioned, long moustaches, the beard of silver (which twenty years ago was of gold), the mouth small, the teeth not much, for he has but six, and those in bad condition and worse placed, for they have no concert one with another; the body between two extremes, neither large nor small, the complexion lively, rather white than brown, somewhat crooked in the shoulders, and not very light of feet—this, I say, is the effigy of the author of *Galatea* and of *Don Quixote de la Mancha*." Upon this description of his person—to which it may be added that he stammered in his speech and had lost the use of his left hand by the wound received at Lepanto—has been founded that ideal portrait, first designed by the English engraver Kent for Lord Carteret's edition of 1753, and since then ignorantly copied and repeated in Spain and everywhere as the true image of Miguel de Cervantes.

Second edition of the first part of Don Quixote.

Novelas Exemplares.

In 1614 was published the *Viage al Parnaso*, which with all its faults may be said to be the most successful of our author's essays in verse. It is a burlesque poem, professedly in imitation of one with the same title by the Italian, Cesare Caporali, but having little but the name in common with its predecessor. The half serious, half jesting vein in which Cervantes here indulges was unquestionably that which was most natural to his genius, and in spite of the cumbrousness of the allegorical machinery, and the excessive laudation which, as usual, he heaps on the small writers his contemporaries, the poem abounds in fancy, humor, and invention. The seventh book, in which is described the encounter between the armies of the good and bad poets, may compare with

Voyage to Parnassus.

the *Battle of the Books* and the fifth canto of the *Lutrin*. Cervantes's fancy of making the combatants wound one another with odes and sonnets is surely happier than either Swift's, where the authors use the ordinary weapons of Homeric war, or Boileau's, where the monks discharge material volumes. Not the least interesting portion of this poem is the fourth book, wherein the author speaks of himself, his labors, and his misfortunes, with a characteristic mixture of modesty, gayety, and simple self-confidence. In the prose appendix is a spirited and humorous dialogue with a messenger from Apollo concerning Cervantes's relations to the theatre, and the reason of his ill-success as a dramatist. After thirty years' retirement from the stage, during which interval the great Lope de Vega had arisen in all his glory, and he and his imitators had, by their fertility and their submissive devotion to the vulgar taste no less than by their genius, obtained the complete mastery of the national drama, Cervantes could hardly hope to recover for himself that position as a playwright to the memory of which he seems to have always clung with tenacity. Encouraged, however, by the renewal of his popularity as a writer, or stimulated perhaps by his necessities, he made in his old age another experiment in the drama, in which it is sad to find that he abandoned all those admirable principles which he had advocated through the mouth of the Canon in *Don Quixote*, surrendering himself to the vicious models he had himself so eloquently condemned. The result was unfortunate for his reputation. A collection of eight comedies and as many interludes was published in 1614, with a preface in which the author reports naively of his ill-success in the negotiation for a sale of their copyright. He would buy them, the bookseller said, were it not that he had been told by a certain person of distinction that "of the prose of Miguel de Cervantes much could be expected, but of his poetry nothing." This opinion was probably confirmed by these plays, which are so unworthy of their author that when reproduced in 1749 by Blas de Nasarre, that editor maintained the ingenious paradox that Cervantes had made them purposely bad in order to ridicule the plays of the day, just as he had written *Don Quixote* to ridicule the books of chivalry. There is no need of any such theory to account for the failure of Cervantes in the drama. His genius was unsuited to the stage. The qualities in which he most excelled were essentially undramatic, nor can his persistent efforts to recover his position as a playwright, even after the success of *Don Quixote* had been assured, be explained otherwise than by the fact that the stage was then almost the only road to literary fortune. The first part of *Don Quixote* had brought him fame, but nothing more. Before the appearance of the second part, the plan of which had been freely announced to his friends for some time previously, Cervantes was destined to encounter perhaps the strangest of the many crosses with which his pitiless evil star teased him to the end of his troubled and painful life. He had seen, while in the flush of manhood, his dream of soldiership dispelled by a cruel captivity. He had experienced the overthrow of all his hopes of civil preferment. He had been subject to every kind of mortification in his literary ambition. He had been jostled out of the arena by his rivals in poetry and in the drama. When old, infirm, and destitute, his genius had at last found in *Don Quixote* its proper field of employment and something like a fitting recognition. But even here he was not to be left undisturbed. The ill-fortune which never ceased to make him its mark was able to send a shaft through this his strongest side, which poisoned all his hardly-earned triumph and vexed him to the grave.

Returns to the drama.

The story of the false second part of *Don Quixote*, published under the name of Avellañeda, is one of the strangest in literary history, the mystery of which, though it has occupied many volumes, is not yet wholly unravelled. It is sufficient here to say that after it was well known that Cervantes was employed upon and had nearly completed his second part of *Don Quixote*, there appeared at Tarragona in 1614 a book pretending to be a continuation of the knight's adventures, by Alonso Fernandez de Avellañeda, a native of Tordesillas. The manifest object of this impudent fabrication was to malign the character of Cervantes, to destroy the credit of his book, and to deprive him of the fame and profit which he expected to derive from its completion. In a preface, full of a curious malignity, evidently arising from some cause deeper than literary envy, Cervantes was reproached in the grossest terms with his infirmities and misfortunes, even with his wounds,—sneered at as one "with more tongue than hands,"—reviled as old, poor, and without friends,—branded as envious and discontented, a calumniator of great men, and an evil-speaker even of the Church and the Holy Office. In the body of the book, under pretence of carrying on the story, every opportunity is taken to spoil it, by degrading the characters and giving a coarse turn to the incidents. Don Quixote is debased into a wild lunatic, who ends his days in a mad-house; Sancho is turned into a dull buffoon and his humor into brutal gluttony. In place of the witty and beautiful Dorothea we have the gross wench Barbara; and the graceful episodes of the original are represented by a string of dreary and vulgar adventures, without life, color, or probability. Apart from the spirit of malice, the book, in the words of Ticknor, is "so completely without dignity or consistency that it is clear the writer did not possess the power of comprehending the genius he at once basely libelled and meanly attempted to supplant." Nothing in viler taste has ever disfigured the literature of any nation, and it is greatly to the scandal of Cervantes's countrymen, nor the least of the injuries they have done him, alive and dead, that they have suffered such a book to be reprinted and to retain a place in their national collections. The false *Don Quixote*, in which Le Sage, and even some later critics, both French and Spanish, have pretended to see merits equal if not superior to those of the true, is now remembered only by Cervantes's perhaps too frequent references to it in the later chapters of his own book, and has little interest except in connection with the mystery of his life. The identity of Avellañeda is a problem which has greatly exercised the Spanish critics. The weight of opinion is in favor of its being the disguise of the notorious Fray Luis de Aliaga, the low-born confessor and minion of the Duke de Lerma, who was high in power during the reign of Philip III. Of all whose names have been suggested as the probable author of the spurious *Quixote* Aliaga is the only one who fulfils the required conditions. He was a Dominican, a preacher, and an Aragonese. He was an intimate friend of Lope de Vega, whose cause he openly espoused. He was in the confidence of the Holy Office, and may be suspected of not being well-disposed to Cervantes's patron the archbishop of Toledo, whom he succeeded as Inquisitor-General. He was known to be of a rancorous and envious spirit, who had written more than one pseudonymous libel, and was himself the mark of frequent caricatures and lampoons. Lastly, it has been proved that, before the appearance of *Don Quixote*, Aliaga's well-known nickname was Sancho. There was much in the book of Cervantes to give such a man offence, even whether such offence was intended or not,—in his person, his character, his office, and his religion. That as Avellañeda he found assistance among some of the writers of the period, rivals of Cervantes and jealous of his fame, is very probable; and there is only too much reason for suspecting that the great Lope de Vega himself was one of Aliaga's allies. Although Spanish writers are slow to admit that the relations between the two illustrious contemporaries were otherwise than friendly, and although on the side of Cervantes there never was any other than the spirit of perfect courtesy, loyalty, and magnanimity which became his own noble nature, recent researches have proved that by Lope de Vega these feelings were not honestly reciprocated. He who was called by his own familiar friend Alarcon "the universal envier of other men's meeds" is known to have regarded with jealous eyes the sudden popularity achieved by his despised competitor in *Don Quixote*. In addition to other proofs of an indirect kind tending to show that about the time of the appearance of *Don Quixote* Lope de Vega was ill-disposed towards his once intimate friend, we have the direct evidence of the letter discovered by Schack among the manuscripts of Count Altamira, dated August 4, 1604, wherein occurs this passage:—"Of poets I speak not; many are budding for the year to come; but none is so bad as Cervantes, or so stupid as to praise *Don Quixote*." With *Don Quixote* it could scarcely be expected that Lope would be pleased; and there was much in the book, especially in the Canon's strictures on the popular drama, to give him offence. If he stooped so low for his revenge as to inspire or to aid his friend Aliaga to write the false *Don Quixote*, his triumph was but brief.

The false *Quixote*.

At the close of 1615 Cervantes published his own second part, and from that moment the other was for ever blotted from the world's memory. This second part, though bearing marks of haste in the concluding chapters, belies, according to the judgment of the best critics, the opinion of the author himself as expressed through the mouth of the Priest, that second parts are never good. Although written in old age it contains at least as much of the glow and warmth of imagination as the first, while it is even superior in invention. There is more harmony in the construction, more correctness if not more vigor in the style, with fewer distractions and digressions. The author has more confidence in himself and more love of his work. His hero is more consistent in his madness, Sancho more pleasant in his sanity. Both master and man, especially the latter, while still true to their character, have developed into an ampler and richer nature. They have evidently advanced in their creator's favor, and have more pains taken with their behavior. The knight is more lovable, the squire more humorous; and the whole treatment of the story, with its vivacity and variety, its easy flow of narrative, and its masterly and pathetic close, is worthy of the happy genius of which it is the crown and full development.

By this time the fame of Cervantes had spread through many lands. Numerous editions of his *Don Quixote* had been printed, either in the original or in translation, thus realizing the author's prediction that there would be no nation or language to which his book would not be carried. According to the interesting story told by the archbishop of Toledo's secretary, in his approbation appended to the second part, dated February, 1615, foreigners of distinction, when they visited Madrid, made it their first business to inquire after the author of *Don Quixote*. To a party of French gentlemen, members of the suite of the ambassador, the Duc de Mayenne, who were anxious to learn of the condition and mode of life of the celebrated writer, the secretary of the archbishop was obliged to respond that "he who had made all the world rich was poor and infirm, though a soldier and a gentleman." The man who was the delight of his age and destined to be the chief glory of his country was indeed still in great misery, depending on alms for his subsistence, and now in his sixty-ninth year stricken by a mortal disease. In the dedication of his second part of *Don Quixote* to the Count de Lemos, Cervantes speaks of his broken health and approaching end, still with unabated courage and cheerfulness. His last work, not published till after his death, was *Pericles and Sigismunda*, a romance of love and adventure after the model of Heliodorus, on which he bestowed great pains and singular affection, declaring that it would be either the best or the worst of his books. The dedication to the Count de Lemos is written with an astonishing gayety and spirit, though it announces that the author had yesterday received extreme unction, and had "one foot in the stirrups," waiting for a summons. About this time must have occurred that adventure, which is so pleasantly told in the prologue, of the meeting with the student near Toledo, when our author, in a grievous state from dropsy, was returning from a visit to his wife's family at Esquivias, at the close of which he wrote:—"And so farewell, humors; farewell, my gay friends, for I feel myself dying, and have no desire but soon to see you happy in the other world." On the 4th of April he entered the order of the Franciscan Friars, whose habit, following the fashion of the period, he had assumed three years before, and on the 23d of that month he ended, in all serenity and cheerfulness, his life of many troubles. In the same year, and nominally on the same day, though really ten days later, allowance being made for the difference of calendars, died William Shakespeare in England. Cervantes's body was buried humbly at the expense of his religious order in the convent of the Trinitarian Nuns in the Calle de Humilladero, of which community his daughter Isabel was a professed member. In 1633 the nuns moved to a new site in the Calle de Cantarrenas, and having exhumed and brought away their dead with them, the bones of Cervantes were mingled with others in a common ossuary, so that Spain, who had shown herself so careless of him in life, has lost all trace of him in death. So closes a record as glorious and as calamitous as any in literary history, of one of the world's greatest benefactors, whom the world knew not—of the best of all Spaniards, the very type and perfect embodiment of the highest Castilian nature, whom his country starved and who has made her immortal.

Death.

The language of eulogy has been exhausted over that work of Miguel de Cervantes which for two hundred and fifty years has been the delight of mankind in a degree such as no other book has ever approached. There is nothing to add to the tribute which the critics of all countries have joined in paying to the wisest, tenderest, and deepest of humorists.

The popularity of *Don Quixote* is best attested by the extraordinary number of editions and translations which have appeared in all languages. According to a computation made by Don Lope de Fabra, in his appendix to the Barcelona fac-simile of the first edition, there were published, up to 1874, 278 editions of *Don Quixote*, of which 87 appeared in Spain, and 191 in other countries. Of these, 136 are in the original. Translations have appeared in English, French, German, Dutch, Italian, Danish, and indeed in every European tongue, including Turkish. England, who of all foreign nations has ever been foremost in recognizing the genius of Cervantes, is entitled to the honor of having produced the first critical edition of the Spanish text, which is that of Dr. John Bowle, published at Salisbury in 1781. This has served as the basis of all the subsequent Spanish editions; for although the Royal Academy anticipated Bowle by a year in its magnificent edition printed by Ibarra, it was a knowledge of the Englishman's design, and to some extent of his labors, which prompted that undertaking. The other most important critical editions in Spanish are that of Pellicer, published in 1797, who has borrowed largely, and not with due acknowledgment, from Bowle; that of Clemencin, in 1833–39, with a very elaborate commentary, displaying much industry and learning but little taste or sympathy, and sadly lacking in reverence for the author; and that in the complete edition of Cervantes's works printed at Argamasilla in 1864, under the editorship of Don Eugenio de Hartzenbusch and Don Cayetano Alberto de Rosell,—superb in type and paper, but otherwise of little value, with a text disfigured by wanton emendations. The principal English translations are—the first, by Thomas Shelton, which is also the earliest version of *Don Quixote* in any foreign language, published in 1612–20, vigorous, and of a spirit akin to the original, but rude and incorrect; that of Motteux, absurdly over-praised by Lockhart, which is nothing more than a loose paraphrase of Cervantes's text, in a style consciously comic and therefore of all the most unhappy for *Don Quixote;* that of Jarvis, which, with some trifling revisions, is the current accepted version—correct and careful, but dull, commonplace, and destitute of humor; and that of Smollett, which is the worst of all, being a piece of hack-work done for the booksellers, without knowledge of Spanish, or even such an insight into his author's meaning as his kindred genius should have suggested. By far the best life of Cervantes is that by Don Martin Fernandez de Navarrete, published in Madrid in 1819. (H. E. W.)

CERVIA, an episcopal town of Italy, with a port on the Adriatic, in the district of Ravenna, and 12 miles S.E. of the city of that name. In the vicinity are the extensive salt-works of Valle di Cervia. Population about 5700.

CESARI, Giuseppe, called Il Cavaliere d'Arpino (being born in or about 1568 at Arpino, and created a "Cavaliere di Cristo" by Pope Clement VIII.), also named Il Giuseppino, an Italian painter, much encouraged at Rome and munificently rewarded. Cesari is stigmatized by Lanzi as not less the corrupter of taste in painting than Marino was in poetry; indeed, another of the nicknames of Cesari is "Il Marino de' Pittori" (the pictorial Marino). There was spirit in Cesari's heads of men and horses, and his frescoes in the Capitol (story of Romulus and Remus, &c.), which occupied him at intervals during forty years, are well colored; but he drew the human form ill. His perspective is faulty, his extremities monotonous, and his chiaroscuro defective. He died in 1640, at the age of seventy-two, or perhaps of eighty, at Rome. Cesari ranks as the head of the "Idealists" of his period, as opposed to the "Naturalists;" of whom Michaelangelo da Caravagio was the leading champion,—the so-called "idealism" consisting more in reckless facility, and disregard of the common facts and common-sense of nature, than in anything to which so lofty a name could be properly accorded. He was a man of touchy and irascible character, and rose from penury to the height of opulence.

CESAROTTI, Melchiore (1730–1808), an Italian poet, born at Padua in 1730, of a noble but impoverished family. At the university of his native place his literary progress procured for him at a very early age the chair of rhetoric, and in 1768 the professorship of Greek and Hebrew. On the invasion of Italy by the French, he gave his

pen to their cause, received a pension, and was made knight of the iron crown by Napoleon I., to whom, in consequence, he addressed a bombastic and extravagantly flattering poem called *Pronea*. Cesarotti is best known as the translator of Homer and Ossian. Much praise cannot be given to his version of the *Iliad*, for he has not scrupled to add, omit, and modernize. Ossian, which he held to be the finest of poems, he has, on the other hand, considerably improved in translation; and the appearance of his version attracted much attention in Italy and France, and raised up many imitators of the Ossianic style. Cesarotti also produced a number of works in prose, including a *Course of Greek Literature*, and essays *On the Origin and Progress of the Poetic Art*, *On the Sources of the Pleasure derived from Tragedy*, *On the Philosophy of Language*, and *On the Philosophy of Taste*, the last being a defence of his own great eccentricities in criticism. His style is forcible but full of Gallicisms, and he is too fond of novelty both in expression and matter. A complete edition of his works, in 42 vols. 8vo, began to appear at Pisa in 1800, and was completed in 1813 after his death. See *Memoirs* by Barbieri (Padua, 1810).

CESENA (Lat. *Cæsena* or *Cæsenia*), an episcopal city of Emilia, in the province of Forli, a station on the railroad between Bologna and Ancona, gives its name to a "circondario" and to two subdivisions or "mandamenti" of the same. Population of circondario in 1862, 77,489. A very fertile region, it makes good white wine of some reputation, rears silk-worms to some extent, and has some sulphur mines, lignite, and specially good brick clay; but its principal source of wealth is its hemp, deemed the best in the north of Italy. The city (15 miles E. of Forli, 25 N. of Rimini, 17½ S. of Ravenna) has 7777 inhabitants, and lies where the Apennine melts into the plain, at the foot of the Monte Garampo, on which once stood the ancient cathedral, replaced by another of debased Gothic architecture, built in the 15th century, in which are some works of Donatello. On the hill above the city are also the imposing ruins of the castle, believed to have been built by the Emperor Frederick II. The famous sanctuary of Madonna del Monte, with its church by Bramante, is also a prominent object in the landscape. The town, irregularly but well built, and divided by the little river Cesola, has several interesting buildings. The town hall is of good mediæval architecture, and possesses a very fine Francia, a Sassoferrato, and some other interesting pictures. Cesena has a large and handsome theatre, some fine palaces of the provincial noble families, and a cemetery of which it is specially proud,—one of the handsomest and best ordered in Italy. The little city has an interesting history of its own, full of eventful changes. It fell in the 4th century under the tyranny of the Malatesta family, one of the worst races of the Italian mediæval tyrants. But it was perpetually rebelling, and occasionally recovering its liberty and autonomy. Dante, in the 27th canto of the *Inferno*, characterizes Cesena as living midway between tyranny and freedom, even as she is placed physically between the mountains and the plain. In 1859 Cesena was among the first of the cities of the Romagna which threw off the Papal yoke.

CESPEDES (in Italian CEDASPE), PABLO DE (1538–1608), was born at Cordova, and was educated at Alcalá de Henares, where he studied theology and Oriental languages. On leaving the university, he went to Rome, where he became the pupil and friend of Federigo Zucchero, under whose direction he studied particularly the works of Raphael and of Michelangelo. In 1560, while yet in Rome, proceedings were taken against him by the Inquisition at Valladolid on account of a letter which, found among the papers of the archbishop of Toledo, had been written by Cespedes during the preceding year, and in which he had spoken with great freedom against the holy office and the inquisitor general, Fernando de Valdés. Cespedes remained in Rome at this critical moment, and from which city he appears rightly to have treated this matter of the prosecution with derision. It is not known how he contrived to bring the proceedings to an end; he returned, however, to Spain, a little before 1577, and in that year was installed in a prebend of the cathedral at Cordova, where he resided till his death.

A distinguished poet, a remarkable painter, eminent also as an architect and sculptor, Pablo de Cespedes has been called the most *savant* of Spanish artists. According to his friend Francisco Pacheco, to whom posterity is indebted for the preservation of all of Cespedes's verse that is extant, the school of Seville owes to him its introduction to the practice of chiaroscuro. He was a bold and correct draughtsman, a skilful anatomist, a master of color and composition; and the influence he exerted to the advantage of early Spanish art was considerable. Cristobal de Vera, Juan de Peñalosa, and Zambrano were among his pupils. His best picture is a Last Supper at Cordova; but there are good examples of his work at Seville and at Madrid.

Cespedes was author of several opuscules in prose on subjects connected with his profession. Of his poem on the *Art of Painting* enough was preserved by Pacheco to enable us to form an opinion of the whole. It is esteemed the best didactic verse in Spanish; Marchena and Castro compare it, not disadvantageously, with the *Georgics*. It is written in strong and sonorous octaves, in the majestic declamatory vein of Fernando Herrera, and is not altogether so dull and lifeless as is most didactic verse. It contains a glowing eulogy of Michelangelo, and some excellent advice to young painters, insisting particularly on hard work and on the study of nature. The few fragments yet remaining, amounting in all to some six hundred lines, were first printed by Pacheco in his treatise *Del Arte de la Pintura*, in 1649.

CETACEA (from the Greek word κῆτος, a whale) is the name employed by zoologists to characterize the important order of Mammals which contains the whales and dolphins. These mammals are aquatic in their habits, and possess a fish-like form. They differ from fishes in breathing by lungs and not by gills, in being viviparous and not oviparous, and in suckling their young with a pair of milk-secreting glands or mammæ. This order was formerly divided into two groups, the herbivorous cetacea and the carnivorous cetacea. By modern zoologists the herbivorous cetacea, which include the animals called dugong, manatee, and rytina, are not regarded as whales, but are referred to a distinct order named *Sirenia*. The order *Cetacea*, therefore, in its present acceptation is limited to the toothed whales or *Odontoceti* and the whalebone whales or *Mystacoceti*. For the organization, classification, and distribution of these animals, see MAMMALIA.

CETINA, GUTIERRE DE, soldier and poet, was born at Seville during the earlier years of the 16th century. Choosing the career of arms as a means of obtaining the preferment he needed, he served several campaigns in Italy, fought at the leaguer of Tunis (1535) against Barbarossa, and continued in the practice of his profession for some years in Flanders, under Ferdinand of Austria. The death of the prince of Ascoli, his patron and protector, whom he mourned in a fine elegiac sonnet, and his own continued poverty, would seem to have disgusted him with the trade of war. He returned to Seville, departing thence soon afterwards for Mexico, where he had a brother high in office. No more is known of him, saving that he came back again to the city of his birth, and that he died there, it is supposed about 1560. An enthusiast in art, the friend of Boscan and Garcilaso, of Hurtado de Mendoza and Jeronimo de Urrea, Gutierre de Cetina, as may naturally be inferred, followed in the wake of these poets, renouncing the old Castilian creed, and preaching the new evangel of Petrarch. His poems, which were not published till long after his death, consist of sonnets, *canzoni*, epistles in *terza rima*, and madrigals, and are remarkable for elegance and simplicity of form, and for grace and tenderness of thought and feeling. Their author has been often confounded with Doctor Gutierre de Cetina, who was vicar of Madrid. See Rivadaneyra's *Biblioteca*, vol. xxxii.

CETTE, a fortified seaport in the department of Hérault, in 43° 23′ 48″ N. lat. and 3° 42′ 15″ E. long., and 15 miles S.W. of Montpellier. After Marseilles it is the principal commercial port on the south coast of France. It occupies the foot and slope of a hill, the ancient *Mons Setius*, situated on a tongue of land that lies between the Mediterranean and the Lagoon of Thau. The town is well built, and has numerous factories, glass-works, shipbuilding yards, a custom-house, a school of navigation, a communal college, a botanic garden, museums, a library, and a theatre. It is much resorted to for sea-bathing. The harbor is capable of accommodating 400 sea-going vessels, and is safe in all weathers. The left of the two moles which form it runs E.N.E. for a distance of about 630 yards into the sea, and is then continued in a break-

water, which extends across the entrance. At the end of this mole are the fort of St. Louis and the lighthouse. Opposite to them, on the other side of the harbor, is the fort of St. Pierre, which, with the citadel, completes the defences of Cette. The town is connected with Lyons by the Canals des Etangs and de Beaucaire and the Rhone, and with Bordeaux by the Canal du Midi; railways communicate with Toulouse and Montpellier, and steamers with the Mediterranean ports. The shipping trade of Cette is very considerable. Its imports are colonial produce, wool and cotton, hides, cork, brandy and wine for manufacture, iron and lead ores, staves from the Adriatic, asphalt, fruits, sulphur, wheat, oats, maize, barley, timber, and coal. In 1873 the port was visited by 63 British ships, of total tonnage 17,409, mostly laden with pitch for manufacture into patent fuel at the coal mines N. of Nîmes. The greater number of these ships left Cette in ballast. The exports are wines, brandy, liqueurs, argol, verdigris, corks, salt, oil, dried fruits and fish, meal, cloth, and woollen stuffs. The sum total of imports and exports in 1870 was about 460,000 tons. In the same year 2075 ships entered, and 2108 left the port. There are upwards of 40 sailing-vessels belonging to the port, of from 60 to 300 tons burdeu. A large number of small craft are employed in the sardine, cod, and oyster fisheries on the coast. There are factories for the manufacture of syrups, grape-sugar, corks, soaps, and chemicals, which with the docks, the extensive salt-works in the neighborhood, and the establishments for the making, from French and Spanish wine and brandy, of claret, sherry, port, champagne, &c., give employment to thousands. The town was founded in 1666 by Louis XIV. Population in 1872, 25,181.

CETTINJE, Cetinje, Zetinje, Cettigno, or Cettin, the capital of the principality of Montenegro, is situated on the left of a small river in a narrow plain deeply sunk in the heart of the mountains, at a height of 2470 feet above the sea. It consists of two streets of whitewashed stone houses, and, according to Mr. Tozer, has very much the appearance of a Dartmoor village. The principal buildings are the monastery and the palace. The former was founded in 1478, but has been frequently burned and restored. It is surrounded with walls, and now contains a prison, a school, a library, a printing establishment, and the residences of the archimandrite and the bishop. The chapel is held in great veneration as the burial-place of the sainted Peter I. and Danilo. The palace is a comparatively simple building of two stories, composing two sides of a court, which is completed by high walls. The town owes its origin to Ivan the Black, who was obliged, in the end of the 15th century, to withdraw from Jabliak, the former capital, situated to the north of Lake Scodra. The town has frequently been taken and ravaged by the Turks, but has seldom continued for any length of time in their possession. Population about 700.

CEUTA, or (in the local Moorish form) Sebta, a town and fortress belonging to Spain on the coast of Marocco, on a peninsula opposite Gibraltar, in 35° 54′ N. lat., 5° 18′ W. long. It derives its name from its seven hills, the most important of which, the Monte del Hacho (the ancient *Abyla*, one of the pillars of Hercules), has a considerable elevation. The town is well built, and is chiefly important as a military and convict station. It contains a cathedral, the bishop of which is suffragan to the archbishop of Seville, several religious houses, and a hospital. It has a small harbor, and imports provisions and military stores from Spain. Ceuta occupies the site of the Roman colony of *Ad Septem Fratres*. In 618 the town, which had been refortified by Justinian, fell into the hands of the West Goths; and in the 8th century it was the seat of that Count Julian whose name is inseparably connected with the Saracenic conquest of Spain. Under the Arabic government it was an industrial city, and it is said to have been the first place in Western Europe where a paper manufactory was established. It was taken from the Moors by John I., king of Portugal, in 1415, and passed into the hands of the Spaniards on the subjugation of Portugal by Philip II. in 1580. It has been several times unsuccessfully besieged by the Moors—from 1694 to 1727 by Mulai Ismail, and in 1732 by Ripperda. In 1810 it was held by the English under Fraser. In 1860 the Spanish territory around the town was extended by force of arms. Population about 7000.

CEVA, the ancient *Ceba*, a town of Italy, in the province of Cuneo and 11 miles east of Mondovi, at the confluence of the Cevetta with the Tanaro. It was formerly fortified; and the rock, at the foot of which the town lies, was surmounted by a citadel. It has iron-works and silk-factories, and carries on a considerable trade in its cheese, which was famous even in the time of the Romans. In the Middle Ages it was the centre of a separate marquisate, and during the 16th and 17th centuries it was several times captured by the French and the Spaniards. In 1796 it was taken by Augereau, and in 1800, after having withstood the siege of the previous year, it again fell into the hands of the French. The conquerors destroyed the castle, which had served as a state prison. Population 4730.

CÉVENNES, a mountain chain in the south of France, dividing the valleys of the Lower Saône and Rhone from those of the Loire and the Garonne. On the N. the Cévennes are a continuation of the Lyonnais mountains; and they end on the S. at the Canal du Midi, which separates them from the Pyrenees. They are divided into two parts,—the south consisting of the Montagnes Noires (in Aude and Hérault), the Espinouses (in Tarn, Aveyron, and Hérault), the Garrigues (in Aveyron and Gard), and the Cévennes proper or Lozère or Gévaudan (in Lozère); and the north consisting of the Vivarais (in Ardèche). Sometimes they are also included in the name the Lyonnais (in Rhône) and the Charolais (in Saône-et-Loire). The average height is 3000 to 4000 feet; and the highest peaks are Mount Mezenc (in Ardèche), 5788 feet, and Mount Lozère, 4880. The principal rivers which take their rise in these mountains are the Loire, the Allier, the Lot, and the Tarn. The mountains consist of limestone, greywacke and granite; and beds of trachyte and lava give evidence of former volcanic action. In the Cévennes are found iron, coal, lead, silver, copper, antimony, marble, and porphyry. The lower slopes are well cultivated; higher up good pasturage is found; while the summits are generally covered with forests of chestnut and pine. The Cévennes are famous as the retreats of the Albigenses, Waldenses, and Camisards.

CEYLON, an island in the Indian Ocean, separated on the N.W. from continental India by the Gulf of Mannār. It lies between 5° 55′ and 9° 51′ N. lat., and between 79° 41′ 40″ and 81° 54′ 50″ E. long. Its extreme length from north to south is 271 miles; its greatest width is 137 miles; and its area, including that of its dependent islands, amounts to 25,742 miles, or about one-sixth smaller than Ireland. In its general outline the island resembles a cone, the apex of which points towards the north.

The Coast.—The coast is beset on the N.W. with numberless sandbanks, rocks, and shoals, and may be said to be almost connected with India by the island of Ramisseram and Adam's Bridge, a succession of bold rocks reaching almost across the gulf at its narrowest point. Between the island and the opposite coast there exist two open channels of varying depth and width, beset by rocks and shoals. One of these, the Mannār Passage, is only navigable by very small craft. The other, called the Paumben Passage, lying between Ramisseram and the mainland, has been deepened at considerable outlay, and is now used by vessels drawing ten feet of water, in passing from the Malabar to the Coromandel coast, which were formerly compelled in doing so to make the circuit of the island. The west and south coasts, which are uniformly low, are fringed their entire length by cocoa-nut trees, which grow to the water's edge in great luxuriance, and give to the island a most picturesque appearance. Along these shores there are numerous inlets and backwaters of the sea, some of which are available as harbors for small native craft. The east coast from Point de Galle to Trincomalee is of an entirely opposite character, wanting the ample vegetation of the other, and being at the same time of a bold precipitous character. The largest ships may freely approach this side of the island, provided they take care to avoid a few dangerous rocks, whose localities are, however, well known to navigators.

Seen from a distance at sea, this "utmost Indian isle" of the old geographers wears a truly beautiful appearance. The remarkable elevation known as "Adam's Peak," the most prominent, though not the loftiest, of the hilly ranges of the interior, towers like a mountain monarch amongst an assemblage of picturesque hills, and is a sure landmark

for the weary navigator, when as yet the Colombo light-house is hidden from sight amidst the green groves of palms that seem to be springing from the waters of the ocean.

The low coast-line of country encircles the mountain zone of the interior on the east, south, and west, forming a belt which extends inland to a varying distance of from 30 to 80 miles; but on the north the whole breadth of the island from Kalpitiya to Batticaloa is an almost unbroken plain, containing magnificent forests of great extent.

Mountains.—The mountain zone is towards the south of the island, and covers an area of about 4212 miles. The uplifting force seems to have been exerted from south-west to north-east, and although there is much confusion in many of the intersecting ridges, and spurs of great size and extent are sent off in many directions, the lower ranges manifest a remarkable tendency to run in parallel ridges in a direction from south-east to north-west. Towards the north the off-sets of the mountain system radiate to short distances and speedily sink to the level of the plain. Detached hills are rare; the most celebrated of these are Mihintale, which overlooks the sacred city of Anuradhapura, and Sigiri. The latter is the only example in Ceylon of those solitary acclivities which form so remarkable a feature in the table-land of the Deccan,—which, starting abruptly from the plain, with scarped and perpendicular sides, are frequently converted into strongholds accessible only by precipitous pathways or by steps hewn in the solid rock.

Sketch Map of Ceylon (embracing 299 miles by 233).

For a long period Adam's Peak was supposed to be the highest mountain in Ceylon, but actual survey makes it only 7352 feet above the sea-level. This elevation is chiefly remarkable as the resort of pilgrims from all parts of the East. The hollow in the lofty rock that crowns the summit is said by the Brahmans to be the footstep of Siva, by the Buddhists of Buddha, by the Mahometans of Adam, whilst the Portuguese Christians were divided between the conflicting claims of St. Thomas and the eunuch of Candace queen of Ethiopia. The footstep is covered by a handsome roof, and is guarded by the priests of a rich monastery half way up the mountain, who maintain a shrine on the summit of the peak. The highest mountains in Ceylon are Piduru Talagala, 8295 feet in altitude; Kirigalpota, 7836 feet; and Totapelakanda, 7746 feet.

The summits of the highest ridges are clothed with verdure, and along their base, in the beautiful valleys which intersect them in every direction, the slopes were till within the last few years covered with forests of gigantic and valuable trees, which have now disappeared under the axe of the planter, who has felled and burnt the timber on all the finest slopes at an elevation of 2000 to 4500 feet, and converted the hill sides into highly-cultivated coffee estates. The plain of Nuwara Eliya, the sanatorium of the island, is at an elevation of 6200 feet, and possesses many of the attributes of an alpine country. The climate of the Horton plains, at an elevation of 7000 feet, is still finer than that of Nuwara Eliya, but they are difficult of access, and are but little known to Europeans. The town of Kandy, in the Central Province, formerly the capital of the native sovereigns of the interior, is situated 1727 feet above sea-level.

Rivers.—The island, though completely within the influence of oceanic evaporation, and possessing an elevated table-land of considerable extent, does not boast of any rivers of great volume. The rains which usher in each monsoon or change of season are indeed heavy, and during their fall swell the streams to torrents and impetuous rivers. But when these cease the water-courses fall back to their original state, and there are but few of the rivers which cannot be passed on horseback. "In the plains there are comparatively few rivulets or running streams; the rivers there flow in almost solitary lines to the sea; and the beds of their minor affluents serve only to conduct to them the torrents which descend at the change of each monsoon, their channels at other times being exhausted and dry. But in their course through the hills and the broken ground at their base they are supplied by numerous feeders, which convey to them the frequent showers that fall in these high altitudes. Hence their traeks are through some of the noblest scenery in the world; rushing through ravines and glens, and falling over precipitous rocks in the depths of wooded valleys, they exhibit a succession of rapids, cataraets, and torrents, unsurpassed in magnificence and beauty. On reaching the plains, the boldness of their march and the graceful outline of their sweep are indicative of the little obstruetion opposed by the sandy and porous soil through whieh they flow. Throughout their entire course dense forests shade their banks." The most important of the Ceylon rivers is the Mahaveli-ganga, which has its source in the Pidurutalagala mountain, whence it takes a tortuous course through the Kotmale valley to Pasbage, where it is joined by a smaller braneh issuing from the base of Adam's Peak; it then passes through the village of Peradeniya, where it is crossed by the railway bridge, and by a beautiful bridge, of a single span of 205 feet, construeted of satin wood, on the Amerieau or wedge principle. Thenee it winds to the west and north of Kandy, and after an easterly deseent of nearly 1000 feet between Kandy and Bintenne, sweeps suddenly to the north, and takes its course through the wild and open country, separating into two branches,—the smaller of which, the Verukal, enters the sea about 25 miles south of Trincomalee, while the larger, retaining its original name, falls into the great bay of Kottiar, near the noble harbor of Trincomalee, after a eourse of nearly 200 miles. In flood-time it rises 25 or 30 feet, but for the greater part of the year it is fordable in many places. It is seldom wider than the Thames at Richmond, and is generally of much less width. Surveys have shown that, at some outlay, this river might be made navigable for a distance of 80 or 90 miles from the sea. The upper half of its course is through a rocky and precipitous country, but the lower half is through a fine open region, well watered throughout the whole of the year, and only requiring capital and labor to convert it into the garden of Ceylon, which it once doubtless was. The remains of stupendous dams and canals bear witness to the importance which the ancient rulers of Ceylon attached to this portion of their possessions. The Kelani-ganga rises at the base of Adam's Peak, whence, running first north and then almost due west to Ruwanwella, it takes its way more southerly to Colombo, on the northern outskirt of which it falls into the sea across a wide sand-bank. It is navigable for about 40 miles by flat-bottomed boats. The Kalu-ganga and the Walawe-ganga (or Wal-

oya) flow from the eastern base of Adam's Peak through the district of Sabaragamuwa to the sea, the former south-westerly, the latter south-easterly. Both are navigable by country boats for some distance,—the Kalu-ganga for upwards of 50 miles, from above Ratnapura to the sea at Kalutara, whence a canal connects it with Colombo. The Walawe-ganga falls into the sea 8 miles to the west of Hambantota. The Mahaoya falls into the sea after a westerly course of about 70 miles, to the north of Negombo. The other rivers, except during the heavy rains, are of no great size, and none of them are navigable.

Lakes and Canals.—There are in Ceylon some lakes of considerable extent and of great beauty. Those of Colombo, Bolgoda, and Negombo are of natural formation; those which have been formed by human labor will be noticed below in connection with irrigation. The rivers, as already explained, descend rapidly from the hills, and sweep along in their rapid course large quantities of earthy matter; at their junction with the ocean they are met "transversely by the gulf-streams, and the sand and soil with which they are laden, instead of being carried out to sea, are heaped up in bars along the shores, and then, augmented by similar deposits held in suspension by the currents, soon extend to north and south, and force the rivers to flow behind them in search of a new outlet." At the mouths of the rivers, the bars thus created generally follow the direction of the current, and long embankments are gradually raised, behind which the rivers flow for considerable distances before entering the sea. Occasionally the embouchures become closed by the accumulations without, and the rivers, swollen by the rains, force new openings for themselves, and leave their ancient channels converted into lakes. Thus have been formed the lakes of Colombo and Negombo on the west coast, the harbor of Batticaloa on the east, and the long low embankments of sand on both coasts. These embankments, known by the local name of "Gobbs," and often from one to three miles in breadth, are covered with thriving cocoa-nut plantations.

The Dutch whilst in possession of Ceylon did much to improve its water communication, and connected the natural channels formed by these embankments by constructing artificial canals, so as to provide unbroken water communication between Kalpitiya, on the N.W. coast, and Negombo; this line has been extended from Negombo to Colombo, and on to the south as far as Kalutara.

Harbors.—The magnificent basin of Trincomalee, situated on the east coast of Ceylon, is perhaps unsurpassed in extent, security, and beauty by any haven in the world. The Admiralty has a dockyard here, and it is the principal naval station in the Indian Seas; but it is far removed from the productive districts, the population is small and scattered, and vessels have to resort to the rocky and dangerous harbor of Point de Galle at the south, or to the open roadstead of Colombo on the west. Something has been done by blasting to improve Galle harbor, but it is small, and its entrance is narrow and difficult; it is also somewhat remote from the most productive districts, and the Colonial Government has decided on making a breakwater at Colombo in preference to improving Galle harbor. The anchorage at Colombo is good, and it is anticipated that the new works will render it a secure harbor at all times of the year.

Seasons, Climate, &c.—The seasons in Ceylon differ very slightly from those prevailing along the coasts of the Indian peninsula. The two distinctive monsoons of the year are called, from the winds which accompany them, the south-west and the north-east. The former is very regular in its approach, and may be looked for along the S.W. coast between the 10th and 20th of May; the latter reaches the N.E. coast between the end of October and the middle of November. There is a striking contrast in the influence which the south-west monsoon exerts on the one side of the island and on the other. The clouds are driven against the lofty mountains that overhang the western and southern coasts, and their condensed vapors descend there in copious showers. But the rains do not reach the opposite side of the island: whilst the south-west is deluged, the east and north are sometimes exhausted with dryness; and it not unfrequently happens that different sides of the same mountain present at the same moment the opposite extremes of drought and moisture. The influence of the north-east monsoon is more general. The mountains which face the north-east are lower and more remote from the sea than those on the south-west; the clouds are carried further inland, and it rains simultaneously on both sides of the island. Owing to the efforts of Lieut.-Col. Fyers, R.E., the surveyor-general of Ceylon, very accurate meteorological observations have been recorded throughout Ceylon for the last few years, and the following table has been compiled from the official return of rainfall in Ceylon during the years 1870–1874 inclusive:—

Months.	Colombo, 42 feet.		Galle, 40 feet.		Ratnapura, 114 feet.		Jaffna, 9 feet.		Puttalam, 11 feet.		Anuradhapura, 312 feet.		Trincomalee, 175 feet.		Kandy, 1713 feet.		Badulla, 2220 feet.		Nuwara Eliya, 6240 feet.		Kotmale, 4000 feet.	
	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.	Inches of rain.	Rainy days.
January.....	2·26	8	4·06	12	7·24	15	1·33	5	3·02	8	3·57	7	8·01	13	5·65	12	10·79	10	7·77	13	1·67	2
February....	2·37	5	3·69	9	5·55	9	2·51	4	1·81	5	2·52	6	3·71	8	5·12	8	6·29	7	3·06	8	3·38	6
March.....	7·08	9	3·62	14	6·70	14	1·78	2	2·49	6	2·01	4	1·23	5	2·31	6	2·15	3	2·20	6	2·22	6
April	7·45	12	6·86	14	11·11	11	3·87	6	6·51	11	8·26	12	2·55	7	7·39	16	7·99	6	7·32	16	11·37	17
May.....	11·82	18	8·39	22	14·91	24	2·69	4	2·49	7	2·92	7	2·46	5	5·13	14	3·29	4	6·61	16	11·78	19
June.....	4·63	16	6·87	21	18·57	26	1·03	1	0·43	4	0·97	3	0·48	2	9·73	24	2·12	3	16·08	26	30·16	25
July.....	2·81	10	3·69	19	12·48	24	0·63	2	0·03	..*	0·04	1	2·88	5	7·65	23	0·74	1	12·19	25	29·75	26
August.....	2·85	8	3·63	17	10·06	21	1·01	3	0·87	2	3·26	5	2·68	8	4·24	21	5·98	6	6·62	22	12·92	21
September...	3·50	13	5·41	16	19·93	23	3·26	5	0·63	4	4·00	5	5·74	8	7·92	21	0·77	1	12·83	21	24·79	16
October	13·71	19	10·17	20	17·75	24	6·06	12	4·79	9	3·54	8	7·82	15	9·63	22	6·88	4	9·66	23	20·75	20
November....	12·83	18	12·24	16	13·90	21	17·39	20	10·95	18	11·15	19	13·27	21	10·51	21	9·37	9	8·41	21	10·92	17
December ...	4·39	12	6·68	15	8·06	16	7·00	15	4·30	13	5·98	17	9·42	19	5·34	16	1·65	3	3·91	11	4·51	7
Total for the year on the average of five years.	75·70	148	75·31	195	146·26	328	48·56	79	38·32	87	48·22	94	60·25	116	81·62	204	58·02	57	96·66	208	164·22	182

* 2 days in 1872 and 1 in 1873.

This table shows that throughout Ceylon the greatest quantity of rain falls in the last three months of the year, though at high elevations and within the immediate influence of the highest mountains the rainfall in June is very great. At Colombo, on the west coast, the rainfall is 75·70 inches, and the number of rainy days is 148; at Galle, at the south-west corner, the rainfall is nearly the same, viz. 75·31, but the number of rainy days is 195. At Ratnapura, about 65 miles S.E. of Colombo, and lying immediately under Adam's Peak, the rainfall is 146·26, and the rainy days 328. Jaffna is at the extreme north of the island; Puttalam lies on a salt lake, behind a gobb, close to the west coast. Anuradhapura lies to the north-east of Puttalam, about 40 miles from the low hills at the north of the mountain zone. Trincomalee is on the east coast, almost due east of Anuradhapura. Badulla lies to the far east of the mountain zone, and, though at a higher elevation than Kandy, has a very small rainfall. The hill-station of Nuwara Eliya has a rainfall of 96·66, and the coffee district of Kotmale, lying below the highest hills, has a rainfall of 164·22, and 182 rainy days. The returns for 1874 show that at four stations the rainfall in 24 hours exceeded five inches. The following table, compiled from the surveyor-general's return, shows the temperature:—

Temperature of the Air in 1874.

Station	Height above sea.	Mean daily maximum temperature in the shade.	Mean daily minimum temperature in the shade.	Adopted mean temperature of the air.	Maximum temperature of the air.	Minimum temperature of the air.	Range.	Maximum temperature in the sun.	Minimum temperature on the grass.
Colombo	42	85·3	76·2	80·7	91·5	69·3	22·2	165·0	55·1
Ratnapura	114	84·1	75·9	80·0	89·2	72·4	16·8	167·8	56·6
Puttalam	11	87·0	75·3	81·1	95·5	63·8	31·7	161·0	
Anuradhapura	312	87·8	73·8	80·5	95·0	60·6	34·4	159·0	35·0
Mannár	.....	85·8	77·4	81·6	91·8	70·2	21·6	.....	54·8
Jaffna	9	86·2	77·4	81·8	92·8	65·5	27·3	160·4	63·0
Trincomalee	175	88·1	75·6	81·8	98·8	69·5	29·3	175·0	52·3
Batticaloa	21	86·5	76·4	81·4	94·8	68·6	26·2	169·0	
Hambantota	40	86·2	74·4	80·3	98·0	65·1	32·9	155·0	55·2
Galle	40	82·9	76·6	79·7	88·0	71·0	17·0	160·0	57·0
Kandy	1650	79·5	72·8	76·1	84·9	66·5	18·4	162·4	40·4
Nuwara Eliya	6150	65·2	51·7	58·4	73·0	38·0	35·1	154·0	7·2
Badulla	2220	81·7	65·7	73·7	88·0	54·0	34·0	160·0	53·0

The length of the day, owing to the proximity of the island to the equator, does not vary more than an hour at any season. The mean time of the rising of the sun's centre at Colombo on February 1st is $6^h\ 23^m$ A.M., and of its setting $6^h\ 5^m$ P.M. On August 15th its rising is at $5^h\ 45^m$ A.M., and its setting at $6^h\ 7^m$ P.M. It is mid-day in Colombo when it is morning in England. Colombo is situated in 79° 50′ 45″ E. long., and the day is further advanced there than at Greenwich by $5^h\ 19^m\ 23^s$.

Geology and Minerals.—Ceylon may be said to have been for ages slowly rising from the sea, as appears from the terraces abounding in marine shells, which occur in situations far above high-water mark, and at some miles distance from the sea. A great portion of the north of the island may be regarded as the joint production of the coral polypi and the currents, which for the greater part of the year set impetuously towards the south; coming laden with alluvial matter collected along the coast of Coromandel, and meeting with obstacles south of Point Calimere, they have deposited their burdens on the coral reefs round Point Pedro; and these, raised above the sea-level, and covered deeply by sand drifts, have formed the peninsula of Jaffna, and the plains that trend westward till they unite with the narrow causeway of Adam's Bridge. The Tertiary rocks are almost unknown. The great geological feature of the island is the profusion of gneiss, overlaid in many places in the interior by extensive beds of dolomitic limestone. This formation appears to be of great thickness; and when, as is not often the case, the under-surface of the gneiss series is exposed, it is invariably found resting on granite. Veins of pure quartz and felspar of considerable extent have been frequently met with in the gneiss; whilst in the elevated lands of the interior in the Galle districts may be seen copious deposits of disintegrated felspar, or *kaolin*, commonly known as porcelain clay. At various elevations the gneiss may be found intersected by veins of trap rocks, upheaved whilst in a state of fusion subsequent to the consolidation of the former. In some localities on the sea-shore these veins assume the character of pitch-stone porphyry highly impregnated with iron. Hornblende and primitive greenstone are found in the vicinity of Adam's Peak and in the Pussellava district.

Laterite, known in Ceylon as *cabook*, a product of disintegrated gneiss, exists in vast quantities in many parts, and is quarried for building purposes.

As yet no traces of coal have been found, with the exception of a little anthracite; but looking to the position of the carboniferous deposits of northern India, lying as they do on the gneiss formation, it is not impossible that similar deposits may be here met with in like positions.

Specimens of tin, platina, copper, and black oxide of manganese from the southern province have been placed in the museum of the Ceylon Asiatic Society. Quicksilver mines existed at one time in the vicinity of Colombo, and the Dutch are said to have exported the article to Europe. Plumbago is quarried to a great extent, and has for a series of years formed a considerable item in the exports of the island. In 1850 the shipments of this article amounted to 23,823 cwts., in 1860 to 75,000 cwts., and in 1874 to 150,000 cwts. Iron exists in vast quantities in the western, southern, and central provinces, of excellent quality, in many places cropping out at the surface in a state of great purity. The Sinhalese have been accustomed to work the ore into tools and implements from the most remote times; and although the means they employ are rude, imperfect, and wasteful in the extreme, they nevertheless manufacture articles which are esteemed by them far above those imported from Europe, and the rudely worked Sinhalese iron is equal in temper to the finest Swedish metal.

Nitre and nitrate of lime are to be met with in many caves of the low country, whilst alum and sulphate of magnesia are known to exist, though in limited quantities. Natural deposits of common salt are found in many parts of the maritime provinces. It is also produced by artificial means in large quantities under the supervision of Government, in whose hands its manufacture and sale form a monopoly which yields an annual revenue of considerable amount. In 1873 the sale of this article yielded £80,000.

In the Sabaragamuwa district precious stones are met with in great abundance; also, though less commonly, in the Badulla, Nuwara Eliya, and Matara districts. The most valuable are the ruby, the sapphire, the amethyst, the cat's-eye, and the carbuncle. Emeralds are rarely met with in any purity; but the moon-stone, cinnamon stones, and garnets are found in great abundance and variety.

Soil.—The natural soils of Ceylon are composed of quartzose gravel, felspathic clay, and sand often of a pure white, blended with or overlaid by brown and red loams, resulting from the decay of vegetable matter, or the disintegration of the gneiss and hornblende formations. The whole of the great northern extremity of the island consists of a sandy and calcareous admixture, made to yield productive crops of grain, tobacco, cotton, and vegetables by the careful industry of the Tamil population, who spare no pains in irrigating and manuring their lands. Between the northern districts and the elevated mountain ranges which overlook the Bintenne and Uva countries are extensive plains of alluvial soil washed down from the table-lands above, where once a teeming population produced large quantities of grain. The remains of ancient works of irrigation bear testimony to the bygone agriculture of these extensive regions now covered by swamps or dense jungle.

The general character of the soil in the maritime provinces to the east, south, and west is sandy. Large tracts of quartzose sand spread along the whole line of sea-coast, some of which, of a pure white, and very deficient in vegetable matter, is admirably adapted to the growth of the cinnamon plant. In the light sandy districts, where the soil is perfectly free, and contains a portion of vegetable and mineral loam, the cocoa-nut palm flourishes in great luxuriance. This is the case along the entire coast line from Kalpitiya to Point de Galle, and further eastward and northward to Matara, stretching to a distance inland varying from 100 yards to 3 miles. From this light sandy belt as far as the mountain zone of the Kandyan country the land is mainly composed of low hilly undulations of sandstone and ferruginous clay, incapable of almost any cultivation, but intersected in every direction with extensive valleys and wide plains of a more generous soil, not highly fertile, but still capable, with a little industry, of yielding ample crops of rice.

The soil of the central province, although frequently containing great quantities of quartzose sand and ferruginous clay, is in many of the more elevated districts of a fine loamy character. Sand sufficiently vegetable and light for rice culture may be seen at all elevations in the hill districts; but the fine chocolate and brown loams overlying gneiss or limestone formations, so admirably adapted for coffee cultivation, are only to be found on the steep sides or along the base of mountain ranges at an elevation varying from 2000 to 4000 feet. Such land well-timbered contains in its elements the decomposed particles of the rocks above, blended with the decayed vegetable matter of forests that have for centuries scattered beneath them the germs of fertility. The quantity of really rich coffee land in these districts is but small as compared with the extent of country,—vast tracts of open valleys consisting of an indifferent yellow tenacious soil interspersed with many low ranges of quartz rock.

Botany.—The characteristics of the low-growing plants

of Ceylon approach nearly to those of the coasts of southern India. The *Rhizophoreæ* are numerous along the low muddy shores of salt lakes and stagnant pools; and the acacias are equally abundant. The list comprises *Ægiceras fragrans, Epithinia malayana, Thespesia populnea, Feronia elephantum, Salvadora persica* (the true mustard tree of Scripture), *Eugenia bracteata, Elæodendron Roxburghii, Cassia Fistula, Cassia Roxburghii*, &c. The herbaceous plants of the low country belong mostly to the natural orders *Compositæ, Leguminosæ, Rubiaceæ, Scrophulariaceæ*, and *Euphorbiaceæ*.

Leaving the plains of the maritime country and ascending a height of 4000 feet in the central districts, we find both herbage and trees assume an altered character. The foliage of the latter is larger and deeper colored, and they attain a height unknown in the hot low country. The herbaceous vegetation is there made up of ferns, *Cyrtandreæ, Compositæ, Scitamineæ*, and *Urticaceæ*. The dense masses of lofty forests at that altitude are interspersed with large open tracts of coarse wiry grass, called by the natives *patanas*, and of value to them as affording pasturage for their cattle.

Between the altitudes of 4000 and 8000 feet, many plants are to be met with partaking of European forms, yet blended with tropical characteristics. The guelder rose, St. John's wort, the *Nepenthes distillatoria* or pitcher plant, violets, geraniums, buttercups, sun-dews, ladies' mantles, and campanulas thrive by the side of *Magnoliaceæ, Ranunculaceæ, Elæocarpeæ*, &c. The most beautiful flowering shrub of this truly alpine region is the rhododendron, which in many instances grows to the height of 70 feet. It is met with in great abundance in the moist plains of the elevated land above Nuwara Eliya, flowering abundantly in June and July. There are two distinct varieties, one similar to the Nilgiri plant, having its leaves broad and cordate, and of a rusty color on the under side; the other, peculiar to Ceylon, is found only in forests at the loftiest elevations; it has narrow rounded leaves, silvery on the under side, and grows to enormous heights, frequently measuring three feet round the stem. At these altitudes English flowers, herbs, and vegetables have been cultivated with perfect success, as also wheat, oats, and barley. English fruit-trees grow, but rarely bear. Grapes are grown successfully in the north of the island. The vines were introduced by the Dutch, who overcame the difficulty of perpetual summer by exposing the roots, and thus giving the plants an artificial winter.

Timber.—The timber trees indigenous to Ceylon are met with at every altitude from the sea-beach to the loftiest mountain peak. They vary much in their hardiness and durability, from the common cashew-nut tree, which when felled decays in a month, to the ebony and satinwood, which for many years resist the attacks of insects and climate. The known woods amount to 416 varieties, of which 33 are valuable for furniture, and house and shipbuilding, and are capable of standing long exposure to weather. The most beautiful woods adapted to furniture work are the calamander, ebony, flowered-satinwood, tamarind, nedun, dell, kadomberiya, kitul, cocoa-nut, &c.; the sack-yielding tree (*Antiaris saccidora*), for a long time confounded with the far-famed upas tree of Java (*Antiaris toxicaria*), grows in the Kurunegala district of the island.

Palms.—The *Cocos nucifera*, or cocoa-nut palm, is a native of the island, and may justly be considered the most valuable of its trees. It grows in vast abundance along the entire sea-coast of the west and south sides of the island, and furnishes almost all that a Sinhalese villager requires. Its fruit, when green, supplies food and drink; when ripe, it yields oil. The juice of the unopened flower gives him toddy and arrack. The fibrous casing of the fruit when woven makes him ropes, nets, matting. The nut-shells form drinking-vessels, spoons, &c. The plaited leaves serve as plates and dishes, and as thatch for his cottage. The dried leaves are used as torches, the large leaf-stalks as garden fences. The trunk of the tree sawn up is employed for every possible purpose, from knife-handles to door-posts; hollowed out it forms alike a canoe or coffin. There are four kinds of this palm,—the common, the king, the dwarf, and the Maldive.

The Palmyra and Areca palms grow luxuriantly and abundantly, the former in the northern, the latter in the western and central districts. The one is valuable chiefly for its timber, of which large quantities are exported to the Indian coasts; the other supplies the betel-nut in common use amongst natives of the eastern tropics as a masticatory. The export trade in the latter to India and eastern ports is very considerable, amounting to £70,000 a year in value.

Cinnamon.—Next in importance to the cocoa-nut palm amongst the indigenous products of Ceylon is the cinnamon plant, yielding the well-known spice of that name.

Animals.—Foremost among the animals of Ceylon is the elephant, which, though far inferior to those of Africa and the Indian continent, is nevertheless of considerable value when tamed, on account of its strength, sagacity, and docility. They are to be met with in greater or less numbers throughout most unfrequented parts of the interior. Occasionally they make inroads in herds upon the cultivated grounds and plantations, committing great damage. In order to protect these lands, and at the same time keep up the Government stud of draught elephants, "kraals" or traps on a large scale are erected in the forests, into which the wild herds are driven; and once secured they are soon tamed and fit for service. The oxen are of small size, but hardy, and capable of drawing heavy loads. Buffaloes exist in great numbers throughout the interior, where they are employed in a half-tame state for ploughing rice-fields and treading out the corn. They feed upon any coarse grass, and can therefore be maintained on the village pasture lands where oxen would not find support. Of deer, Ceylon possesses the spotted kind (*Axis maculata*), the muntjac (*Stylocerus muntjac*), a red deer (the Sambur of India), popularly called the Ceylon elk (*Musa Aristotelis*), and the small musk (*Moschus meminna*). There are five species of monkeys, one the small rilawa (*Macacus pileatus*), and four known in Ceylon by the name of "wandaru" (*Presbytes ursinus, P. Thersites, P. cephalopterus, P. Priamus*), and the small quadrumanous animal, the loris (*Loris gracilis*), known as the "Ceylon sloth." Of the Cheiroptera sixteen species have been identified; amongst them is the rousette or flying fox (*Pteropus Edwardsii*). Of the Carnivora the only one dangerous to man is the small black bear (*Prochilus labiatus*). The tiger is not known in Ceylon, but the true panther (*Felis pardus*) is common, as is the jackal (*Canis aureus*) and the mongoos or ichneumon (*Herpestes vitticollis*). Rats are numerous, as are the squirrel and the porcupine, and the pig-rat or bandicoot (*Mus bandicota*), while the scaly ant-eater (*Manis pentedactyla*), locally known by the Malay name of pengolin, is occasionally found. The dugong (*Halicore dugong*) is frequently seen on various points of the coast.

Birds.—Upwards of 320 species of birds have been found in Ceylon, and many of them have splendid plumage, but in this respect they are surpassed by the birds of South America and Northern India. The eagles are small and rare, but hawks and owls are numerous; among the latter is a remarkable brown species, the cry of which has earned for it the name of the "devil-bird." The esculent swift, which furnishes in its edible nest the celebrated Chinese dainty, builds in caves in Ceylon. Crows of various species are numerous, and in the wilder parts pea-fowl are abundant. There are also to be mentioned king-fishers, sun-birds, several beautiful fly-catchers and snatchers, the golden oriole, parroquets, and numerous pigeons, of which there are at least a dozen species. The Ceylon jungle-fowl (*Gallus Lafayetti*) is distinct from the Indian species. Ceylon is singularly rich in wading and water birds,—ibises, storks, egrets, spoonbills, and herons being frequently seen on the wet sands, while flamingoes line the beach in long files, and on the deeper waters inland are found teal and a countless variety of ducks and smaller fowl. Of the birds familiar to European sportsmen there are partridge, quail, and snipe in abundance, and the woodcock has been seen.

Reptiles.—The poisonous snakes of Ceylon are not numerous. Four species have been enumerated,—the ticpolonga (*Daboia elegans*), the cobra di capello (*Naja tripudians*), the carawilla (*Trigonocephalus hypnale*), and the *Trigonocephalus nigromarginatus*, which is so rare that it has no popular name. The largest snake in Ceylon is the "boa," or "anaconda" of Eastern story (*Python reticulatus*); it is from 20 to 30 feet in length, and preys on hog-deer and other smaller animals. Crocodiles infest the rivers and estuaries, and the large fresh-water reservoirs which supply the rice-fields; there are two species (*C. biporcatus* and *C. palustris*). Of lizards the most noteworthy are the iguana,

several bloodsuckers, the chameleon, and the familiar geckoes, which are furnished with pads to each toe, by which they are enabled to ascend perpendicular walls and adhere to glass and ceilings.

Insects.—Insects exist in great numbers. The leaf and stick insects are of great variety and beauty. Ceylon has four species of the ant-lion, renowned for the predaceous ingenuity of its larvæ; and the white ants or termites, the ravages of which are most destructive, are at once ubiquitous and innumerable in every place where the climate is not too chilly, or the soil too sandy for them to construct their domed dwellings. They make their way through walls and floors, and in a few hours destroy every vegetable substance within their reach. Of all the insect pests that beset an unseasoned European the most annoying are the mosquitoes. Ticks are also an intolerable nuisance; they are exceedingly minute, and burrow under the skin. In the lower ranges of the hill country land leeches are found in tormenting profusion.

Fishes.—Of the fish in ordinary use for the table the finest is the seir, a species of scomber (*Cybium guttatum*). Mackerel, dories, carp, whitings, mullet (red and striped), soles, and sardines are abundant. Sharks appear on all parts of the coast, and the huge saw-fish (*Pristis antiquorum*) infests the eastern coast of the island, where it attains a length of from 12 to 15 feet. There are also several fishes remarkable for the brilliancy of their coloring; *e.g.*, the Red sea perch (*Holocentrum rubrum*), of the deepest scarlet, and the great fire fish (*Scorpæna miles*), of a brilliant red. Some are purple, others yellow, and numbers with scales of a lustrous green are called "parrots" by the natives; of these one (*Sparus Hardwickii*) is called the "flower parrot," from its exquisite coloring—irregular bands of blue, crimson, and purple, green, yellow and grey, crossed by perpendicular stripes of black.

Pearl Fishery.—Pearl oysters are found in the Tambalagam bay, near Trincomalee, but the great banks on which these oysters are usually found lie near Arippu, off the northern part of the west coast of Ceylon, at a distance of from 16 to 20 miles from the shore. They extend for many miles north and south, varying considerably in their size and productiveness. A naturalist was recently employed by the Government for five years to study the habits of the pearl oysters, but no information of any value has been obtained. It is, however, generally believed that the oyster arrives at maturity in its seventh year, that the pearl is then of full size and perfect lustre, and that if the oyster be not then secured it will shortly die, and the pearl be lost. It is certain that from some unexplained cause the oysters disappear from their known beds for years together. The Dutch had no fishery from 1732 to 1746, and it failed them again for 27 years from 1768 to 1796. The fishery was again interrupted between 1820 and 1828, also from 1833 to 1854, and from 1864 to 1873. In 1797 and 1798 the Government sold the privilege of fishing the oyster-beds for £123,982 and £142,780 respectively. Since that time the fishery has been conducted by the Government itself, which sells the oysters in heaps of 1000 as they are landed from the boats. Under this system, however, receipts have not exceeded £87,000 in any year, and have fallen as low as £7200, which was the net revenue from the fishery of 1874. The fishery immediately preceding (that of 1863) yielded a net revenue of £46,000. The small oyster found at Tambalagam is the *Placuna placenta;* the pearl oyster of the Arippu banks is the *Meleagrina margaritifera.*

History.—The island of Ceylon was known to the Greeks and Romans under the name of *Taprobane*, and in later times Serendib, Sirinduil, and Zeylan have been employed to designate it by writers of the Western and Eastern Worlds. Serendib is a corruption of the Sanskrit Sinhaladvīpa. Like most Oriental countries, Ceylon possesses a great mass of antiquarian records, in which the real is so intimately and largely blended with the ideal that the student finds it difficult to determine the respective limits of history and fable. The labors of Turnour have, however, helped to dissipate much of what was before confused and contradictory, and in his admirable translation of the "Mahawanso" we may trace the true current of Sinhalese history.

Of the first colonization of Ceylon but little is known. In the great Hindu epic, the Ramayana, we have the fable of the conquest of a part of Ceylon by the hero Rama and his followers, who, as the poem tells, besieged and took the capital of its king Rawana. No permanent occupation of the country took place at this time, nor until the advent, in 543 B.C., of Vijaya, an Indian prince, who, arriving from the mainland with a small band of followers, succeeded in establishing himself as sole ruler of the country. To this king is attributed the introduction of *caste* into Ceylon, an institution which, although far less rigorously observed than on the continent, is still maintained.

Under him and his successors Ceylon attained a degree of civilization scarcely to be looked for in that remote age of Oriental despotism. The purity of the religious and moral code, the strict administration of justice, and the well-defined and carefully-protected rights of the king and his many classes of subjects excite our admiration not less than our astonishment. It is impossible, however, to follow the subsequent current of Sinhalese history through its many intricate windings. It must suffice to say that the descendants of Vijaya the conqueror continued to hold the reins of government with varied ability and unequal success. Some of them were distinguished for their learning, their military prowess, their benevolence, and the length of their reigns. Others lived amidst civil dissensions and foreign invasions, which not unfrequently cost them their lives. The incursions of the Malabars upon their territories were not less frequent and fatal than those of the Danes in Britain. During a period of four or five centuries, these marauders continued to pour their bands of armed men into the island; and so far had the country fallen off from its ancient prosperity and strength that when, in the year 1505, the Portuguese adventurer Almeida landed at Colombo, he found the island divided into seven separate kingdoms.

The first settlement of the Portuguese was effected in 1517, when Albergaria succeeded in obtaining permission from the king of Kotta, whose territories closely adjoined Colombo, to erect a small factory on the latter spot for purposes of trade. Once established, the new-comers lost no opportunity of strengthening their position and extending their intercourse with the natives. Stone walls quickly took the place of palisades; the factory became a fort; whilst bristling cannon commanded alike the approaches by land and the entrance by sea. Alarmed at these unequivocal signs of military possession, the Sinhalese kings attempted to expel their new friends from the island, in which they were joined by the Moorish and other traders opposed to the progress of the Portuguese. But their efforts were too late, and proved ineffectual; and after a series of unequal and sanguinary conflicts, the Europeans found themselves in secure possession of the west coast of Ceylon.

The fanatical zeal and remorseless cruelty of the Portuguese were a constant source of dissension with the natives; and when, in the year 1602, the Dutch, under Admiral Spilberg, landed on the east coast and sought the alliance of the king of Kandy in the interior of the island, every encouragement was held out to them with the view of inducing them to aid in expelling the Portuguese. Nothing seems to have come of this until 1638–9, when a Dutch expedition attacked and razed the Portuguese forts on the east coast. In the following year they landed at Negombo, without, however, establishing themselves in any strong post. In 1644 Negombo was captured and fortified by the Dutch, while in 1656 they took Colombo, and in 1658 they drove the Portuguese from Jaffna, their last stronghold in Ceylon.

Pursuing a wiser policy than their predecessors, the Dutch lost no opportunity of improving that portion of the country which owned their supremacy, and of opening a trade with the interior. More tolerant and less ambitious of military renown than the Portuguese, they so far succeeded in their object as to render their commerce between this island and Holland a source of great profit. Many new branches of industry were developed. Public works were undertaken on a large scale, and education, if not universally placed within the reach of the inhabitants of the maritime provinces, was at least well cared for on a broad plan of Government supervision.

That which they had so much improved by policy they were, however, unable to defend by force when the British turned their arms against them. A century and a half had wrought great changes in the physical and mental status of the Dutch colonists. The territory which in 1658 they had slowly gained by undaunted and obstinate bravery, they as rapidly lost in 1796 by imbecility and cowardice.

The first intercourse of the English with Ceylon took

place as far back as 1763, when an embassy was despatched from Madras to the king of Kandy, without, however, leading to any result. On the rupture between great Britain and Holland in 1795, a force was sent against the Dutch possessions in Ceylon, where the opposition offered was so slight that by the following year the whole of their forts were in the hands of the English commander.

At first the island was placed under the care of the East India Company, but in 1802 the whole seaboard of Ceylon became, by the treaty of Amiens, a possession of the British Crown. The central tract of hilly country, hedged in by impenetrable forests and precipitous mountain ranges, remained in possession of Wikrama Sinha, the last of the Malabar dynasty of kings, who showed no signs of encouraging communication with his European neighbors.

Minor differences led in 1803 to an invasion of the Kandyan territory; but sickness, desertion, and fatigue proved more formidable adversaries to the British forces than the troops of the Sinhalese monarch, and peace was eventually concluded upon terms by no means favorable to the English. The cruelty and oppression of the king now became so intolerable to his subjects that disaffection spread rapidly amongst them. Executions of the most horrible kinds were perpetrated. The utmost stretch of despotism failed to repress the popular indignation; and in 1815 the British, at the urgent request of many of the Adigars and other native chiefs, proceeded against the tyrant, who was captured near Kandy, and subsequently ended his days in exile. With him ended a long line of sovereigns, whose pedigree may be traced through upwards of two thousand years.

By a convention entered into with the Kandyan chiefs on the 2d of March, 1815, the entire sovereignty of the island passed into the hands of the British, who in return guaranteed to the inhabitants civil and religious liberty. The religion of Buddha was declared inviolable, and its rites, ministers, and places of worship were to be maintained and protected; the laws of the country were to be preserved and administered according to established forms; and the royal dues and revenues were to be levied as before for the support of Government.

With the exception of a serious outbreak in some parts of the interior in 1817, which lasted for upwards of a year, and of two minor attempts at rebellion easily put down, in 1843 and 1848, the political atmosphere of Ceylon has remained undisturbed since the deportation of the last king of Kandy.

Population.—The total population of Ceylon, as ascertained by the census of March, 1881, is given as 2,761,396. Its distribution according to provinces is as follows:—

Province.	Population.	Area.	Population to square mile.
Western[1]	775,285	3,345	232
North-Western	269,084	2,383	113
Southern	399,755	1,937	206
Eastern	113,290	3,516	32
Northern	281,788	3,139	89
Central[1]	495,340	5,770	85
North-Central	70,720	4,384	16
Total	2,406,262	24,474	98

The principal towns with these populations are—Colombo, 95,843, Galle, 47,059, and Jaffna, 34,864.

The distribution according to race is as follows:—

Sinhalese	1,670,207
Tamils	540,685
Arab descendants	163,516
Malays	7,952
Other Asiatics, Kaffirs, &c	3,835
European descendants and half-castes	14,181
Europeans	5,886
Total	2,406,262

Government.—Ceylon is a Crown colony, that is, a possession of the British Crown acquired by conquest or cession, the affairs of which are administered by a governor, who receives his appointment from the Crown, generally for a term of six years. He is assisted by an executive and a legislative council. The executive council acts as the cabinet of the governor, and consists of the Queen's advocate, the three principal officers of the colony (namely, the colonial secretary, the treasurer, and the auditor-general), and the general in command of the forces. The legislative council, in addition to the members of the executive, includes the two principal civil officers of the western and central provinces, the surveyor-general, the collector of customs, and six unofficial members nominated by the governor, who generally selects three to represent the planting and mercantile community, and three to represent the Sinhalese, Tamil, and Eurasian inhabitants; the governor presides and has a casting vote, if the numbers are equal, in addition to his original vote. There are thus nine official members and six unofficial. The powers of the governor constitute a "paternal despotism," controlled only by the distant authority of the Crown, as exercised through the secretary of state for the colonies. The functions of his councils are consultative; the adoption or rejection of their recommendations rests exclusively with himself. The executive council is the body by whose advice all Government measures are originally framed preparatory to their submission to the legislative council, by whom they are finally discussed with all the forms of parliamentary debate; still the paramount authority of the governor can overrule their deliberations, and their labors may be nullified by his withholding his assent, which is necessary to give an enactment the force of law pending its allowance or disallowance by the Crown. All legislative enactments must be published in the local gazette for three weeks before they can be finally adopted by the legislature. A certain portion of the colonial expenditure is covered by permanent ordinances, which provide for the fixed establishments of the colony, the contribution toward the military defence of the colony, and the payment of interest and sinking fund on account of loans. All other expenditure has to be covered by an annual vote of the legislative council. The administration is carried on by a civil service, organized on the model of the great institution by which our Indian empire has been formed. It is recruited by members selected by competition from a limited number of candidates nominated by the secretary of state and the governor of Ceylon. The selected candidates are carefully trained in the colonial office at Whitehall and in the public offices in Ceylon, and are also required to pass an examination in the native languages before being employed in any responsible office. For this highly-trained body the more important civil appointments in Ceylon, including many of the judicial appointments, are reserved. The old routine system of rising by seniority was abolished by the order of the earl of Derby in 1845, and merit instead of seniority is professedly now the basis of promotion. The island is divided into seven provinces, each having its chief and assistant agents, who carry on the affairs of the province under the direct authority of the Government. The agents of Government are the sole means of communication between the Government and the native inhabitants of the island; it is their duty to ascertain the real feelings of the people in reference to any Government measure the expediency of which may be doubtful, and to keep them thoroughly acquainted with any change in the law, and also to bring before the Government the wants of the people, and to obtain early information of any disaffection or fear of a rising of the people. They have consequently very delicate and important duties to perform in relation to the native chiefs and nobles. They have also to collect, through their subordinates, all the revenue not derived from customs duties, to see that the public buildings and highways are kept in proper order, and generally to see to the welfare of the province. The provinces are divided into districts under an assistant agent, and the districts are parcelled out into smaller divisions under native chiefs and headmen of various ranks,—called in the Kandyan country Ratemahatmayas, Koralas, and Arachchies; in the maritime Sinhalese provinces Mudaliyas, Muhandirams, and Vidanas; in the Tamil provinces Vanniyas, Udaiyars, and Vidanas. The Kandyan provinces are the central, north-central, and parts of the western and north-western; the maritime or low-country Sinhalese provinces are the southern and parts of the western and north-western; the Tamil provinces are the northern and eastern.

Justice.—The administration of justice is conducted by a Supreme Court, consisting of a chief justice and two puisne judges; by district judges, police magistrates, justices of the peace, and Commissioners of Courts of Request. There are a Queen's advocate and a deputy Queen's advocate for the island. These officers correspond to the attorney-general and solicitor-general in England. They are the law officers of the Government, and are bound to give their advice on any case submitted for their opinion, and to appear for the Crown in all civil suits. The Queen's advocate also has to discharge the duties of public prosecutor, to supervise the proceedings of the justices of the peace, and to conduct the prosecution in all cases before the Supreme Court and in all serious cases before the District Courts. The Queen's advocate is assisted by provincial deputies, who are the legal advisers of the agents of Government in charge of the provinces.

The Supreme Court has original criminal jurisdiction in all cases. It usually tries only cases ordinarily punished with more than one year's imprisonment; in all criminal cases it has the assistance of a jury. It goes on circuit twice a year for criminal cases. It has appellate jurisdiction, civil and crim-

[1] [The province of Uva, with 3725 sq. m. and 165,672 people, was formed from the Central in 1886, and that of Sabaragamawa, with 2085 sq. m., from the Western province in 1889.—Am. Ed.]

inal, over all the subordinate courts in the island, and the power to issue writs of mandamus and habeas corpus. The District Courts have criminal jurisdiction in cases ordinarily punishable by twelve months' imprisonment with or without hard labor, by a fine of £100 or, more strictly, 1000 rupees, or 50 lashes, or by imprisonment and fine, or by imprisonment and lashes within the specified limits. They have original civil jurisdiction in all cases, whether affecting land or not, in lunacy, in testamentary and matrimonial cases, and in administering the estates of minors and intestates. They have long exercised the combined powers of the Court of Chancery and the Courts of Law which have been only recently conferred by the Judicature Acts on the Supreme Court of Judicature in England. The District Courts have no jury, but they have the power, which, however, is rarely exercised, of summoning assessors to their assistance. The police courts have jurisdiction in cases ordinarily punishable by imprisonment with or without hard labor for three months, by a fine of £5 or 50 rupees, or by twenty lashes, or by imprisonment and fine, or by imprisonment and lashes within the specified limits. The Courts of Requests have jurisdiction in civil cases where the matter in dispute is not of greater value than £10. The pleadings in all the courts are in English, but the proceedings are conducted in the language of the district unless both parties are English. The evidence is interpreted and recorded in English.

Village Tribunals.—In ancient times all petty disputes were settled by the village elders, who formed the village council or gamsabāwa. When the island fell under European control these native customs were rudely swept away, and courts were established which were to administer justice equally to all. In course of time it was found that these courts were in reality highly oppressive to the people, who are of a litigious disposition, by bringing parties and witnesses away from their homes for the settlement of every petty case and involving them in costs for stamps and legal assistance, the costs often being tenfold the value of the matter in dispute. It was also found that the ancient customs by which each shareholder in arable land was compelled to take his proper share in the common work, such as fencing, repairing the dams of the reservoirs for irrigation, and the like, had gradually fallen into disuse under British rule. It was consequently determined by Sir Hercules Robinson, then governor of Ceylon, to revive the ancient system, and by the "Village Communities Ordinance, 1871," power was given to every village or group of villages to frame rules, having the force of law, for the management of village affairs, and to form village tribunals on the ancient model for the settlement of all petty cases, such as petty assaults and the like, punishable by a small fine, and all civil cases of £2 and under. These tribunals are presided over by a native of rank and experience. The experiment has proved a success beyond the expectation of its original advocates. The relief to the people in getting their small disputes settled on the spot by their own elders is very great, and the revival of the ancient village customs is leading to the general restoration of the village tanks and other irrigation works, which were rapidly falling into decay from the failure of the Government to enforce the ancient rules for their preservation.

Laws.—In the maritime provinces ceded to Great Britain by the peace of Amiens the Roman-Dutch law prevails; in the Kandyan provinces the Kandyan law is administered under the convention of 1815. The Mahometans have their own laws of marriage and succession. The English law of evidence, trial by jury in the more serious criminal cases, and the English mercantile law have been introduced by local enactments. The Roman-Dutch law applies where no other system of law specially applies. Cases frequently occur in which it is a matter of the utmost difficulty to determine by which system of law they are to be decided, and it is a matter for surprise that no attempt has been made to codify the Ceylon laws, or at least to adapt to the not very different circumstances of Ceylon the admirable civil and criminal codes, and the regulations of procedure, which have been given to India by the able men who have followed Lord Macaulay in the great task of regulating the administration of justice in India.

Language.—The language of nearly 70 per cent. of the population is Sinhalese; of the remaining 30 per cent., with the exception of about 6000 Europeans and about 14,000 of European descent, the language is Tamil. Sinhalese is an Aryan language, nearly allied to Pali, which is the sacred language of Buddhism. Tamil is a Dravidian language spoken by those of Arab descent and by the Tamils, who are natives of the northern and eastern provinces, as well as by the Tamil immigrants from Southern India. A corrupt form of Portuguese is spoken by some natives of European descent. The Vaddas, a small forest tribe, speak a distinct language, and the Rodiyas, an outcast tribe, possess a large vocabulary of their own. Pali is one of the Prakrits of ancient India, "which was spoken in the sixth century before Christ, and has been a dead language for upwards of two thousand years." It was the dialect of Magadha, or Southern Behar, and was the language in which Gautama Buddha preached. "Originally a mere provincial dialect, it was raised by the genius of the great reformer to the dignity of a classic language. It stands to Sanskrit in the relation of a younger sister, Pali and Sanskrit, though intimately connected, being independent corruptions of the lost Aryan speech which is their common parent."

Literature.—The Sinhalese possess several original poems of some merit, and an extensive and most interesting series of native chronicles, but their most valuable literature is written in Pali, though the greater portion of it has been translated into Sinhalese, and is best known to the people through these Sinhalese translations. The Pali literature is of great extent; it comprises—(1.) The Buddhist Scriptures, called the Tripitaka, estimated in extent at eleven times that of our own Bible, and dating from 309 B.C.; (2.) The commentaries of Buddhaghosha, which date from the 5th century A.D.; and (3.) Historical, grammatical, and other works, of various dates from the 2d or 3d century to the present day, of which the most important are the two histories *Dipavansa* and *Mahavansa*, the discovery of which made the name of George Turnour illustrious, for in them we find the only authentic sources for the history of India previous to the Christian era. The treasures of the Pali literature are gradually being opened up to European scholars; foremost amongst those who have sought to raise Pali scholarship to a science are a Frenchman and a Dane. Burnouf has left behind him the important works—*Introduction á l'Histoire du Bouddhisme* and *Le Lotus de la Bonne Loi;* and Fausböll is now editing the text of the entire *Jataka, or History of the Births of Buddha.* This work is being translated by an Englishman, Professor Childers, whose valuable dictionary is an immense boon to the Pali student.

Religions.—The census of 1871 gives the following figures:—

Buddhists.....	1,520,575	Mahometans.....	171,542
Hindus.....	465,944	Christians.....	240,042

Of the Christians, about 186,000 are Roman Catholics, and 54,000 are Protestants of various denominations; and it is estimated that about 150,000 of them are Sinhalese, 72,000 Tamils, and 18,000 Europeans and Eurasians. The Mahometans are the descendants of Arabs (locally termed Moormen) and the Malays. The Tamils, both the inhabitants of the island and the immigrants from India, are Hindus, with the exception of the 72,000 Christians. The Sinhalese, numbering 70 per cent. of the whole population, are, with the exception of 150,000 Christians, Buddhists. Ceylon may properly be called a Buddhist country, and it is here that Buddhism is found almost in its pristine purity. Ceylon was converted to Buddhism about 300 years B.C. by the great Augustine of Buddhism, Mahinda, son of the Indian king Dhammasoka; and the extensive ruins throughout Ceylon, especially in the ancient cities of Anuradhapura and Polonnaruwa, bear witness to the sacrifices which kings and people joined in making to create lasting monuments of their faith. Under European rule royal support is no longer given to it, but its pure and simple doctrines live in the hearts of the people, and are the noblest monument to the memory of its founder Gautama Buddha. The taking of the meanest life is strictly forbidden, and falsehood, intemperance, dishonesty, anger, pride, and covetousness are denounced as incompatible with Buddhism, which enjoins the practice of chastity, gratitude, contentment, moderation, forgiveness of injuries, patience, and cheerfulness. The Buddhist priests are sworn to celibacy, and are regularly ordained. They are required to meet at convenient places every fourteen days for mutual confession. The Buddhist Temples in the Kandyan country possess valuable lands, the greater portion of which is held by hereditary tenants on the tenure of service. These lands were given out with much care to provide for all that was necessary to maintain the temple and its connected monastery. Some tenants had to do the blacksmiths' work, others the carpenters', while another set of tenants had to cultivate the land reserved for supplying the monastery; others again had to attend at the festivals, and prepare decorations, and carry lamps and banners. In course of time difficulties arose; the English courts were averse to a system under which the rent of

lands was paid by hereditary service, and a commission was issued by the governor, Sir Hercules Robinson, to deal with the whole question, to define the services and to enable the tenants to commute these for a money payment. The result of the inquiry was to show that the services, except in a few instances, were not onerous, and that almost without an exception the tenants were willing to continue the system. The Government maintains an ecclesiastical establishment consisting, for the Church of England, of a bishop, whose see is Colombo, an archdeacon, four principal chaplains, and several junior chaplains; and, for the Church of Scotland, of four principal chaplains. The total cost of this establishment is about £14,000 a year. Various missionary bodies have established themselves in Ceylon.

Caste.—Caste exists among the Sinhalese as a conventional and social, not as a sacred institution. All castes, however low, are eligible to the priesthood, which commands the homage of the highest. Buddha teaches that—

> "A man does not become low caste by birth,
> Nor by birth does one become high caste;
> High caste is the result of high actions—
> And by actions does a man degrade himself to caste that is low."

Nevertheless, caste was tolerated under the Sinhalese kings as a social institution, and in the account given in the *Mahavansa* of the planting of the great Bo tree, it is said that "the sovereign, the lord of chariots, directed that it should be lifted by the four high caste tribes and by eight persons of each of the other castes." The highest caste among the Sinhalese is the goi-vansa, or tillers of the soil; there are, besides, fishers, smiths, washers, baggage-carriers, weavers, potters, scavengers, and many others. Every trade is a caste. The castes do not intermarry, and neither wealth nor European influence has had any effect in breaking down caste distinctions. At present the wealthiest native of Ceylon is a fisher by caste, but his wealth cannot gain him admittance to the houses of the native aristocracy, who are all of necessity of the highest caste. The Tamils have the same caste distinctions as their fellows on the mainland. The Mahometans have no caste distinctions.

Education.—The Ceylon Government maintains a large number of public schools, chiefly of the village class; and there are throughout the island several schools under the management of the Roman Catholics and other missionary bodies, which receive large grants from Government in the form of payments for results in subjects of secular instruction. The education department is under a Director of Public Instruction. The following is an abstract of the school returns for 1874:—

	Number of Scholars.		
	Male.	Female.	Total.
253 Public Schools	10,376	1,343	11,719
4 Regimental Schools	331	27	358
882 Free Schools	33,554	10,825	44,379
329 Private Schools	8,569	1,360	9,929
Total	52,830	13,555	66,385

The annual expenditure by the Government on education is upwards of £30,000; of which from £17,000 to £18,000 is expended on general administration and salaries of masters of public schools, and £13,000 on grants in aid and other contingent charges.

Crime.—The criminal statistics for the year 1874 give the following figures, having reference to a population of upwards of 2,400,000. The justices of the peace made 10,171 preliminary inquiries, of which 2750 related to offences against the person, 2452 to cattle stealing, 3706 to offences against property, and 1263 to other offences; 1807 persons were committed for trial in the superior courts, of whom 528 were sent up for offences against the person, 552 for cattle stealing, 452 for offences against property, and 275 for other offences. There were 11,794 summary convictions, in the magistrates' courts, of which 2568 were for assaults, &c.; 178 malicious injuries; 1678 other offences against property; 5779 offences against Revenue Acts, Highway Acts, Health Acts, and the like; 437 under Masters and Servants Acts; and 1154 other offences. A comparison of the statistics for 1872, 1873, and 1874 shows a slight increase under almost every head in 1874, as compared with the two previous years.

Diseases.—Ceylon is reputed to be more healthy than most parts of the adjoining continent of India. It is doubtful, however, how far this is true. It is a point which it is difficult to bring to the test of statistics. Experience proves that with ordinary care Europeans may pass many years in the island as free from disease as in any part of Europe, but a lengthened residence almost invariably induces a reduced vigor in the whole muscular apparatus. The diseases to which Europeans are most subject are dysentery and hepatic attacks. The returns from the native hospitals for 1874 show that chronic dysentery, diarrhœa, anasarca, and asthenia are the most fatal. In the principal hospital in Ceylon, namely, the Maradana hospital, near Colombo, out of 292 deaths 34 were from chronic dysentery, 99 from diarrhœa, 33 from anasarca, and 18 from asthenia; in the Kandy hospital, out of 304 deaths, 14 were from chronic dysentery, 99 from diarrhœa, 94 from anasarca, and 42 from asthenia; in the Galle hospital, out of 89 deaths, 4 were from chronic dysentery, 14 from diarrhœa, 11 from anasarca, and 1 from debility.

Roads.—The policy of the Sinhalese rulers of the interior was to exclude strangers from the hill country. Prior to the British occupation of the Kandyan territory in 1815, the only means of access from one district to another was by footpaths through the forests. The Portuguese do not appear to have attempted to open up the country below the hills, and the Dutch confined themselves to the improvement of the inland water-communications. The British Government saw from the first the necessity of making roads into the interior for military purposes, and, more recently, for developing the resources of the country. The credit of opening up the country is due mainly to the governor, Sir Edward Barnes, by whose direction the great military road from Colombo to Kandy was made. Gradually all the military stations were connected by broad tracks, which by degrees were bridged and converted into good carriage roads. The governors, Sir Henry Ward and Sir Hercules Robinson, recognized the importance of giving the coffee-planters every assistance in opening up the country, and the result of their policy is that the whole of the hill country is now intersected by a vast number of splendid roads, made at a cost of upwards of £2000 per mile. In 1848 an ordinance was passed to levy from every adult male in the colony (except Buddhist priests and British soldiers) six days' labor on the roads, or an equivalent in money. The labor and money obtained by this wise measure have enabled the local authorities to connect the Government highways by minor roads, which bring every village of importance into communication with the principal towns. The expenditure in 1874 out of the revenues of the colony on roads, streets, bridges, and canals was, in round numbers, £175,000, of which sum £113,500 was expended in the ordinary maintenance of existing roads. The expenditure by the local authorities under the road ordinance amounted in the same year to £65,000, and by the municipalities of Colombo, Kandy, and Galle to £23,000.

Railways.—After repeated vain attempts by successive governors to connect Colombo with the interior by railways, Sir Charles MacCarthy successfully set on foot the present railway of 75 miles in length from Colombo to Kandy, which is probably the most prosperous in the world. It was constructed at a cost of £1,738,483. The gross receipts in 1872 were £226,000, and the working expenses £89,000, or about 38 per cent. of the gross earnings. A branch railway from Peradeniya (four miles from Kandy) to Navalapitiya, 17 miles in length, has just been completed, and a line from Colombo to Moratuwa, 11 miles in length, has been commenced; the latter line will probably be extended to Kalutara, distant 26 miles from Colombo. The line from Colombo to Kandy is remarkable for its beauty, and for the engineering skill shown in its construction. The ruling gradient for the first 50 miles is 1 in 100; the line then rises for 12 miles with a gradient of 1 in 45 throughout and curves of 10 chains radius, to the Peradeniya station, which is 1562 feet above the sea-level. The Navalapitiya railway station is 1913 feet above the sea-level.

Agriculture.—The Sinhalese are more attached to the pursuit of agriculture than any other occupation, and although their implements are of the rudest kind, and their processes the most simple, they succeed in obtain-

ing successive crops of grain of good quality wherever they can secure sufficient water. The chief culture in every part of the island is that of rice, the staple food of all the native races in Ceylon.

Rice.—In a few places, where the rain-fall is abundant, rice cultivation is allowed to depend on the natural supply of water, but in most parts the cultivation is not attempted unless there is secured beforehand a certain and sufficient supply, by means of canals or reservoirs. In the hill country every valley and open plain capable of tillage is made to yield its crops of grain, and the steep sides of the hills are cut into terraces, on which are seen waving patches of green rice watered by mountain streams, which are conducted by means of channels ingeniously carried round the spurs of the hills and along the face of acclivities, by earthen water-courses and bamboo aqueducts, so as to fertilize the fields below. These works bear witness to the patience, industry, and skill of the Kandyan villagers. In the low country to the north and east and north-west of the hills, irrigation works of a more expensive kind are necessary.

Irrigation.—The native rulers covered the whole face of the country with a network of irrigation reservoirs, by which Ceylon was enabled in ancient times to be the great granary of Southern Asia. Wars, and the want of a strong hand to guide the agriculture of the country, have led to the decay of these ancient works, and large tracts of land, which were formerly highly productive, have become swampy wastes or dense forests. The remains of some of the larger irrigation works are amongst the most interesting of the memorials of Ceylon's former greatness. Some of the artificial lakes were of great size. Mineriya, formed by damming across the valleys between the low hills which surround it with an embankment 60 feet wide at the top, is at this day twenty miles in circumference. Another with an embankment several miles in length, the Kalawewa, was formed by damming back the waters of the Kalaoya, but they have forced their way through the embankment, and in the ancient bed of the lake, or tank, are now many small villages. In connection with these large tanks were numerous canals and channels for supplying smaller tanks, or for irrigating large tracts of fields. Throughout the district of Nuwarakalawiya every village has its tank. The embankments have been formed with great skill, and advantage has been taken to the utmost of the slightest fall in the land; but they in common with the larger works had been allowed to fall into decay, and were being brought to destruction by the evil practice of cutting them every year to irrigate the fields. The work of restoring these embankments has at last been undertaken by the Government. Proper sluices will gradually be supplied to all the village tanks, and the embankments will be raised and strengthened by the united labor of the villagers in proportion to their shares in the fields under the *gamsabāwa* system.

Dry Grains.—Several dry grains (so called as distinguished from rice, which is grown in water) are grown in Ceylon. These are chiefly kollu, millet, kurakkan, gingele, and pulse of various kinds.

Tobacco.—Tobacco is extensively cultivated in various parts of the island, and the growth of particular places, such as Dumbara and Uva, is much prized for local consumption. The tobacco of export is grown in the peninsula of Jaffna, where the rajah of Travancore has an agent who purchases for him direct from the growers. The exports of this article in 1850 were 22,176 cwts., valued at £20,698, and in 1873, 36,676 cwts., valued at £99,174.

Cinnamon.—Ceylon has been celebrated since the middle of the 14th century for its cinnamon, and during the period of the Dutch occupation this spice was the principal article of commerce; under their rule and up to 1832 its cultivation was a government monopoly. With the abolition of the monopoly the quantity exported increased, but the value declined. European consumers contented themselves with the cheaper and coarser cassia, and the Ceylon producers then peeled the coarser and less valuable shoots of cinnamon to compete with the cassia, till the average price in London, which was 5s. 1d. per lb in 1841, was reduced in 1857 to 1s. 6d. per lb. Cassia during this period varied from 1s. 1¼d. to 6¼d. per lb. The customs returns give the exports for 1850 at 664,857 lb, valued at £64,486, and for 1873 at 1,160,754 lb, valued at only £58,037.

Coffee.—The most important cultivation is that of coffee, a branch of industry which since the year 1841 has assumed a position of great and ever-increasing prominence. Coffee was an article of growth and export from Ceylon so far back as the time of the Portuguese, but like the cinnamon it grew wild without any attempt at cultivation. Patches of it were to be seen around the Kandyan villages in wild luxuriance; and the berry, gathered before it was ripe, and imperfectly cured, seldom possessed much flavor, and was lightly esteemed as an article of European commerce. Coffee cultivation on the West Indian plan was first commenced in 1824 by Sir E. Barnes, then governor of Ceylon, who hoped by his example to introduce coffee-planting by Europeans into the island. Until 1834, however, public attention does not seem to have been occupied with the subject; but in that year the falling off in the supplies from other quarters brought capitalists into the field; and when in 1836 the home duty on East India coffee was reduced to 6d. per lb, a great impulse was given to coffee planting in Ceylon. During that and the following year about 7000 acres of forest land were purchased for this object; and when at the end of a few years it became matter of notoriety that the soil and climate of Ceylon were capable of yielding a coffee equal in value to most kinds, the influx of capital from England for investment in this new branch of Ceylon industry became very great.

The commercial crisis of 1847 gave a check to coffee-planting in the island, and caused the abandonment of several estates. But enforced economy induced more careful cultivation, and the coffee enterprise soon recovered. There are now 1215 coffee plantations, of which 800 are owned by individual proprietors, 250 of whom reside on their own estates, and 400 more are resident in the island. The area is estimated at 250,000 acres, of which 195,000 are in bearing. The exports from these plantations for the coffee season ending 10th Oct., 1874, were 850,000 cwts., giving an average yield from old and new estates together of a little over 4 cwts. per acre. Estates from 5 to 10 years old probably yield about four and a half cwts. per acre, and older estates about three and a half cwts. per acre. The price for plantation coffee in the London markets in 1845 was 74s. per cwt.; it has fluctuated considerably, and went down to 50s. in 1851, but it did not rise much above the price of 1845 till 1872, when it steadily rose till it reached 139s. on Feb. 7th, 1873. Land suitable for coffee is purchased from the Government in forest. It was formerly sold in large blocks at an upset price of 5s. an acre; it is now sold in convenient blocks of 200 acres or less at an upset price of £1 an acre; no land, however, which is really well suited for coffee can be obtained at less than £9 or £10 an acre, and in 1873 a lot of 306 acres of forest land sold for £18 per acre. Including the lands sold in small lots to natives, the Government granted from 1833 to 1844 267,373 acres, and between 1844 and 1874 693,886 acres; the average price per acre has risen from 10s. 8d. to £2, 12s. 4d. per acre. The exports of coffee in 1850 were 278,473 cwts., valued at £609,262, and in 1873, 951,591 cwts., valued at £4,220,750.

Tea.—The cultivation of tea has recently been introduced. A small quantity of pure good tea is produced annually, and finds a ready market in the island. It has not yet become an article of export.

Cinchona.—Cinchona was introduced into the hill-districts of Ceylon and India from South America in 1860. It was brought direct from the forests, where it maintained an incessant struggle with other trees for existence. After patient and intelligent experiment its cultivation has been assured, and the object of its introduction secured. There is now provided an abundant supply of the bark at a price which will secure to the population at large the valuable febrifuge yielded by the alkaloids of cinchona.

Sugar.—The cultivation of sugar was commenced in 1836 near Kandy, and subsequently in several other parts of the island, but without any permanent success; the sugar grown in the island forms a very small portion of the annual consumption. The sugar imported in 1873 amounted to 28,956 cwt., valued at £46,953.

Cocoa-nuts.—As an investment for English capital cocoa-nut planting has not proved remunerative. To the native cultivator a small cocoa-nut plantation adjoining his homestead is of the utmost value, as has been already explained under the head "palms." It is estimated that the extent of land, held by Europeans and natives, bearing cocoa-nuts is 250,000 acres.

Manufactures.—The native manufactures are of the most primitive description. Coarse cotton cloth of a strong and serviceable kind is woven in rude looms, but the looms are rapidly disappearing with the introduction of the cheaper but inferior productions of Manchester. The fibre of the cocoa-nut is worked up in large quantities into coir yarn and cordage, which is admirably adapted for use in salt water. The country trading vessels employ no other cordage or rope than this, and indeed the planks of their small vessels are held together solely by coir yarn, without the aid of a single nail. Cocoa-nut oil is expressed from the dried kernel of the cocoa-nut in native mills, which are simply a rough mortar of wood or stone in which a heavy pestle of hard wood is made to revolve by means of a pair of oxen at the end of a long pole, secured by a bamboo to the upper end of the pestle, the whole machine forming a simple kind of lever, by the action of which the oil is extracted. Steam-power is now used by European merchants in manufacturing this oil and in preparing and pressing coir fibre, and oil and coir have become important articles of export. In 1850 the exports of coir rope, yarn, &c., were 39,886 cwts., valued at £20,435, and in 1873, 65,048 cwts., valued at £45,363. Of cocoa-nut oil the exports in 1850 were 32,785 cwts., valued at £35,035, and in 1873, 113,872 cwts., of the value of £141,818.

Trade and Commerce.—The trade of Ceylon shows a steady improvement. The earliest returns of imports and exports are those for 1825, which give the following figures:—Imports, £296,301; exports, £224,388; total, £510,689. The latest returns show that in 1874 the imports and exports together were valued at nearly ten millions, as against half a million in 1825, that is half a century ago. The figures are as follows:—

Year.	Imports.	Exports.	Total.
1835	£352,076	£199,268	£551,344
1845	1,495,127	583,100	2,078,227
1855	2,388,191	1,974,777	4,362,968
1865	5,022,179	3,565,157	8,587,336
1874	5,336,119	4,394,427	9,730,546

There has been a corresponding increase in the tonnage of shipping entered and cleared during the same period. The figures are as follows:—

1825	91,685 tons.
1835	145,182 "
1845	423,370 "
1855	634,482 "
1865	1,150,840 "
1874	2,015,158 "

With the exception of a duty of one shilling per cwt. on plumbago, which is in lieu of the royalty to which the Crown was entitled on all plumbago as it came from the pits, there are no export duties; the duty on imports is five per cent. on the declared value, with some few exceptions, such as arms, wines, spirits, and grain, which are liable to special rates; paddy, or rice in husk, which pays 3d. a bushel; rice and other grain, 7d. a bushel; and machinery, paper, and a few other articles, which are free.

Banks.—Two English banking companies and one Indian bank have branches in Ceylon—the Oriental Bank Corporation, the Chartered Mercantile Bank of India, London, and China, and the Bank of Madras. The two chartered banks, the Oriental and the Chartered Mercantile Bank, have the privilege of issuing notes of five rupees and upwards in value. The Government in 1856 gave up this privilege, and left the paper currency of the island entirely in the hands of the banks, who pay to the Government, in lieu of stamp duty, one per cent. per annum on the average amount of notes in circulation, and are required to keep in reserve bullion equal to one-third of their issues. The bank notes are received at all the Government treasuries throughout the island, but the banks are bound to redeem them with specie after a notice of 60 days; this rule is only enforced when the Government requires a remittance of specie at some distant treasury. The note circulation has increased with the general improvement in the financial position of Ceylon. In 1854 it amounted to £131,000, of which £70,000 was represented by Government notes; in 1859 it amounted to £93,334, in 1864 to £259,631, in 1869 to £270,979, and in 1874 to £386,089. Since 1st January, 1872, the rupee has been the sole standard of value in Ceylon, with decimal subdivisions, represented by bronze token pieces, which are taken as equivalent to $\frac{1}{20}$th part of a rupee or 5 cents, $\frac{1}{100}$th part of a rupee or one cent, $\frac{1}{200}$th part of a rupee or half a cent, $\frac{1}{400}$th part of a rupee or a quarter of a cent. All accounts are kept in rupees and cents. The Indian silver subsidiary coins are current,—the half rupee as 50 cents, the quarter rupee as 25 cents, and the two anna piece ($\frac{1}{8}$th of a rupee) as 12½ cents. The rupee is the Company's silver rupee of India, of 180 grains weight and $\frac{11}{12}$ths fineness.

Revenue and Expenditure.—The total revenue for 1874 was £1,241,558, the total expenditure £1,110,180. The principal heads of revenue are customs, £268,203; land sales, £67,795; land revenue, £80,822; tolls on roads and canals, £41,247; licenses (under which head is derived the revenue from the Government monopoly of the arrack trade), £173,305; stamps (including both general and postage), £105,239, of which about £20,000 is postal revenue; fines and forfeitures, £8440; sale of Government property, £133,323, of which about £70,000 is derived from the monopoly on salt; reimbursements, £30,000; interest on suitors' deposits invested in Indian Government securities and on balances in England, £13,600; miscellaneous, £44,633; pearl fishery, £9524; railway receipts, £221,168. Of the customs duties about £150,000 is derived from the import duty on grain, and of the land revenue about £70,000 is derived from the tithe on grain; it thus appears that about one-fifth of the total revenue of the island is derived from a tax on the daily food of the people. In defence of these burdens on food, it is urged that the importation of rice is rendered necessary, to a large extent, by the employment on the coffee estates of immigrant laborers from the south of India, who come over for the coffee season and return to India with their earnings, out of which they would contribute nothing to the revenue of Ceylon, if it were not for the tax on their imported food; and as regards the tithe on grain, that this is the reserved rent of the Crown as supreme landlord. The monopoly of the arrack trade yields about £170,000. The very name of monopoly has an odious sound, but in the instances in which it exists in Ceylon it is difficult to see what mode of taxation would be less oppressive, and, as regards the arrack monopoly, there can be no doubt that its possession by the Government renders possible the exercise of an effectual check on the abuse of this intoxicant. The Government restricts distillation to certain licensed stills, which are left free to sell the spirit wholesale in open market, but the right to retail is granted only to certain persons and certain taverns. This right is sold by auction from year to year to taverns or groups of taverns, which are bound to retail pure arrack at not more than a certain price named in the conditions, and are subjected to stringent regulations for the prevention of drunkenness and the maintenance of order. In the management of this monopoly, revenue is a secondary consideration, and taverns are only allowed where they are absolutely required, that is, where their place, if they were not allowed, would be supplied by the illicit sale of arrack. The proper management of this monopoly has received much attention from the present governor, Sir W. H. Gregory, and he has been careful to enforce the observance of the principles which have always been supposed to govern this question. The monopoly of salt has been from time immemorial in the hands of the sovereign, and, as it prevails in Ceylon, is common to every country in the East; it seems to be the only expedient by which to obtain a minimum of taxation from classes incapable of bearing in any other shape an equitable share of the public burdens. Salt is produced at about 10d. per cwt. and sold at 4s. 8d. per cwt.

The principal heads of expenditure are as follows:—Salaries and office charges, £354,761; pensions, £41,000; revenue services, £24,000; hospitals, £16,000; education, £14,600; police and jails, £30,700; works and buildings, £24,000; roads, streets, bridges, and canals, £185,300; military expenditure, £124,687. The returns of revenue and expenditure of the Government, as given above, do not represent the whole of the public revenue and expenditure of the island; there have to be added the returns from the municipalities and the local boards by which the road tax is collected. These figures are as follows for the year 1874:—

	Revenue.	Expenditure.
Colombo Municipality	£38,961	£38,708
Galle "	7,057	6,100
Kandy "	11,766	14,548
Provincial Road Committees—		
Western Province	35,087	28,468
North-Western Province	9,213	6,130
Southern "	9,554	8,046
Eastern "	5,192	4,350
Northern "	7,117	6,976
Central "	16,937	9,319
North-Central "	2,635	1,833
Total	£143,519	£124,478

The returns of revenue from 1856 to the present time show a steady and rapid increase, and are a fair indication of the great advance which Ceylon is making. The revenue in 1856 was £504,174; it rose, year by year, till it reached £767,100 in 1860, and in 1865 it amounted to £978,462; it then fell somewhat owing to the cession by the Government to the municipalities of certain sources of revenue, but it arose in 1870 to £1,091,606, in 1871 to £1,121,679, in 1872 to £1,174,698, and in 1873 to £1,290,918. The revenue for 1874 in reality exceeded that of

1873, though it is only given as £1,241,558, which is the equivalent of rupees 13,243,288 at 1s. 10½d., at which the rupee is rated in the accounts for 1874, whereas in the previous year it was rated at 2s.

Tennent's *Ceylon*, 2 vols. 2d ed. 1859; *Reports to Ceylon Government by Service Tenures Commissioner*, 1870–1873; Ceylon Government *Blue Book*, 1874, and *Gazette*, 1875; Childers's *Pali Dictionary*, 1875; Ferguson's *Ceylon Directory*, 1875. (J. F. D.)

CHABLIS, a town of France on the Seray or Serein, in the department of Yonne, 10 miles east of Auxerre. It has a church, St. Martin, of the 13th century, which is classed among the historical monuments of France; and it gives its name to a celebrated white wine produced in the neighboring vineyards, of which the most esteemed are Clos, Valmur, Vaudesir, Bougereau, and Mont de Milieu. Population in 1872, 2270.

CHABRIAS, a celebrated Athenian general, who first assumed the command about the year 392 B.C. He defeated the Spartans at Ægina (388), and again at Naxos (376). With Iphicrates and Callistratus he commanded at Corcyra, and repulsed Epaminondas before the walls of Corinth. In 366, together with Callistratus, he was accused of treachery in advising the surrender of Oropus to the Thebans, and was then, it is said, defended by Plato. His unpopularity on account of this charge, and also on account of his ostentation and luxuriousness, led him to accept a foreign command under Tachos, king of Egypt, who had revolted from the Persians. On the breaking out of the Social War (357), he, however, joined Chares in the command of the Athenian fleet. At the siege of Chios his ship was disabled, but he refused to flee, and fell fighting bravely. He was famous for the invention of a manœuvre, which consisted in receiving a charge on the left knee, with the spears of the front ranks pointed against the enemy and the shields resting on the ground.

CHADERTON, Laurence (1536–1640), a Puritan divine, was born at Lees Hall, in the parish of Oldham, Lancashire, September 14, 1536, being the second son of Edmund Chaderton, a gentleman of an ancient family, and a zealous Catholic. Under the tuition of Laurence Vaux, a priest, he became an admirable scholar. In 1562 he entered Christ's College, Cambridge, where, after a short time, he formally joined the Established Church, and was, in consequence, disinherited by his father. In 1567 he was elected a fellow of his college, and subsequently he was chosen lecturer of St. Clement's Church, Cambridge, where he preached to admiring audiences for many years. So great was his reputation that when Sir Walter Mildmay refounded Emmanuel College in 1584, he chose Chaderton for the first master, and on his expressing some reluctance, declared that if he would not accept the office, the foundation should not go on. In the beginning of the reign of James I. Chaderton was appointed one of the five divines for managing the cause of the Puritans at the Hampton Court conference; and he was also one of the translators of the Bible. In 1613 he was created D.D. At this period he made provision for twelve fellows and above forty scholars in Emmanuel College. Fearing that he might have a successor who held Arminian doctrines, he resigned the mastership in favor of Dr. Preston, but survived him, and lived also to see the college presided over successively by Dr. Sancroft and Dr. Holdsworth. He died November, 1540, in the second month of his 105th year, according to his biographer Dr. Dillingham. Dr. Chaderton published a sermon preached at St. Paul's Cross in 1578, and a treatise of his *On Justification* was printed by Anthony Thysius, professor of divinity at Leyden. Some other works by him on theological subjects remain in manuscript.

CHÆRONEIA, a Bœotian town situated on the Thermodon, a tributary of the Cephissus, on a plain which was on the borders of Phocis, and was on the natural route for an army invading Bœotia on that side. It is celebrated in history as the scene of three great battles. In the first (447 B.C.) the Athenians were defeated by the Bœotians; in the second (388 B.C.) Philip defeated the confederate forces of the Athenians and Bœotians; and in the third (86 B.C.) Sulla defeated the generals of Mithridates. A colossal lion lately excavated near the site of the modern Kápurna marks the grave of the Bœotians who fell in the second of these engagements, and in the village itself are some remains of the ancient citadel, the Petrachus, and a theatre excavated out of the rock on which the citadel was built. Chæroneia was the birthplace of Plutarch.

CHAFFINCH (*Fringilla cœlebs*), a Conirostral Bird belonging to the family *Fringillidæ* or Finches, and distinguished, in the male sex, by the deep grayish blue of its crown feathers, the sulphur yellow of its rump, the white of the wing coverts, so disposed as to form two conspicuous bars, and the reddish brown passing into vinous red of the throat and breast. The female is less conspicuous in its coloring than the male, and the young males resemble the females until after the first autumn moult, when they gradually assume the plumage of their sex. The chaffinch breeds early in the season, and its song may often be heard in February. Its nest, which is a model of neatness and symmetry, it builds on trees and bushes, preferring such as are overgrown with moss and lichens. It is chiefly composed of moss and wool, lined internally with grass, wool, feathers, and whatever soft material the locality affords. The outside consists of moss and lichens, and according to Selby, "is always accordant with the particular color of its situation." When built in the neighborhood of towns the nest is somewhat slovenly and untidy, being often composed of bits of dirty straw, pieces of paper, and blackened moss; in one instance, near Glasgow, the author of the *Birds of the West of Scotland* found several postage-stamps thus employed. It lays four or five eggs of a pale purplish buff, streaked and spotted with purplish red. In spring the chaffinch is destructive to early flowers, and to young radishes and turnips just as they appear above the surface; in summer, however, it feeds principally on insects and their larvæ, while in autumn and winter its food consists of grain and other seeds. On the Continent of Europe the chaffinch is a favorite songbird, especially in Germany, where a cow has been known to be given in exchange for one of these birds, and where great attention is paid to its training. Its notes are clear and powerful, and, according to Bechstein, "seem almost to approach to words." The chaffinch is found throughout Europe and Western Asia, and has been observed as far west as the Azores. It is resident all the year in the warmer parts of this area, but migrates southward from northern Europe on the approach of winter. It was at one time supposed that the females only migrated, and Linnæus named the species *Cœlebs*, or "bachelor," in allusion to this alleged desertion of the males by their mates, which, however, does not appear to take place.

CHAGRES, a seaport of Colombia, in the state of Panama, situated on the northern side of the Isthmus of Panama, about 12 miles W.S.W. of Colon or Aspinwall, at the mouth of a river of its own name. Before the opening of the railway between Panama and Aspinwall in 1855 it was a place of very considerable importance; but it has now sunk into a very decadent and dilapidated condition, and the inhabitants, who are mainly negroes or half-castes, only amount to about 1000. The period of its greatest prosperity coincides with the great emigration from the United States to the Californian gold-fields, and the district on the left side of the river is still known as the American town. The chief facts in its history are its destruction by the buccaneers in 1671 and its capture by the English under Admiral Vernon in 1740.

CHALCEDON, or rather Calchedon, an ancient maritime town of Bithynia, in Asia Minor, called also Procerastis and Colpusa, almost directly opposite Byzantium, to the south of the present town of Scutari. It was founded by a colony from Megara, on a site so obviously inferior to that which was within their view on the opposite shore, that it received from the oracle the name of "The City of the Blind." In its early history it shared the fortunes of Byzantium, was taken by the satrap Otanes, vacillated long between the Lacedæmonian and the Athenian interest, and at last fell into the hands of the kings of Bithynia, by the last of whom it was bequeathed to the Romans. It was taken and partly destroyed by Mithridates, but it recovered during the empire, and in 451 A.D. was the seat of the Fourth General Council, which condemned the Monophysites. It fell under the repeated attacks of the barbarian hordes, who crossed over after having ravaged Byzantium, and it furnished an encampment to the Persians under Chosroes for about ten years after 616. Its ruin was completed by the Turks, who used it as a quarry from which to draw the building materials for Constantinople. The site is now occupied by the village of Kadi Keui, or "Village of the Judge."

which contains a number of fine villas and a large Roman Catholic cathedral. At a short distance to the south are the ruins of Panteichon, or, as it is now called, Pandik, where Belisarius is said to have lived in retirement. A plain in the neighborhood affords camping ground for the caravans after they leave Scutari.

CHALCIS. See EUBŒA.

CHALDEA. See BABYLONIA, vol. iii. p. 159.

CHALK (Ang.-Sax. *cealc;* Lat. *calx*, lime), an earthy limestone of the Upper Cretaceous group of rocks. It has a specific gravity of from 2·4 to 2·6, is rough to the touch, is friable, and presents an uneven fracture; it has an insipid taste, and adheres slightly to the tongue; it is usually white, and imparts its color to surfaces over which it is rubbed. On microscopical examination, chalk is found to consist in the main of the minute shells of Foraminifera. In addition to calcium carbonate, chalk usually contains about 5 per cent. of water, with some free silica and ferric oxide, besides minor impurities. The red varieties of chalk may contain as much as 9·28 per cent. of silica, 9·6 per cent. of ferric oxide, and 1·42 per cent. of alumina (Clapham, *Chem. News*, 1862, vol. vi. p. 313). Some of the red chalk of Norfolk gives, when treated with acids, an argillaceous residue, which when air-dried has a weight equal to 9·3 per cent. that of the chalk taken, and has been found on analysis to consist of water, ferric oxide, and alumina, with a small proportion of magnesia and potash (Church, *Chem. News*, 1875, vol. xxxi. p. 199).

The flooding of streams that flow through chalky ground is almost unknown, since chalk is very porous, and will when dry take up nearly one-third of its bulk of water (Ansted and Miller); and in some districts where chalk is the surface rock, the heaviest showers are absorbed as soon as they fall. During the summer months, however, most of the rainfall penetrates only a few feet downwards, and is consequently imbibed by vegetation or evaporated; for though chalk is highly absorbent, its fine and close texture does not allow of the free permeation of water. Occasionally, lower-lying beds of chalk have been drained, whilst higher levels have remained charged with moisture. The circulation of water in chalk strata is due, in fact, not so much to general percolation in the mass, as to its flow either through fissures or, as in the case of deep-seated and but little disturbed and creviced beds, along planes of stratification. As a storehouse of water the chalk formation is of great importance, the artesian wells of London and many other places being supplied directly or indirectly from it. Where chalk forms the surface of the land, the yield of water may be very large, as at the Tring cutting of the North-Western Railway, where it amounted to upwards of a million gallons a day. Chalk is much used as a dressing for land deficient in lime, and is of special value where the soil consists of a stiff wet clay. The effect of the addition of chalk is to render the soil better able to retain moisture, and to improve its texture. It is generally most efficacious when used in moderate quantity every six or seven years. The renewal of the supply of chalk is necessary owing to its removal from the surface by solution and by the undermining action of earthworms. The chalk is not ploughed into the land till it has been exposed to frost, which breaks it up into small squarish fragments. In the Lincolnshire wolds, the process of chalking, in conjunction with boning and manuring, has brought about a great improvement in the soil. In Dorsetshire the land is usually chalked once in twenty years. The chalk is spread on the ground in large lumps, which crumble down under the influence of the weather; or it may be burnt and applied as lime. For sandy soils, on which it acts as a cement, chalk is best adapted when marly in character. On poor chalky ground, the sainfoin (*Onobrychis sativa*), a plant which flourishes in calcareous soils and is an excellent fodder for cattle, has been cultivated with great success; and the herbage of the chalk downs of Sussex, Wilts, and other counties of England, affords good pasture for sheep.

Chalk is employed medicinally as an antacid and mild astringent, either alone, or together with other astringents, or combined with mercury as *hydrargyrum cum creta*, but never in the crude state. As none of the salts it forms is purgative, it is a valuable remedy in diarrhœa. Externally, prepared chalk is used as a desiccant, and as a protective application for ulcers and burns, and in intertrigo and other affections of the skin. When taken for a prolonged period, chalk is apt to form concretions in the stomach, for want of acid sufficient to dissolve it.

Chalk is rarely hard enough to be used in any kind of building. When burnt to lime it serves the same purposes as stone lime, but on account of its more rapid absorption of carbonic acid gas, it is not so fit for general use as the latter, except when fresh from the kiln. Chalk is employed in the manufacture of cements and of carbonate of soda, in the preparation of carbonic acid gas, and in many other chemical processes; also for making paints, crayons, and tooth-powder. *Whiting* or *Spanish white*, used to polish glass and metal, is purified chalk prepared by triturating common chalk with a large quantity of water, which is then decanted and allowed to deposit the finely-divided particles it holds in suspension.

Black chalk or *drawing slate* is a soft carbonaceous schist, which gives a black streak, so that it can be used for drawing or writing. *Brown chalk* is a kind of umber. *Red chalk* or *reddle* is an impure earthy variety of hæmatite. *French chalk* is a soft variety of steatite, a hydrated silicate of magnesium.

See J. Prestwich, *The Water-bearing strata of London*, p. 57, *sqq.* (London, 1851); J. A. Clarke in *Journ. Roy. Agric. Soc.*, vol. xii. p. 331 (1851); Caird, *English Agriculture in* 1850 *and* 1851, p. 61 (London, 1852).

CHALLONER, RICHARD (1691–1781), an eminent Roman Catholic prelate, born at Lewes, Sussex, 29th September, 1691. After the death of his father, who was a rigid Dissenter, his mother sought refuge with some Roman Catholic families, the consequence being that the son was brought up in their religion, chiefly at the seat of Mr. Holman at Warkworth, Northamptonshire, where the Rev. John Gother, a celebrated controversialist, officiated as chaplain. In 1704 he was sent to the English College at Douay, where he was ordained a priest, took his degrees in divinity, and was appointed professor in that faculty. In 1730 he was sent on the English mission and stationed in London. The controversial treatises that he now published in rapid succession attracted much attention, particularly his *Catholic Christian Instructed*, which was prefaced by a witty reply to Dr. Conyers Middleton's *Letter from Rome, showing an exact conformity between Popery and Paganism.* Middleton is said to have been so irritated that he endeavored to put the penal laws in force against his antagonist, who prudently withdrew from London until the commotion subsided. On 29th January, 1741, Challoner was raised to the episcopal dignity at Hammersmith, by the title of bishop of Debra, *in partibus infidelium*, and nominated coadjutor, *cum jure successionis*, to Bishop Petre, Vicar-Apostolic of the London district. Accordingly, on the decease of that prelate in 1758, Challoner succeeded to the Vicariate-Apostolic. He resided principally in London, but was obliged to retire into the country during the "No Popery" riots of 1780. Soon afterwards he died, on January 12, 1781, and was buried at Milton, Berkshire. Bishop Challoner was the author of numerous controversial and devotional works, which have been frequently reprinted and translated into various languages. He compiled the *Garden of the Soul*, which continues to this day to be the most popular manual of devotion among English-speaking Roman Catholics; and he revised an edition of the Douay version of the Scriptures (1749–50), correcting the language and orthography, which in many places had become obsolete. Of his historical works the most valuable is one which was intended to be a Roman Catholic antidote to Foxe's well-known martyrology. It is entitled *Memoirs of Missionary Priests and other Catholicks of both Sexes who suffered Death or Imprisonment in England on account of their Religion, from the year* 1577 *till the end of the reign of Charles II.*, 2 vols. 1741; reprinted in 1803. Bishop Challoner also published anonymously, in 1745, the lives of English, Scotch, and Irish saints, under the title of *Britannia Sancta.*

CHALMERS, ALEXANDER (1759–1834), was born in Aberdeen. He was educated as a doctor, but gave up this profession for literature. His first productions were contributions to London periodicals, and he was for some time editor of the *Morning Herald.* Besides editions of the works of Shakespeare, Beattie, Fielding, Johnson, Warton, Pope, Gibbon, Bolingbroke, and others, he published *A General Biographical Dictionary in* 32 vols. (1812–1817);

a *Glossary to Shakespeare;* an edition of Shakespeare; and the *British Essayist*, commencing with the *Tatler* and ending with the *Observer*, with biographical and historical prefaces and a general index.

CHALMERS, GEORGE (1742–1825), an antiquarian and political writer of considerable eminence, was born at Fochabers, a village in the county of Moray, in the year 1742. His father, James Chalmers, was a grandson of George Chalmers of Pittensear, a small estate in the parish of Lhanbryde, now St. Andrews-Lhanbryde, in the same county, possessed by the main line of the family from about the beginning of the 17th to the middle of the 18th century. After completing the usual course at King's College, Aberdeen, young Chalmers studied law in Edinburgh for several years. Two uncles on the father's side having settled in America, he visited Maryland in 1763, with the view, it is said, of assisting to recover a tract of land of some extent about which a dispute had arisen, and was in this way induced to commence practice as a lawyer at Baltimore, where for a time he met with much success. Having, however, espoused the cause of the Royalist party on the breaking out of the American war of Independence, he found it expedient to abandon his professional prospects in the New World, and return to his native country. For the losses he had sustained as a colonist he received no compensation, and several years elapsed before he obtained an appointment that placed him in a state of comfort and independence.

In the meantime Chalmers applied himself with great diligence and assiduity to the investigation of the history and establishment of the English colonies in North America; and enjoying free access to the state papers and other documents preserved among what were then termed the plantation records, he became possessed of much important information. His work entitled *Political Annals of the present United Colonies from their Settlement to the Peace of* 1763, 4to, London, 1780, was to have formed two volumes; but the second, which should have contained the period between 1688 and 1763, never appeared. The first volume, however, is complete in itself, and traces the original settlement of the different American colonies, and the progressive changes in their constitutions and forms of government as affected by the state of public affairs in the parent kingdom. Independently of its value as being compiled from original documents, it bears evidence of great research, and has been of essential benefit to later writers. Continuing his researches, he next gave to the world *An Estimate of the Comparative Strength of Britain during the Present and Four Preceding Reigns*, Lond. 1782, which passed through several editions. At length, in August, 1786, Chalmers, whose sufferings as a Royalist must have strongly recommended him to the Government of the day, was appointed chief clerk to the committee of Privy Council on matters relating to trade, a situation which he retained till his death in 1825, a period of nearly forty years. As his official duties made no great demands on his time, he had abundant leisure to devote to his favorite studies,—the antiquities and topography of Scotland having thenceforth special attractions for his busy pen.

Besides biographical sketches of De Foe, Sir John Davies, Allan Ramsay, Sir David Lyndsay, Churchyard, and others, prefixed to editions of their respective works, Chalmers wrote a life of Paine, the author of the *Rights of Man*, which he published under the assumed name of Francis Oldys, A.M., of the University of Pennsylvania; and a life of Ruddiman, in which considerable light is thrown on the state of literature in Scotland during the earlier part of the last century. His life of Queen Mary, in two quarto volumes, was first published in 1818. It is founded on a MS. left by Whitaker the historian of Manchester; but Chalmers informs us that he found it necessary to rewrite the whole. The history of that ill-fated queen occupied much of his attention, and his last work, *A Detection of the Love-Letters lately attributed in Hugh Campbell's work to Mary Queen of Scots*, is an exposure of an attempt to represent as genuine some fictitious letters said to have passed between Mary and Bothwell, which had fallen into deserved oblivion. In 1797 appeared his *Apology for the Believers in the Shakespeare Papers which were exhibited in Norfolk Street*, followed by other tracts on the same subject. These contributions to the literature of Shakespeare are full of curious matter, but on the whole display a great waste of erudition, in seeking to show that papers which had been proved forgeries might nevertheless have been genuine. Chalmers also took part in the Junius controversy, and in *The Author of Junius Ascertained, from a Concatenation of Circumstances amounting to Moral Demonstration*, Lond. 1817, 8vo, sought to fix the authorship of the celebrated letters on Hugh Boyd. In 1824 he published *The Poetical Remains of some of the Scottish Kings, now first collected;* and the same year he edited and presented as a contribution to the Bannatyne Club *Robene and Makyne and the Testament of Cresseid, by Robert Henryson.* His political writings are equally numerous. Among them may be mentioned *Collection of Treaties between Great Britain and other Powers*, Lond. 1790, 2 vols. 8vo; *Vindication of the Privileges of the People in respect to the Constitutional Right of Free Discussion, &c.*, Lond. 1796, 8vo, published anonymously; *A Chronological account of Commerce and Coinage in Great Britain from the Restoration till* 1810, Lond. 1810, 8vo; *Opinions of Eminent Lawyers on various points of English Jurisprudence, chiefly concerning the Colonies, Fisheries, and Commerce of Great Britain*, Lond. 1814, 2 vols. 8vo; *Comparative Views of the State of Great Britain before and since the War*, Lond. 1817, 8vo.

But Chalmers's greatest work is his *Caledonia*, which, however, he did not live to complete. The first volume appeared in 1807, and is introductory to the others. It is divided into four books, treating successively of the Roman, the Pictish, the Scottish, and the Scoto-Saxon periods, from 80 to 1306 A.D. In these we are presented, in a condensed form, with an account of the people, the language, and the civil and ecclesiastical history, as well as the agricultural and commercial state of Scotland during the first thirteen centuries of our era. Unfortunately the chapters on the Roman period are entirely marred by the author's having accepted as genuine Bertram's forgery *De Situ Britanniæ;* but otherwise his opinions on controverted topics are worthy of much respect, being founded on a laborious investigation of all the original authorities that were accessible to him. The style both of this and of the succeeding volumes is redundant, the scholarship is often defective, and hastily-drawn conclusions are asserted with the utmost confidence in their accuracy; yet, notwithstanding all these drawbacks, such were the industry and perseverance of Chalmers that his *Caledonia* contains a mass of information on all subjects connected with early Scottish history and topography that has been of the highest value to subsequent writers. The second volume, published in 1810, gives an account of the seven south-eastern counties of Scotland—Roxburgh, Berwick, Haddington, Edinburgh, Linlithgow, Peebles, and Selkirk, each of them being treated of as regards name, situation and extent, natural objects, antiquities, establishment as shires, civil history, agriculture, manufactures and trade, and ecclesiastical history. In 1824, after an interval of fourteen years, the third volume appeared, giving, under the same headings, a description of the seven south-western counties—Dumfries, Kirkcudbright, Wigtown, Ayr, Lanark, Renfrew, and Dumbarton. In the preface to this volume the author states that the materials for the history of the central and northern counties were collected, and that he expected the work would be completed in two years. This expectation, however, was not destined to be realized. It is much to be regretted that, instead of all but wasting his time on profitless and acrimonious controversies about Shakesperian forgeries and the character of Queen Mary, Chalmers did not direct his whole energies to his *magnum opus*, and give to the world the matured fruits of all the labor he had bestowed on it; for it is on *Caledonia* that his fame must chiefly rest.

While thus fully occupied, Chalmers had for many years been engaged in laying the foundation for other works of a not less important and laborious nature. One of these is said to have been a history of Scottish poetry, another, a history of printing in Scotland. Each of them he thought likely to extend to two large quarto volumes, and on both he expended an unusual amount of enthusiasm and energy. He had also prepared for the press an elaborate history of the life and reign of David I. In his later researches he was assisted by his nephew James, son of Alexander Chalmers, writer in Elgin.

George Chalmers died at his house, James Street, Buckingham Gate, London, May 31, 1825, after a few days' illness, in the eighty-third year of his age. His valuable

and extensive library he bequeathed to his nephew, at whose death in 1841 it was sold and dispersed. Chalmers was a member of the Royal and Antiquarian Societies of London, an honorary member of the Antiquarian Society of Scotland, and a member of other learned societies. In private life he was undoubtedly an amiable man, although the dogmatic tone that disfigures portions of his writings procured him many opponents. He is besides chargeable with a want of taste, which appears too prominently in his keen attempts to silence, at all hazards, those whom he considered the detractors of Mary. Among his avowed antagonists in literary warfare the most distinguished were Malone and Steevens, the Shakespeare editors; Mathias, the author of the *Pursuits of Literature;* Dr. Jamieson, the Scottish lexicographer; Pinkerton, the historian; Dr. Irving, the biographer of the Scottish poets; and Dr. Currie of Liverpool. But with all his failings in judgment, Chalmers was a valuable writer. He uniformly had recourse to original sources of information; and he is entitled to great praise for his patriotic and self-sacrificing endeavors to illustrate the history, literature, and antiquities of his native country. (J. M'D.)

CHALMERS, Dr. Thomas (1780–1847), a distinguished Scottish divine, was born at Anstruther in Fifeshire, on the 17th March, 1780. He was early destined to the church, and while only eleven years old was enrolled as a student in the university of St. Andrews. Having completed his collegiate course, in which he devoted himself almost exclusively to the study of mathematics, in January, 1799, he was licensed as a preacher of the gospel by the presbytery of St. Andrews. Instead of entering at once on the duties of his profession, he spent the two following winters in Edinburgh, attending the lectures of Professors Stewart, Playfair, Robison, and Hope. In May, 1803, he was ordained as minister of Kilmany, a small parish in Fifeshire, about nine miles from St. Andrews. During the preceding winter he had acted as assistant to Mr. Vilant, professor of mathematics in the university of that city, who for many years had been laid aside by ill health. The novelty, however, of his method, and the singular enthusiasm that he exhibited and excited were distasteful to those attached to the old routine of university education; and at the close of the session he was informed that his further services would not be required. Indignant at the fancied injustice thus done him, he adopted the singular expedient of opening mathematical classes of his own during the succeeding winter, which, though discountenanced in every way by the university authorities, many of the students were attracted to attend. The winter of 1803–4 was a very busy and exciting one. During the week he taught three classes in St. Andrews, and prepared and delivered there a course of lectures on chemistry, largely illustrated by experiments,—appearing at the same time in the pulpit of Kilmany every Sunday. Having sufficiently redeemed his reputation by the great success which attended them, his mathematical classes were not resumed. The lectures on chemistry were frequently redelivered in his own and in many adjoining parishes, to the surprise and delight of many rural audiences. In 1805 the chair of mathematics in Edinburgh became vacant, and he appeared, but unsuccessfully, as a candidate. In 1808 he published an *Inquiry into the Extent and Stability of National Resources,* a treatise originated by the alarm which Bonaparte's commercial policy had created in Britain, and intended to elucidate some of those questions in political economy which the existing state of affairs had raised. He was preparing a new edition of this work when a series of domestic bereavements, and a severe illness that brought him to the brink of the grave, and laid him aside from all duty for upwards of a year, turned his thoughts and life into a new channel. Dr. Brewster had invited him to become a contributor to the *Edinburgh Encyclopædia;* at his own request the article Christianity had been assigned to him, and he was now engaged in preparing it. In studying the credentials of Christianity, he received a new impression of its contents. A sustained but abortive effort to attain that pure and heavenly morality which the Gospel of Christ requires led on to that great spiritual revolution the nature and progress of which his journal and letters enable us to trace with such distinctness. When he resumed his duties, an entire change in the character of his ministry was visible to all. The report of discourses so earnest and eloquent as those now delivered, and of household visitations conducted with such ardent zeal, soon spread beyond the limits of his own neighborhood. His reputation as an author received at the same time a large accession by the publication in a separate form of his article on Christianity, as well as by several valuable contributions to the *Edinburgh Christian Instructor* and the *Eclectic Review.* So strong, however, at that time was the public bias against those evangelical doctrines which he had embraced, that when a vacancy occurred in Glasgow, and his friends brought him forward as a candidate, it was only after extraordinary efforts, and by a narrow majority, that his election was carried in the town-council.

In July, 1815, he was formally admitted as minister of the Tron church and parish. A blaze of unparalleled popularity at once broke around him as a preacher. A series of discourses which he had preached on the connection between the discoveries of astronomy and the Christian revelation were published in January, 1817. Never either before or since has the same reception been given to any volume of sermons in our language. Within a year, nine editions and 20,000 copies of the volume were in circulation. Soon after its appearance he visited London, and occupied for the first time one or two of the pulpits of the metropolis. The crowds were enormous, the applause loud and universal. "All the world," writes Mr. Wilberforce, "was wild about Dr. Chalmers." His extraordinary popularity remained undiminished during the eight years that he remained in Glasgow.

His preparation for the pulpit, however, formed but a small part of his labors. In visiting his parish, which contained a population of about 11,000 souls, he speedily discovered that nearly a third of them had relinquished all connection with any Christian church, and that their children were growing up in ignorance and vice. The appalling magnitude of the evil, and the certainty of its speedy and frightful growth, at once arrested and engrossed him. To devise and execute the means of checking and subduing it became henceforth one of the ruling passions of his life. Attributing the evil to the absence of those parochial influences, educational and ministerial, which wrought so effectually for good in the smaller rural parishes, but which had not been brought to bear upon the overgrown parishes of our great cities, from all spiritual oversight of which the members of the Establishment had retired in despair, his grand panacea was to revivify, remodel, and extend the old parochial economy of Scotland. Taking his own parish as a specimen, and gauging by it the spiritual necessities of the city, he did not hesitate to publish it as his conviction that not less than twenty new churches and parishes should immediately be erected in Glasgow. All, however, that he could persuade the town-council to attempt was to erect a single additional one, to which a parish containing no fewer than 10,000 souls was attached. This church, built at his suggestion, was offered to him and accepted, in order that he might have free and unimpeded room for carrying out his different parochial plans.

In September, 1819, he was admitted as minister of the church and parish of St. John's. The population of the parish was made up principally of weavers, laborers, factory workers, and other operatives. Of its 2000 families, more than 800 had no connection with any Christian church. The number of its uneducated children was countless. In this, as in his former parish, Dr. Chalmers's first care and efforts were bestowed upon the young. For their week-day instruction, two commodious school-houses were built, four well-qualified teachers were provided, each with an endowment of £25 per annum; and at the moderate school-fees of 2s. and 3s. per quarter, 700 children had a first-rate education supplied. For the poorer and more neglected, between forty and fifty local sabbath schools were opened, in which more than 1000 children were taught. The parish was divided into 25 districts, embracing from 60 to 100 families, over each of which an elder and a deacon were placed—the former taking the oversight of their spiritual, the latter of their temporal interests. Over the whole of this complicated parochial apparatus Dr. Chalmers presided, watching, impelling, controlling every movement. Nor was his work that of mere superintendence. He visited personally all the families, completing his round of them in about two years, and holding evening meetings, in which he addressed those whom he had visited during the week. Many families were thus

reclaimed to the habit of church-going, and many individuals deeply and enduringly impressed by the sacred truths of Christianity.

The chief reason why Dr. Chalmers removed from the Tron parish to that of St. John's was that he might have an opportunity of fairly testing the efficacy of the old Scottish method of providing for the poor. At this period there were not more than 20 parishes north of the Forth and Clyde in which there was a compulsory assessment for the poor. The English method of assessment, however, was rapidly spreading over the southern districts of Scotland, and already threatened to cover the whole country. Dr. Chalmers dreaded this as a great national catastrophe. Having studied in its principles, as well as in its results, the operation of a compulsory tax for the support of the poor, he was convinced that it operated prejudicially and swelled the evil it meant to mitigate. It was said, however, that though the old Scotch method of voluntary contributions at the church door administered by the kirk-session was applicable to small rural parishes, it was inapplicable to the large and already half-pauperized parishes of our great cities. Dr. Chalmers asked the magistrates of Glasgow to commit the entire management of the poor of the parish of St. John's into his own hands, and he undertook to refute that allegation. He was allowed to try the experiment. At the commencement of his operations, the poor of this parish cost the city £1400 per annum. He committed the investigation of all new applications for relief to the deacon of the district, who had so small a number of families in charge, that by spending an hour among them every week, he became minutely acquainted with their character and condition. By careful scrutiny of every case in which public relief was asked for, by a summary rejection of the idle, the drunken, and the worthless, by stimulating every effort that the poor could make to help themselves, and when necessary, aiding them in their efforts, a great proportion of these new cases were provided for without drawing upon the church-door collections; and such was the effect of the whole system of Christian oversight and influence, prudently and vigorously administered, that in four years the pauper expenditure was reduced from £1400 to £280 per annum.

At the commencement of his ministry in St. John's, Dr. Chalmers began a series of quarterly publications on *The Christian and Civic Economy of Large Towns*, devoted to the theoretic illustration of the various schemes of Christian usefulness which he was carrying on,—presenting himself thus to us as at once their skilful deviser, their vigorous conductor, their eloquent expounder and advocate. But the fatigues of so toilsome a ministry began to exhaust his strength; and he was already longing to exchange the personal for the literary labors of his profession, when the vacant chair of moral philosophy in the university of St. Andrews was offered to him. This offer, the seventh of the same kind that had been made to him during his eight years' residence in Glasgow, he accepted, entering on his new duties in November, 1823, and devoting the next four years of his life to their fulfilment. Hitherto metaphysics and ethics had been taught conjunctly by the professors of moral science in the Scotch colleges, while, in teaching the latter, allusions to the peculiar doctrines of Christianity had generally and often carefully been avoided. Looking upon mental philosophy as belonging properly to another chair, Dr. Chalmers confined his prelections to the philosophy of morals, entering at large upon the duties man owes to God as well as those he owes to his fellow-men, endeavoring throughout to demonstrate the insufficiency of natural religion to serve any other purpose than that of a precursor of Christianity. Many of his lectures, as remodelled afterwards and transferred to the theological chair, are to be found now in the first and second volumes of his works. In the purely ethical department, the discussions in which he made important and original contributions to the science are those occupied with the place and functions of volition and attention, the separate and underived character of the moral sentiments, and the distinction between the virtues of perfect and imperfect obligation. It was not so much, however, for their scientific speculations that his lectures in the moral philosophy class-room were distinguished, as for that fervor of professional enthusiasm with which they were delivered, and which proved so healthfully contagious. Beyond the intellectual impulse thus communicated, his frequent references to the great doctrines of Christianity, and still more the force of his inviting example, kindled to a very remarkable degree the religious spirit among the students of St. Andrews; and not a few of them—including many men who have since highly distinguished themselves—were led thereby to consecrate their lives to missionary labor.

In November, 1828, Dr. Chalmers was transferred from the chair of moral philosophy in St. Andrews to that of theology in Edinburgh. In this wider theatre he was enabled to realize all his favorite ideas as to the best methods of academical instruction, To the old practice of reading to his students a set of carefully prepared lectures he added that of regular *viva voce* examination on what was thus delivered, and introduced besides the use of text-books, communicating through them a large amount of information; and coming into the closest and most stimulating contact with his pupils, he attempted to combine the different systems pursued in the English and the Scottish universities. In the professorial chair there have been many who, with larger stores of learning, have conducted their students to greater scientific proficiency; but none have ever gone beyond him in the glowing impulse, intellectual, moral, and religious, that he conveyed into the hearts of the ardent youths who flocked around his chair; and to that spirit with which he so largely impregnated the young ministerial mind of Scotland, may, to a large extent, be traced the Disruption of the Scottish Established Church.

The leisure for literary labor which professorial life afforded was diligently improved. At St. Andrews he resumed the work which his departure from Glasgow had suspended, and in 1826 published a third volume of the *Christian and Civic Economy of Large Towns*. This was followed in 1827 by his treatise on the *Use and Abuse of Literary and Ecclesiastical Endowments*, the ablest defence of endowments in our language, a work which itself would have won celebrity for its author. For many years his chief ambition had been to complete a treatise on political economy, a science which had been a favorite one from youth. In St. Andrews, besides his ordinary course on ethics, he had opened a class for instruction in this science, and had been delighted to find how attractive it had proved. As soon as he had got through his first course of theological lectures in Edinburgh, he resumed this subject, and embodied the reflections and preparations of many years in a work on *Political Economy*, published in 1832. Many of the particular doctrines of this work have not met with general acceptance. The public mind, however, has been gradually coming round to a belief in that great truth which this volume was mainly intended to enforce,—that a right moral is essential to a right economic condition of the masses,—that character is the parent of comfort. His work on *Political Economy* was scarcely through the press, when, on invitation from the trustees of the earl of Bridgewater, Dr. Chalmers was engaged on a treatise *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, which appeared in 1833. Literary honors, such as were never united previously in the person of any Scottish ecclesiastic, crowned these labors. In 1834 he was elected fellow of the Royal Society of Edinburgh, and was soon after made one of its vice-presidents. In the same year he was elected corresponding member of the Royal Institute of France, and in 1835 the university of Oxford conferred on him the degree of D.C.L.

Hitherto Dr. Chalmers had taken but little part in the public business of the church. He had given some effective help in the prosecution of two measures—the one for the abolition of pluralities, and the other for the improvement of theological education. The death of Dr. Andrew Thomson, who had long been the able leader of the Evangelical party, and the obtaining by that party of the ascendency, called him to lead the counsels and doings of the church. One of the earliest acts of the General Assembly of 1834, the first in which the Evangelical party had the majority, was to place Dr. Chalmers at the head of a committee appointed to promote the extension of the church. In this office he had a double duty to discharge—to solicit the Government to make a grant out of the public revenue, and to stimulate the friends of the church by their own voluntary efforts to meet the spiritual necessities of the country. In both departments extraordinary efforts were made, but with very different results. The Whig

Government, insecure in its hold of power, and dependent to some extent on the political assistance of the Scottish Dissenters, could be induced to do nothing beyond appointing a committee of inquiry, which led to no practical result. It was otherwise when Dr. Chalmers appealed to the country. That appeal was made with singular ardor and eloquence. When circulars, pamphlets, and reports had done their uttermost, he made a tour through a large part of Scotland, addressing the various presbyteries and holding public meetings in the most populous districts. Year after year swelled the fund that these efforts created, till at last in 1841, when he resigned his office as convener of the Church Extension Committee, he had to announce that in seven years upwards of £300,000 had been contributed to this object, and 220 new churches had been built.

This great movement on behalf of church extension was finally checked by another in which Dr. Chalmers was destined to play a still more conspicuous part. In 1834, the General Assembly, after declaring it to be a fundamental principle of the church that "no minister shall be intruded into any parish contrary to the will of the congregation," had enacted that in every instance the dissent of the majority of the male heads of families, being communicants, should be a bar to the settlement of a minister. This Act, commonly called the Veto Law, was based upon the old constitutional practice of the "call," in which the people invited the minister to undertake the pastoral office, on which invitation alone the spiritual act of ordination was grounded. The church believed herself to possess the power of determining what kind and amount of popular concurrence was necessary before the pastoral tie was formed by ordination. She had often exercised that power to the effect of setting aside the nominee of the patron. When invited in such instances to interfere, the civil courts had refused, on the ground that the church was acting within the limits of her acknowledged authority. In other instances the civil courts had often reviewed decisions of the church courts, but only with a view of regulating the title to the benefice. But now the power of the church to pass such a law as that of the Veto was challenged, and the civil courts claimed a right not only to regulate the destination of the benefice, but to control and overrule the decisions of the church. In the parish of Auchterarder, containing a population of 3000 souls, only two individuals signed the call, while 287 out of 300 dissented; but in an action raised at the instance of the presentee, the Court of Session decided that his rejection by the church was illegal. This decision the House of Lords, on appeal to it, confirmed,—Lords Brougham and Cottenham, in delivering judgment, stating it expressly to be their opinion that in settling a minister the church had no legal right to look beyond his qualification as to "life, literature, and morals." In this decision, as involving a forfeiture of the benefice, the church acquiesced, declaring at the same time her intention, for her own spiritual objects, to interpret for herself the statutes which established her, and announcing her unaltered purpose to protect her congregations from the intrusion of unacceptable ministers. It speedily appeared that she was not to be permitted to carry out these resolutions if the Court of Session could prevent. The presbytery of Dunkeld rejected a licentiate presented by the Crown to the parish of Lethendy on the ground of his having been vetoed by the people. The Crown acquiesced and issued a new presentation. At the instance of the first presentee the Court of Session interdicted the presbytery from ordaining the second. The church ordered the presbytery to proceed with the ordination. It did so, and was summoned in consequence to the bar of the civil court, solemnly rebuked, and informed that in the next instance of such disregard by the church of the interdict of the civil court imprisonment would be the punishment. In the parish of Marnoch, with a population of 2800 souls, only one individual signed the call; an overwhelming majority dissented; but in defiance of the law of the church, and in obedience to the Court of Session, the presbytery of Strathbogie, by a majority of 7 to 3, resolved to proceed to the ordination. To prevent this ordination the church suspended the seven ministers who formed the majority. The Court of Session not only annulled that suspension and prohibited the church from intimating or executing it, but interdicted all ministers from preaching or administering any of the sacraments within any of the parishes of the seven suspended clergymen. The church held such interference as a violation of her spiritual independence, and proceeded as if no such sentence of the civil court had been passed,—many of the most distinguished ministers, Dr. Chalmers and Dr. Gordon among the rest, preaching in those parishes in the face of interdicts served on them personally. The seven suspended clergymen treated in the same way the supreme ecclesiastical authority, and on the 21st January, 1841, in opposition to an express order of the General Assembly, consummated the ordination. By the following General Assembly, these clergymen were deposed from the office of the ministry. The Court of Session immediately thereafter pronounced the deposition null and void. Other like instances occurred. The collisions between the two supreme courts became frequent and most unseemly. Matters were running into inextricable confusion. The church appealed to the Government to interfere. At first the Whigs were in power, but they declined to interfere. In 1841, Sir Robert Peel was placed at the head of a Government strong enough to have applied the remedy, and the hopes of the church were excited. Still no measure was introduced. Under the guidance of Dr. Chalmers the church pursued her course with steady unfaltering step; but she was not prepared to prolong the controversy indefinitely. Denying the right of the Court of Session to act as it had done, she freely conceded to the legislature the right of determining on what terms she held her temporalities; and if, fairly appealed to, the legislature declared that she held them on condition of rendering such obedience to the civil courts as they now required, she felt that she had no alternative but either to renounce her own principles or relinquish the temporalities. At a solemn convocation held in November, 1842, a large number of ministers signed and published a declaration that if no measure of relief were granted they would resign their livings. Up to the last, however, it was not believed that any very extensive secession would take place. In January, 1843, the Government not only refused to grant the protection the church required, but put a final and peremptory negative on her claims of spiritual independence. And in March the House of Commons did the same by a large majority,—the Scotch members, however, voting in the proportion of more than two to one in her favor. The controversy was now closed, and it remained only for those clergymen who felt that they could not with a good conscience submit to the civil restraint imposed upon the church to adopt the only expedient now left to them and retire from the Establishment. On the 18th May, 1843, 470 clergymen withdrew from the General Assembly and constituted themselves into the Free Church of Scotland, electing Dr. Chalmers as their first moderator.

For two years previous to this final step, Dr. Chalmers had foreseen the issue, and in preparation for it had drawn up a scheme for the support of the outgoing ministers. For a year or two afterwards the establishment and extension of that fund, to which the Free Church owes so much of her stability, engaged a large share of his attention. He then gradually withdrew from the public service of the church, occupying himself with his duties as principal of the Free Church College, and in perfecting his *Institutes of Theology*. In May, 1847, he was summoned before a committee of the House of Commons to give evidence regarding that refusal of sites for churches in which a few of the landed proprietors of Scotland who were hostile to the Free Church were still persisting. He returned from London in his usual health, and after a peaceful Sabbath (May 30) in the bosom of his family at Morningside, he bade them all good night. Next morning, when his room was entered and the curtains of his bed withdrawn, he was found half erect, his head leaning gently back upon the pillow, no token of pain or struggle, the brow and hand when touched so cold as to indicate that some hours had already elapsed since the spirit had peacefully departed.

During a life of the most varied and incessant activity, spent much too in society, Dr. Chalmers scarcely ever allowed a day to pass without its modicum of composition. He had his faculty of writing so completely at command that at the most unseasonable times, and in the most unlikely places, he snatched his hour or two for carrying on his literary work. He was methodical indeed in all his habits, and no saying passed more frequently from his lips than that punctuality is a cardinal virtue. His writings now occupy more than 30 volumes. He would permanently perhaps have stood higher as an author had he written less, or had he indulged less in that practice of reiteration into which he was so constantly betrayed by his anxiety

to impress his ideas upon others. It would be premature to attempt to estimate the place which his writings will hold in the literature of our country. We may briefly indicate, however, some of the original contributions for which we are indebted to him. As a political economist he was the first to unfold the connection that subsists between the degree of the fertility of the soil and the social condition of a community, the rapid manner in which capital is reproduced (see Mill's *Political Economy*, vol. i. p. 94), and the general doctrine of a limit to all the modes by which national wealth may accumulate. He was the first also to advance that argument in favor of religious establishments which meets upon its own ground the doctrine of Adam Smith, that religion like other things should be left to the operation of the natural law of supply and demand. In the department of natural theology and the Christian evidences, he ably advocated that method of reconciling the Mosaic narrative with the indefinite antiquity of the globe which Dr. Buckland has advanced in his Bridgewater Treatise, and which Dr. Chalmers had previously communicated to that author. His refutation of Hume's objection to the truth of miracles is perhaps his intellectual *chef d'œuvre*, and is as original as it is complete. The distinction between the laws and dispositions of matter, as between the ethics and objects of theology, he was the first to indicate and enforce. And it is in his pages that the fullest and most masterly exhibition is to be met with of the superior authority as witnesses for the truth of Revelation of the Scriptural as compared with the ex-Scriptural writers, and of the Christian as compared with the heathen testimonies. In his *Institutes of Theology*, no material modification is either made or attempted on the doctrines of Calvinism, which he received with all simplicity of faith as he believed them to be revealed in the Divine word, and which he defended as in harmony with the most profound philosophy of human nature and of the Divine providence.

The character of Dr. Chalmers's intellect was eminently practical. The dearest object of his earthly existence was the elevation of the common people. Poor-laws appeared to him as calculated to retard this elevation; he therefore strenuously resisted their introduction. The Church of Scotland appeared to him as peculiarly fitted to advance it; he spoke, he wrote, he labored in its defence and extension. "I have no veneration," he said to the royal commissioners in St. Andrews, before either the Voluntary or the Non-intrusion controversies had arisen, "I have no veneration for the Church of Scotland *quasi* an establishment, but I have the utmost veneration for it *quasi* an instrument of Christian good." Forcing that church to intrude unacceptable ministers, and placing her in spiritual subjection to the civil power, in his regard stripped her as such an instrument of her strength, and he resolutely but reluctantly gave her up.

It is as a mover of his fellow-men, as the reviver of evangelistic feeling in Scotland, and as a leader in the great movement which terminated in the erection of the Free Church, that Dr. Chalmers will fill the largest place in the eye of posterity, and occupy a niche in the history of Scotland and of the church. Various elements combined to clothe him with public influence —a childlike, guileless, transparent simplicity, the utter absence of everything factitious in matter or manner—a kindliness of nature that made him flexible to every human sympathy—a chivalry of sentiment that raised him above all the petty jealousies of public life—a firmness of purpose that made vacillation almost a thing impossible, a force of will and general momentum that bore all that was movable before it—a vehement utterance and overwhelming eloquence that gave him the command of the multitude, a scientific reputation that won for him the respect and attention of the more educated—the legislative faculty that framed measures upon the broadest principles, the practical sagacity that adapted them to the ends they were intended to realize—the genius that in new and difficult circumstances could devise, coupled with the love of calculation, the capacity for business details, and the administrative talent that fitted him to execute—a purity of motive that put him above all suspicion of selfishness, and a piety unobtrusive but most profound, simple yet intensely ardent. (W. HA.)

CHALONER, Sir Thomas (1515–1565), a statesman and poet, of a noble Welsh family, was born in 1515. Under Henry VIII. he was sent as ambassador to Charles V., whom he accompanied on his unfortunate expedition against Algiers in 1541. On his return he was appointed to the office of first clerk of the council. He gained the friendship of the duke of Somerset; but after his fall he was obliged to live in retirement, and during the reign of Mary his Protestantism still kept him from the court. On the accession of Elizabeth he was received into high favor, and appointed ambassador, first to the Emperor Ferdinand I., and then to the court of Spain, where, however, he found himself so uncomfortable that after three years' stay he obtained permission to return home in 1564. He died the following year. Chaloner enjoyed considerable reputation as a poet, and left *Poetical Works*, *De Republica Anglorum Instauranda*, *the Praise of Folie* (from the Latin of Erasmus), *In Laudem Henrici Octavi Carmen Panegyricum*, the *Office of Servants* (from the Latin of Cognatus), and some other small pieces.

CHALON-SUR-SAONE, a town of France, capital of an arrondissement in the department of Saône-et-Loire, 81 miles by rail north of Lyons. It is a neat and well-built town, situated in an extensive plain on the right bank of the Saône, at the junction of the Canal du Centre, and connected by a fine stone bridge with the suburb of St. Laurent on an island in the river. Its principal buildings are the cathedral of St. Vincent, a Gothic edifice of the latter part of the 14th century, on the site of a church founded about 532; the church of St. Pierre, with two lofty steeples; the hospitals of St. Laurent and St. Louis; the town hall, the market, and the courthouse. An obelisk was erected in the 18th century to commemorate the opening of the canal. There are tribunals of primary instance and commerce, an exchange, a communal college, a school of design; a public library, and societies for agriculture, history, archæology, and arts. The industrial establishments are extensive and various, comprising docks, flour-mills, sugar factories, glass-works, distilleries, breweries, and tile-works; and the transient trade, both with the north and south of France, is of the greatest importance. There is also manufactured in the town the *essence d'orient*, a preparation from the scales of the bleak (*Cyprinus alburnus*), employed in the fabrication of mock pearls.

Châlon-sur-Saône is identified with the ancient *Cabillonum*, originally a town of the Ædui. It was chosen in the 6th century by Gontram, king of Burgundy, as his capital; and it continued till the 10th to pay for its importance by being frequently sacked. The bishop, first appointed in the 4th century, obtained the title of count in the 12th, and retained it to the Revolution. In its modern history, the most important fact is the service the town rendered in the defence of the French territory in 1814, by keeping in check a division of the Austrian army. Population in 1872, 20,055.

CHALONS-SUR-MARNE, a town of France, capital of the department of Marne, is situated mainly on the right bank of the river, here crossed by a fine stone bridge, 107 miles E. of Paris on the railway to Strasburg, and 25 S. of Rheims by another line, in 48° 57′ 21″ N. lat. and 4° 21′ 27″ E. long. It occupies a considerable area for its population, and is rather irregularly laid out; many of its streets are broad, and it has fine public walks. Among its principal buildings may be mentioned the cathedral of St. Etienne, originally founded in the 12th century on the site of an earlier church, but in several portions dating only from the 17th; the churches of Nôtre Dame, St. Alpin, St. Jean, and St. Louis, belonging respectively to the 12th, 13th, 14th, and 15th centuries; the town-house, which was erected in 1771; the prefecture, formerly the palace of the count of Artois; the barracks of St. Pierre, on the site of the Benedictine abbey; the public library; and the industrial school. The town is the seat of a bishopric, and has tribunals of primary instance and commerce, a communal college, two theological seminaries, a normal school, a theatre, a museum, a botanical garden, and societies of agriculture, commerce, arts, and sciences. To the east of the town lies a large public park of 19 acres, known as the Jard, which was stripped of its trees during the war of 1870–1; and beyond the river is the church of St. Prudenticnne, annually in the month of May the rendezvous of about 50,000 pilgrims. Châlons has long been an important industrial centre. As early as the 14th century, it was famous for its woollen cloth, which was known by the name of the town, afterwards corrupted into "shalloon;" and in the 18th it maintained an extensive manufacture of linen goods of various kinds. Besides these industries, it now carries on tanning and shoemaking, and the manufacture of cotton cloth and hosiery, while at the same time it is one of the principal seats of the champagne wine trade. The annual export amounts on an average to 1,000,000 bottles, and the cellars of Jacquesson et Fils have storage room for 3,000,000. About six miles east of the town is the beautiful church of Nôtre Dame de l'Epine, which was built in the 15th century, and restored in 1860. Population in 1872, 16,436.

Châlons-sur-Marne occupies the site of the chief town of the Catalauni, which became signalized by the defeat of Attila in the terrible conflict of 451. In 643 it was laid waste by Her-

bert of Vermandois, in 931 by Ralph of Burgundy, and in 947 by Robert of Vermandois; but in the four following centuries it attained great prosperity as a kind of independent state under the supremacy of its bishops, who held a most influential position in the kingdom, and obtained the title of grand-vassals of the crown. In 1214 the men of Châlons appeared in the first rank in the battle of Bouvines; and in the 15th century their descendants maintained their honor by twice (in 1430 and 1434) repulsing the English from their walls. In the 16th century the town sided with Henry IV., who in 1589 transferred thither the parliament of Paris, which shortly afterward was bold enough to burn the bulls of Gregory XIV. and Clement VIII. In 1814 the Prussians took possession of the town after the expulsion of Macdonald, and in 1815 it was captured by Chernicheff. In 1856 Napoleon established a large camp, known as the Camp of Châlons, about 16 miles north of the town by the railway to Rheims. It was situated in the immediate neighborhood of Grand Mourmelon and Petit Mourmelon, and occupied an area of 12,000 hectares or 29,650 acres. The troops were principally accommodated in tents, but also partly in wooden barracks. At the outbreak of the Franco-German war, the camp was occupied by the sixth army corps, under Canrobert, and it was afterwards held by MacMahon. On the 22d August, 1870, the town of Châlons was occupied by the Prussians, and in the course of the war it formed an important point of communication.

CHALOTAIS. See La Chalotais.

CHALYBÄUS, Heinrich Moritz (1796–1862), a distinguished German writer on philosophy, was born on the 3d July, 1796. The facts of his life are few and unimportant. For some years after completing his university education he acted as lecturer in the Kreuz-Schule at Dresden, and while there his lectures on the history of philosophy in Germany, delivered before large audiences, drew attention to his rare merits as a thinker and writer. In 1839 he was called to a Professorship in Kiel University, where, with the exception of one brief interval, he remained till his death on 2d September, 1862. His first published work, *Historische Entwickelung der spekulativen Philosophie von Kant bis Hegel*, 1837, was extremely popular, and still retains its place as one of the best and most attractive expositions of modern German thought. It has been twice translated into English, by Tulk in 1854, and by Edersheim in 1860. His other writings are *Phänomenologische Blätter*, 1841; *Die moderne Sophistik*, 1843; *Entwurf eines Systems der Wissenschaftslehre*, 1846; *System der spekulativen Ethik*, 2 vols., 1850; *Philosophie und Christenthum*, 1853; *Fundamental-Philosophie*, 1861. Of these the most important are the *Wissenschaftslehre* and the *Ethik*. Chalybäus's general principle may be named Ideal Realism. He opposes both the extreme realism of Herbart and what he calls the one-sided idealism of Hegel, and endeavors to find a mean between them, to discover the ideal or formal principle which unfolds itself in the real or material world presented to it. His *Wissenschaftslehre*, accordingly, divides itself into three parts,—*Principlehre*, or theory of the one principle; *Vermittelungslehre*, or theory of the means by which this principle realizes itself; and *Teleologie*. The most noticeable point is the position assigned by Chalybäus to the "World Ether," which is defined as the infinite in time and space, and which, he thinks, must be posited as necessarily coexisting with the Infinite Spirit or God. The *System der Ethik* is perhaps the richest and most thorough-going modern work on moral philosophy. The fundamental principle is carried out with great strength of thought, and with an unusually complete command of ethical material. A brief but satisfactory account of Chalybäus will be found in Erdmann, *Grundriss der Geschichte der Philosophie*, ii. 781–786.

CHÁMBÁ, a feudatory state of Northern India, subordinate to the Punjab Government, situated between 32° 10′ and 33° 9′ N. lat., and between 75° 54′ and 76° 30′ E. long. Chámbá is bounded on the N. by a range of mountains, separating it from the province of Zaskár in Kashmír; on the E. by the outlying British *parganás* of Bangáhal and Lahaul, belonging to Kángra district; on the S. by mountain ranges which separate it from the Kángra valley; and on the W. by the provinces of Jammu and Kistwar in Kashmír. In shape the state is an oblong, its eastern and western sides being about 65 miles in length, and its mean width about 50 miles. It is traversed from east to west by a lofty range which divides it into two distinct valleys. The northern of these valleys is drained by the Chináb, which, rising in Lahaul, passes through Chámbá into Kashmír territory, having a general direction from south-east to north-west. The southern valley is drained by the Rávi, of which one head is in Chámbá territory, and the other in Bangáhal. The two branches unite a short distance below Barmur in Chámbá. The river then flows eastwards till close to Dalhousie it turns southwards, and after forming the boundary of the state for some distance, enters the plains of the Punjab. The estimated population of the state is 140,000 souls, and the estimated gross revenue, £18,937. The annual tribute payable to the British Government is £500. Owing to the abdication of the late rájá and the succession of his son, a lad of seven years of age, the administration of the state passed under the direct control of the British Government in 1872–73, an arrangement which will continue during the minority of the young chief. The only towns in the state are Chámbá and Barmur situated on the Rávi, and Kilár on the Chináb. The British sanitarium of Dalhousie is within the limits of the state, situated upon ground purchased from the chiefs. The principal agricultural products are wheat and millet; among the other products are timber, wax, nuts, honey, lime, and slate from quarries near Dalhousie. The extensive forests are leased by the British Government, and are under the management of the Punjab Forest Department.

CHAMBERLAIN (Latin *camerarius*, from *camera*, a chamber; French *chambellan*), etymologically, and also historically to a large extent, an officer who superintends the arrangement of domestic affairs. Such were the chamberlains of monasteries, and the chamberlains of cathedrals, who had charge of the finances, gave notice of chapter meetings, and provided the materials required for various services. A royal chamberlain is an officer whose function is in general to attend on the person of the sovereign, and regulate the etiquette of the palace. The Roman emperors appointed this officer under the title of *cubicularius*. During the Middle Ages, the royal chamberlain usually enjoyed the important privilege of keeping the king's signet ring; and it seems that the mayoralty of the palace, which gradually acquired such an authority as to overthrow the Merovingian dynasty in France, grew out of an office corresponding to that of the chamberlain. The chamberlain of the Pope enjoys very extensive powers, having the revenues of the church under his charge. In France, the office existed from very early times till the reign of Louis XIV., and was revived by Napoleon.

The Lord Great Chamberlain of England originally took rank after the Lord Privy Seal. The office is hereditary, and belonged at one time to the De Veres, from whom it descended by the female line into the family of Bertie. On the death of the fourth duke of Ancaster in 1777, it passed to the houses of Cholmondeley and Willoughby d'Eresby. From these families alternately a Lord Great Chamberlain is appointed on the death of the reigning monarch. The principal duties of this office are to take charge of the houses of parliament, and to attend on the sovereign at his coronation.

The Lord Chamberlain is an officer distinct from the Lord Great Chamberlain, and of greater importance, though his functions are less responsible than they were formerly. He is regarded as chief officer of the royal household; he has charge of a large number of appointments, such as those of the royal physicians, tradesmen, and private attendants of the sovereign; he is licenser of plays; and he examines the claims of those who desire to be presented at court. He is a member of the privy council, and holds office during the ascendency of the political party to which he belongs.

Many corporations appoint a chamberlain. The most important in England is the chamberlain of the corporation of the city of London, who is treasurer of the corporation, admits persons entitled to the freedom of the city, and determines disputes between masters and apprentices. He is elected annually by the liverymen.

CHAMBERS, Ephraim, an English author, was born at Kendal, Westmoreland, in the latter part of the 17th century. He was apprenticed to a globe-maker, but having conceived the plan of his *Cyclopædia*, he left this business, and devoted himself entirely to writing. The first edition of the *Cyclopædia*, which was the result of many years' intense application, appeared by subscription in 1728, in two vols. fol. It was dedicated to the king, and procured for Mr. Chambers the honor of being elected fellow of the Royal Society. In less than ten years a second edition was printed, with corrections and additions (in 1738); and

this was followed by a third a year later. In addition to the *Cyclopædia*, Mr. Chambers wrote for the *Literary Magazine*, and translated the *History and Memoirs of the Royal Academy of Sciences at Paris* (1742), and the *Jesuits' Perspective*. He died in 1740.

CHAMBERS, George (1803–1840), a marine painter, born at Whitby, Yorkshire, was the son of a seaman, and for several years he pursued his father's calling. While at sea he was in the habit of sketching the different classes of vessels. His master, observing this, gratified him by cancelling his indentures, and thus set him free to follow his natural bent. Chambers then apprenticed himself to an old woman who kept a painter's shop in Whitby, and began by house-painting. He also took lessons of a drawing-master, and found a ready sale for small and cheap pictures of shipping. Coming afterwards to London, he was employed by Thomas Horner to assist in painting the great panorama of London for the Colosseum (the exhibition building in the Regent's Park, recently demolished), and he next became scene-painter at the Pavilion Theatre. In 1834 he was elected an associate, and in 1836 a full member, of the Water-color Society. His best works represent naval battles. Two of these—the Bombardment of Algiers in 1836, and the Capture of Porto Bello—are in Greenwich Hospital. Not long before his death he was introduced to William IV., and his professional prospects brightened; but his constitution, always frail, gave way, and brought him to an early grave. He died on the 28th October, 1840. A Life of him, by John Watkins, was published in 1841.

CHAMBERS, Robert (1802–1871), author and publisher, distinguished especially for his services to popular literature, was born at Peebles on the 10th July, 1802. His parents were of the middle class, but owing to the father's misfortunes in business the family were reduced to poverty, and had to leave Peebles for Edinburgh while Robert was still young. He had before that received such an education as the parish and grammar-schools of his native place afforded, and had shown himself possessed of unusual literary taste and ability. A small circulating library in the town, and a copy of the first edition of the *Encyclopædia Britannica* which his father had purchased, furnished him with stores of reading of which he eagerly availed himself. Long afterwards he wrote of his early years—"Books, not playthings, filled my hands in childhood. At twelve I was deep, not only in poetry and fiction, but in encyclopædias."

In Edinburgh the family had a somewhat hard struggle with their straitened circumstances. Robert had been destined by a sort of tacit understanding for the church, and was placed for a time at a classical school with a view to his being sent to the university. This design had, however, to be abandoned. After enduring many hardships, and making two unsuccessful attempts to fill situations in mercantile houses in Leith, he commenced business on his own account as a bookstall-keeper in Leith Walk, on the advice of his elder brother and future partner, William. He was then only sixteen, and his whole stock consisted of a few old books belonging to his father. By slow degrees the stock was increased and the business extended. A similar but distinct concern was carried on during the same period with like success by William, and after a number of years the two brothers were united as partners in the now well-known publishing firm of W. and R. Chambers.

From the commencement of his residence in Edinburgh, Robert Chambers had shown an enthusiastic interest in the history and antiquities of the city. In frequent rambles every feature of its ancient buildings grew familiar to him, and his mind became a storehouse for all sorts of information connected with its famous persons and places. He thus found a most congenial task in the publication of the *Traditions of Edinburgh* (1823–4), which, though not his first work, was the first which brought him into general notice. It secured for him the approval, and what he doubtless valued even more highly, the personal friendship, of Sir Walter Scott, then in the zenith of his fame. Other works on kindred subjects followed in rapid succession, the most popular and important being a *History of the Rebellion of* 1745. He also wrote from time to time a number of short poetical pieces of very considerable merit, which were afterwards collected and printed for private circulation (1835). For a year or two he acted as editor of the *Edinburgh Advertiser*, a Tory newspaper of old standing, which has now ceased to appear. With commendable and characteristic prudence the bookselling business was diligently prosecuted in the midst of these numerous literary engagements, so that his life at this period was one of ceaseless activity.

In the beginning of 1832 his brother William, after consultation with him, started a weekly publication under the title of *Chambers's Journal*, which speedily attained an immense circulation, and still holds a leading place in the cheap popular periodical literature of which it was the pioneer. Robert's connection with it was at first only that of a contributor. After fourteen numbers had appeared, however, he became associated with his brother as joint-editor, and from that period he wrote for it nearly all the leading articles, which took the form of essays—moral, familiar, and humorous. Written in an easy, graceful style, entirely free from any affectation of condescension, always interesting, and carefully avoiding the debatable ground of religion and politics, they contributed more perhaps than anything else to the remarkable success of the *Journal*. A number of them were republished in 1847 in the author's *Select Writings*, and are thought to be on the whole the best specimens of his original work. Of the same character as his work for the *Journal* were his numerous contributions to the *Information for the People* and the *Miscellany of Useful and Entertaining Tracts* published by his firm.

Among the other works of which he was in whole or in part the author, the *Cyclopædia of English Literature*, the *Life and Writings of Burns*, *Ancient Sea Margins*, the *Domestic Annals of Scotland*, and the *Book of Days* were the most important. The *Cyclopædia of English Literature* contained a series of admirably selected extracts from the best authors of every period, "set in a biographical and critical history of the literature itself." The biographies were gracefully written, and the critical estimates, though brief, were just and comprehensive. For the *Life of Burns* he made diligent and laborious original investigations, gathering many hitherto unrecorded facts from the surviving acquaintances of the poet, and especially from his sister, Mrs. Begg, to whose benefit the whole profits of the work were generously devoted. The poems are interwoven into the narrative in their proper chronological order, and with all the information that could be obtained as to the circumstances of their composition. In connection with the work on *Ancient Sea Margins*, it may be mentioned that its author ranked high as a scientific geologist, and that he had availed himself of tours in Scandinavia and Canada for the purpose of geological exploration. His knowledge of geology was one of the principal grounds on which the authorship of the celebrated anonymous work, *The Vestiges of the Creation*, was very generally attributed to him. As, however, neither he himself nor any one entitled to speak for him ever acknowledged the work, its authorship remains a mystery. The *Book of Days* was his last publication, and perhaps his most elaborate. Help on which he had depended having failed him, he was left to do the work almost alone, and it is supposed that his excessive labor in connection with it hastened his end. He died at St. Andrews, where he had built a pleasant residence for himself several years previously, on the 17th March, 1871. Two years before his death the university of St. Andrews had conferred upon him the degree of Doctor of Laws, in consideration of his distinguished literary merit, and he was a fellow of several learned societies. As a writer Chambers possessed in very harmonious combination most of the qualities which form the basis of a sound and lasting popularity. Few even of popular authors ever possessed in a higher degree the faculty of interesting without resorting to sensation, of amusing without stooping to frivolity, and of instructing without assuming superiority. Few have done more than he for the illustration of Scottish life and character, and for the preservation of what was curious in Scottish tradition and antiquities. But it will always be his highest claim to distinction that he did as much as, if not more than, any other single man to give a healthy tone and a pure moral influence to the cheap popular literature which has become so important a factor in modern civilization. An interesting account of the life of Robert Chambers by his brother appeared in 1872, under the title, *Memoir of Robert Chambers: With Autobiographic Reminiscences of William Chambers*. (W. B. S.)

CHAMBERSBURG, a town of the United States, the capital of Franklin county, Pennsylvania, is situated about 135 miles west of Philadelphia, in a populous district in the great limestone valley that extends along the east side of the Blue Mountains. It has a court-house, a national bank, ten churches, and a Presbyterian college for young ladies; and it manufactures cotton, wool, paper, and iron. In 1864 a large part of the town was burned by the Confederates under Early. Population in 1870, 6308.

CHAMBÉRY (in Italian CIAMBERI), a city of France, capital of the department of Savoy, pleasantly situated in a fertile district, between two hills, on the rivers Laisse and Albana, 46 miles S.S.W. of Geneva. The town, however, is irregularly and ill built, and has only two good streets—the Place Saint-Léger and the Rue de Boigne, of which the latter is named after a General Boigne who left a fortune of 3,400,000 francs to the town. The principal edifices are the cathedral, dating from the 14th and 15th centuries; the Hotel-Dieu, founded in 1647; the castle, a modern building serving as a prefecture, and preserving only a great square tower belonging to the original structure; the palace of justice, the theatre, the barracks, and the covered market, which dates from 1863. Several of the squares are adorned with fountains; the old ramparts of the city, destroyed during the French Revolution, have been converted into public walks; and various promenades and gardens have been constructed. Chambéry is the seat of an archbishop, and of a superior tribunal; and has also a Jesuit college, a royal academical society, a society of agriculture and commerce, a public library, with 20,000 vols., a museum, a botanic garden, and many charitable institutions. It manufactures silk-gauze, lace, leather, and hats, and has a considerable trade in liqueurs, wine, lead, copper, and other articles. Overlooking the town is the Rock of Lemenc, which derives its name from the *Lemincum* of the Romans; and in the vicinity is Charmettes, for some time the residence of Rousseau.

The origin of Chambéry is unknown, but its lords are mentioned for the first time in 1029. In 1232 it was sold to the count of Savoy, Thomas I., who bestowed several important privileges on the inhabitants. As capital of the duchy of Savoy, it has passed through numerous political vicissitudes. From the middle of the 16th century to 1713 it was in the hands of the French; in 1742 it was captured by a Franco-Spanish army; and in 1792 it was occupied by the Republican forces. Restored to the house of Savoy by the treaties of Vienna and Paris, it was again surrendered to France in 1860. Among the famous men whom it has given to France, the most important are Vaugelas, Saint-Réal, and the brothers Joseph and Xavier de Maistre. Population of the town in 1872, 17,331, and of the commune, 19,144.

CHAMBORD, a magnificent Gothic château of France, in the department of Loire-et-Cher, 10 miles east of Blois, on the left bank of the Cosson. It was commenced by Francis I. in 1532, carried on by Henry II., and at length finished by Louis XIV. It is built of black stone, with a profusion of towers, turrets, and minarets, and the interior is fitted up with great magnificence. The park is enclosed by walls seven leagues in circumference. The castle is famous as the residence of Diana of Poitiers, and of Stanislaus, king of Poland, whose son-in-law, Louis XV., bestowed it upon Marshal Saxe. It was given by Napoleon to Marshal Berthier, from whose widow it was purchased by subscription in 1821, and presented to the duke of Bordeaux, the representative of the older branch of the Bourbons, who has assumed from it the title of Count de Chambord.

CHAMELEON, the common name of a well-defined family of Lizards, forming the tribe *Dendrosaura*, and containing the single genus *Chamæleo*, which includes about twenty known species, bearing a close family resemblance to each other, and differing very widely from all other lizards. They are small creatures, not usually exceeding 7 inches in length exclusive of the tail, which in general is as long as the body. The body is greatly compressed, often with a crest—toothed or otherwise—along the back and belly, and the skin is covered with granular specks, giving it the appearance of shagreen. The large pyramidal head is supported by a short neck composed of five vertebræ, instead of eight, as in the majority of saurians; and there is no true sternum, although the anterior ribs are joined to the mesial line, which thus takes the place of a breast-bone, while the ribs which follow are so connected together as to form a bony circle for the protection of the abdominal region. Unlike other lizards, the chameleon has the body raised high on its legs, and the toes, which are five in number on both posterior and anterior limbs, are divided into two opposable groups or bundles, closely resembling those of a parrot, and equally serving the purpose of prehension. The tail, by the greater thickness of which at the base the male is distinguishable from the female, is also prehensile, and is of the greatest service in giving support and security to the climbing chameleon. The lungs are large, and are connected with air-vessels distributed throughout the body, by the inflation of which a certain transparency is given to the body, as well as a plumpness which at once disappears on their collapse, and this, together with the fact that the chameleon can live apparently in a thriving condition for weeks without food, seems to have given rise to the ancient belief that this singular creature lived on air. The eyes of the chameleon are large, globular, and covered with a circular disk formed by the junction of the two lids and having a central aperture which acts as an external pupil, being capable of dilatation or contraction at will. In moving, the eyes act independently of each other, so that while the one stares upwards the other may be eagerly following the motions of an insect beneath, or the one may even be directed backwards while the other watches in front. This extraordinary range of vision amply compensates for the small degree of mobility in the neck and the general slowness of motion characteristic of the chameleon. The tongue is equally remarkable, being subcylindrical, worm-like, and extremely extensile, with the end somewhat enlarged and hollow, and supplied with a glutinous secretion. It is by means of this organ, which is capable of being protruded to a length of six or seven inches, that chameleons obtain their food. They are arboreal in their habits, supporting themselves on the branches of trees by their grasping hand-like feet and prehensile tails. In their movements they are slow and deliberate, and when watching for the insects which form their sole food, they remain motionless for hours, partly concealed by the foliage, and still more by the exercise of the faculty which they possess above all other creatures of changing their color so as to resemble surrounding objects. Their power in this direction has, however, been greatly exaggerated. They cannot, as was at one time supposed, assume in succession all the colors of the rainbow; but under certain conditions, by no means well ascertained, their normal bluish ash color may give place to a green or yellowish hue, with irregular spots of a dull red, or it may become considerably paler so as to approach to whiteness. Thus an observer reports recently that he saw a chameleon making its way along the top of an old wall near Ephesus, the stones of which were of a dark color, occasionally varied by a block of white marble, and he noticed that no sooner did the creature rest on one of the latter than it gradually became less visible, owing evidently to its assumption of a color somewhat harmonizing with the marble on which it rested. This curious phenomenon was observed by the earliest writers on natural history, and gave rise to much speculation. Aristotle held that the change of color only took place when the chameleon was inflated with air, to which therefore it was owing; Pliny that its varying colors were borrowed from surrounding objects; while Wormius was the first to attribute those variations to the play of the emotions and passions; but Milne Edwards, in a paper published in the *Annales des Sciences*, showed that, whatever the exciting cause of these changes in color, whether due to the emotions, the inflation of the lungs, or exposure to the sun's rays, they were rendered possible only by the presence in the skin of the chameleon of two layers of differently-colored pigment, placed one over the other, and so arranged that both may appear simultaneously on the surface, or the one may be displaced to a greater or less extent by the other, the color varying with the amount of such displacement. Thus protected by its coloring, the chameleon awaits the coming of its prey, and no sooner does an insect place itself within reach of its worm-like tongue than that organ, leaping forth from its sheath with lightning speed, fixes its victim on the glutinous tip, which is forthwith engulphed with equally astonishing rapidity. The eggs of the chameleon are deposited under leaves on the ground. They are numerous, round, and covered with an exceedingly porous shell formed of calcareous matter. The species composing the family are inhabitants chiefly of Africa and the islands adjacent

notably of Madagascar, to which about a third of all the known species are confined. The latter include such curious forms as the Rhinoceros Chameleon, the male of which has a horn-like tubercle at the end of the muzzle; also a form recently described by Günther, in which the tail is so short as to be almost useless for prehension, a defect which seems compensated for by the presence of an additional denticle at the inner base of each claw, and of a spine projecting from the side of each finger and toe, which must add greatly to the creature's prehensile power. Owing to this peculiarity Günther proposes to make it the type of a new genus (*Proceedings of the Zoological Society*, 1874). Fernando Po is the home of the Three-Horned Chameleon (*Chamæleo Oweni*), which has a long conical horn over each eye, and another at the extremity of the muzzle; but the best known and most widely distributed species is the Common Chameleon (*C. vulgaris*), found in Southern Asia and the north of Africa, and naturalized in the southern countries of Europe. It is often brought to England, but owing to the coldness of the climate it exists there in a more or less torpid condition, and soon dies.

CHAMFORT, Nicolas (1741–1794), one of the most famous talkers of a century rich in conversational excellence, was born at a little village near Clermont in Auvergne. The illegitimate child of a *dame de compagnie*, he never knew his father, and started in life as plain Nicolas, that being the name bestowed on him by his mother. A journey to Paris resulted, through some now unknown influence, in the boy's obtaining a bursary at the Collége des Grassins. He worked hard, and won nine prizes out of ten in two years. It is significant of his cynical and original turn of mind that he should have been the only critic disposed to be severe on the Latin hexameters that crowned his college reputation, and that in after years he should have regarded as wasted the time bestowed on the acquisition of academical knowledge, his opinion of which is expressed in one of his most contemptuous epigrams—"*Ce que j'ai appris je ne le sais plus; le peu que je sais je l'ai deviné.*" After this success the future king of the *salons* ran away from college, in company with two class-mates, on a voyage round the world. The three rovers reached Cherbourg, and there reflected. They returned, and Chamfort became an abbé. "*C'est un costume et non point un état,*" he said; and to the principal of his college who promised him a benefice, he replied that he would never be a priest, inasmuch as he preferred honor to honors—"*j'aime l'honneur et non les honneurs.*"

About this time he assumed that name of Chamfort he was afterwards to render famous, and plunged hap-hazard into the press for literary work and renown. He met with scant success. Repulsed by editors and booksellers alike, he took to making sermons at a louis each for an incompetent brother; and in this way, scribbling now and then for the journals, he contrived to exist for a whole year. A successful competition for one of the Academy's prizes opened to him the drawing-rooms of the upper world, and he became fashionable. His health and constitution were exceedingly vigorous; but his passions were violent, he lived hard, and he presently had to seek rest and recovery at Spa and elsewhere. In a second competition he was unsuccessful; but a comedy of little merit, *La Jeune Indienne*, made some noise, and consoled him for his failure. He was always poor. Though his was already a well-known name, he lived on eleemosynary dinners and suppers, repaying countenance and sustenance with his *bons mots*. Madame Helvétius entertained him at Sèvres for some years. Chabanon, however, gave up to the destitute wit his pension of 1200 livres on the *Mercure de France*, and about the same time Chamfort took two more Academy prizes for his eulogies on Molière and on La Fontaine, by which he also won a hundred louis from Necker, and obtained an enormous reputation. And as he wrote little and talked a great deal, his reputation increased, till, under protection of the Duchesse de Grammont, he went to court. His poor tragedy, *Mustapha et Zeangir*, was played at Fontainebleau before Louis XVI. and Marie Antoinette; the king added 1200 livres to the gift of Chabanon, and the Prince de Condé made Chamfort his secretary. The man was then some forty years of age; he was fast growing misanthropical; he was "*gai mais ombrageux;*" he was a Bohemian naturally and by habit. He resigned his post in the prince's household, and retired into solitude at Auteuil. There, comparing the authors of old with the men of his own time, he uttered the famous *mot* that proclaims the superiority of the dead over the living as companions; and there too he presently fell in love. The lady, attached to the household of the Duchesse de Maine, was forty-eight years old, but clever, amusing, a woman of the world; and Chamfort married her. They left Auteuil, and went to Vaudouleurs, near Etampes, where in six months Madame Chamfort died. The widowed epicurean travelled, lived in Holland for a space with M. de Narbonne, and returning to Paris received the Academy arm-chair left vacant by the death of Sainte-Pelaye in 1781. He haunted the court, and made himself loved in spite of the reach and tendency of his unalterable irony; but he quitted it for ever after an unfortunate and mysterious love affair, and was received into the house of M. de Vaudreuil. Among the many men of mark assembled round him there by his fine faculty of pregnant speech, he made the acquaintance and gained the friendship of Mirabeau, whom he assisted with orations, and whom he followed heart and soul into the storm and tumult of the young Revolution.

He forgot his old friends ("*ceux qui passent la fleuve des révolutions ont passé la fleuve de l'oubli*"); he frequented the clubs, and for a time was secretary of that of the Jacobins; he became a street-orator; he entered the Bastille among the first of the storming party; he worked for the *Mercure de France*, a royalist print in which he depreciated kingship. With the reign of Marat and Robespierre, however, his uncompromising Jacobinism grew critical, and with the fall of the Girondins his political life came to an end. But he could not restrain the tongue that had made him famous; he no more spared the Convention than he had spared the Court. His notorious republicanism failed to excuse the sarcasms he lavished on the new order of things; and denounced by an assistant in the *Bibliothèque Nationale*, to a share in the direction of which he had been appointed by Roland, he was taken to the Madelonnettes. Released for a moment, he was threatened again with arrest; but to this brilliant free-lance of thought captivity had been intolerable, and he had determined to prefer death to a repetition of the moral and physical restraint to which he had been subjected. He attempted suicide, with pistol and with poniard; and, horridly hacked and shattered, dictated to those who came to arrest him the well-known declaration—"*Moi, Sebastien-Roch-Nicolas Chamfort, declare avoir voulu mourir en homme libre plutôt que d'être conduit en esclave dans une prison*"—which he signed in a firm hand and in his own blood. He did not die at once, but lingered on a while in charge of a gendarme, for whose wardship he paid a crown a day. To the Abbé Sieyès Chamfort had given fortune in the title of a pamphlet ("*Qu'est-ce que le Tiers-État? Tout. Qu'a-t-il? Rien*"), and to Sieyès did Chamfort retail his supreme sarcasm, the famous "*Je m'en vais enfin de ce monde où il faut que le cœur se brise ou se bronze.*" The maker of constitutions followed the dead wit to the grave.

The writings of Chamfort, which include comedies, political articles, literary criticisms, portraits, letters, and verses, are colorless and uninteresting in the extreme. As a talker, however, he was of extraordinary force. His *Maximes et Pensées*, highly praised by John Stuart Mill, are, after those of La Rochefoucauld, the most brilliant and suggestive sayings that have been given to the modern world. The aphorisms of Chamfort, less systematic and psychologically less important than those of the ducal moralist, are as significant in their violence and iconoclastic spirit of the period of storm and preparation that gave them birth as the *Réflexions* in their exquisite restraint and elaborate subtlety are characteristic of the tranquil elegance of their epoch; and they have the advantage in richness of color, in picturesqueness of phrase, in passion, in audacity. Sainte-Beuve compares them to "well-minted coins that retain their value," and to keen arrows that "*arrivent brusquement et sifflent encore.*" An edition of his works—*Œuvres complètes de Nicolas Chamfort*, 5 volumes—was published at Paris in 1824–25. A selection—*Œuvres de Chamfort*—in one volume, appeared in 1852, with a bibliographical and critical preface by Arsène Houssaye, reprinted from the *Revue des Deux Mondes*. See also Sainte-Beuve, *Causeries de Lundi*. (W. E. H.)

CHAMISSO, Adalbert von (1781–1838), poet, botanist, and voyager, was by family, birth, and the education of childhood, a Frenchman, by his after-life, his

marriage, and his literary activity, a German. He was born in 1781 at the castle of Boncourt in Champagne, and traced his descent from a respectable line of French knights, who derived their title from the ancient town of Chamesson or *Cambisonum*, near Châtillon-sur-Seine. The quiet home-life at Boncourt was broken up by the Revolution in 1790, and the Chamissos, parents and children, were forced, like so many of their rank, to leave their country, and find such footing as might chance in a foreign land. And though in after years the main part of the family was permitted to settle again on their native soil, several of the younger members were left behind, where they had begun to take root. Of these was Adalbert, who had in 1796 obtained a situation as page to the queen of Prussia, and in 1798 entered the military service with the rank of ensign. To his professional studies he devoted himself with ardor, and he attracted the royal attention by some of his writings; but in the society of his comrades he was made bitterly to feel that he was not regarded as one of themselves, and it was not altogether with regret that he found himself in 1806 set free from the army. Meanwhile he had formed a friendship with several congenial spirits, such as Hitzig, Varnhagen von Ense, and Neumann; and with the last two he joined in the publication of the *Musenalmanach*, which first appeared in 1803. A visit to Madame de Stael at Coppet was a pleasing interruption to his ordinary course of life, and has afforded the reader of his letters some amusing descriptions of that eccentric woman, who alternately flattered Chamisso for his ability and scolded him soundly for his inattention to etiquette. The study of botany, which he began at Coppet, was prosecuted with so much persistence and success that it became his professional subject. In 1815 he was chosen botanist of the expedition for the circumnavigation of the world, which was originated by Romanzoff, and conducted by Kotzebue; and on his return in 1818 he was appointed custodian of the botanical gardens at Berlin. Much to his own advantage and comfort, he obtained the hand of Antonie Piaste, a young lady of eighteen years; and the rest of his life was spent in steady professional labor, relieved by kindly intercourse with an increasing circle of friends. Among those with whom he became acquainted were August Neander, Freiligrath, and Andersen.

It cannot be said of Chamisso, as he himself affirmed of Heine, that he was a poet to the very tips of his fingers; but the poetic element in his nature was genuine and strong, and, in spite of the unfavorable circumstances of his life, his tendency towards literary expression was very early displayed. In estimating his success as a writer, it should not be forgotten that he was cut off from his native speech and from his natural current of thought and feeling. None of his works perhaps can be called great; but he has none the less enriched his adopted language with several poems of undisputed and enduring value. He often deals with gloomy and sometimes with ghastly and repulsive subjects; and even in his lighter and gayer productions there is too frequently an undertone of sadness or of satire. In the lyrical expression of the domestic emotions he displays a fine felicity, and he knows how to pour true pathos into a tale of love or vengeance. The "Lion's Bride"—*Die Löwenbraut*—may be taken as a sample of his weird and powerful simplicity; and "Retribution"—*Vergeltung*—is remarkable for a pitiless precision of treatment. The "Song of Women's Devotion"—*Ein Lied von der Weibertreue*—might find a place in the *Ingoldsby Legends;* and "Cousin Anselmo"—*Vetter Anselmo*—is worthy to rank with the ballads of Southey. Of more celebrity perhaps than any of his poems is the little prose narrative of *Peter Schlemihl*, the man who lost his shadow, which first appeared in 1814, and was soon afterwards translated into several European languages. It was written partly to divert his own attention from gloomier thoughts, and partly to afford amusement to the children of his friend Hitzig; and the plot was suggested by a casual question of Fouqué's. First and prominently a genuine story such as children love, with full allowance of incident and fun, it is also to the older and sympathetic reader an allegory only too accurate of the poet's own life. For full details see the *Leben und Briefe*, by Hitzig, in the fifth and sixth volumes of Chamisso's *Werke*.

Works.—*Uebersicht der nützbarsten und schädlichsten Gewächse in Norddeutschland*, 1827; *Reise um die Welt; Bemerkungen und Ansichten auf einer Entdeckungsreise unter Kotzebue*, 1827; *Ueber die Hawaiische Sprache*, 1837.

CHAMOIS (*Rupicapra tragus*), the *Gemse* of the Germans, is the only Antelope found in Western Europe, and forms the type of the Rupicaprine or goat-like group of that family. It resembles the roebuck in size, being about 3 feet long and 2 feet high at the shoulders, and is specially characterized by the form of its horns. These are from 6 to 8 inches long, of a black color, slender, round, and slightly striated, rising perpendicularly from the forehead, and suddenly hooked backwards at their extremities. They are common to both sexes, although in the female they are less uncinated. The body is covered with long hair of a chestnut brown color in winter, when it is also longest, that of the head being paler, with a dark brown streak on each side. At other seasons the color is somewhat lighter, in spring approaching to grey. Underneath the external covering the body is further protected from the cold by a coat of short thick wool of a greyish color. The tail is short and black, the ears pointed and erect; the hoofs are solid, with the outer edges higher than the soles, and are thus admirably adapted for laying hold of the slightest projection or roughness on the face of the rocky precipices it frequents. The chamois is gregarious, living in herds of 15 or 20, and feeding generally in the morning or evening. The old males, however, live alone except in the rutting season, which occurs in October, when they join the herds, driving off the young males, and engaging in fierce contests with each other, that often end fatally for one at least of the combatants. The period of gestation is twenty weeks, when the female, beneath the shelter generally of a projecting rock, produces one and sometimes two young. They are said to attain the age of thirty years. The chamois inhabits the Alpine regions of Central Europe from the Pyrenees to the Caucasus, and extends eastwards as far as Persia, frequenting the wildest and most inaccessible peaks and ravines of these mountain ranges. In summer it ascends to the limits of perpetual snow, being only outstripped in the loftiness of its haunts by the ibex; and during that season it shows its intolerance of heat by choosing such browsing grounds as have a northern exposure. In winter it descends to the wooded districts that immediately succeed the region of glaciers, and it is there only that it can be successfully hunted. Chamois are exceedingly shy; and their senses, especially those of sight and smell, are exceedingly acute. The herd never feeds without having a sentinel posted on some suitable prominence to give timely notice of the approach of danger; this is done by stamping on the ground with the fore feet, and uttering a shrill whistling note, which puts the entire herd on the alert. No sooner is the object of alarm scented or seen than each one seeks safety in the most inaccessible situations, which are often reached by a series of astounding leaps over crevasses, up the faces of seemingly perpendicular rocks, or down the sides of equally precipitous chasms. The chamois will not hesitate, it is said, thus to leap down 20 or even 30 feet, and this it effects with apparent ease by throwing itself forward diagonally and striking its feet several times in its descent against the face of the rock. Chamois-shooting is most successfully pursued when a number of hunters form a circle round a favorite feeding ground, which they gradually narrow; the animals, scenting the hunters to windward, fly in the opposite direction, only to encounter those coming from leeward. Chamois-hunting, in spite of, or perhaps owing to, the great danger attending it, has always been a favorite pursuit among the hardy mountaineers of Switzerland and Tyrol, as well as of the amateur sportsmen of all countries, with the result that the animal is now much rarer than formerly. In certain parts of Switzerland it now enjoys a close season; thus in the Canton of Grisons it can only be hunted during September, and there in 1874 no fewer than 918 were killed during that period, the largest number shot by one sportsman being 16. The chamois feeds in summer on mountain herbs and flowers, and in winter chiefly on the young shoots and buds of the fir and pine trees. It is particularly fond of salt, and in the Alps sandstone rocks containing a saline impregnation are often met with hollowed by the constant licking of these creatures. The skin of the chamois is very soft; made into leather it was the original *shammy* which is now made, however, from the skins of many other animals. The flesh is prized as venison. The chamois

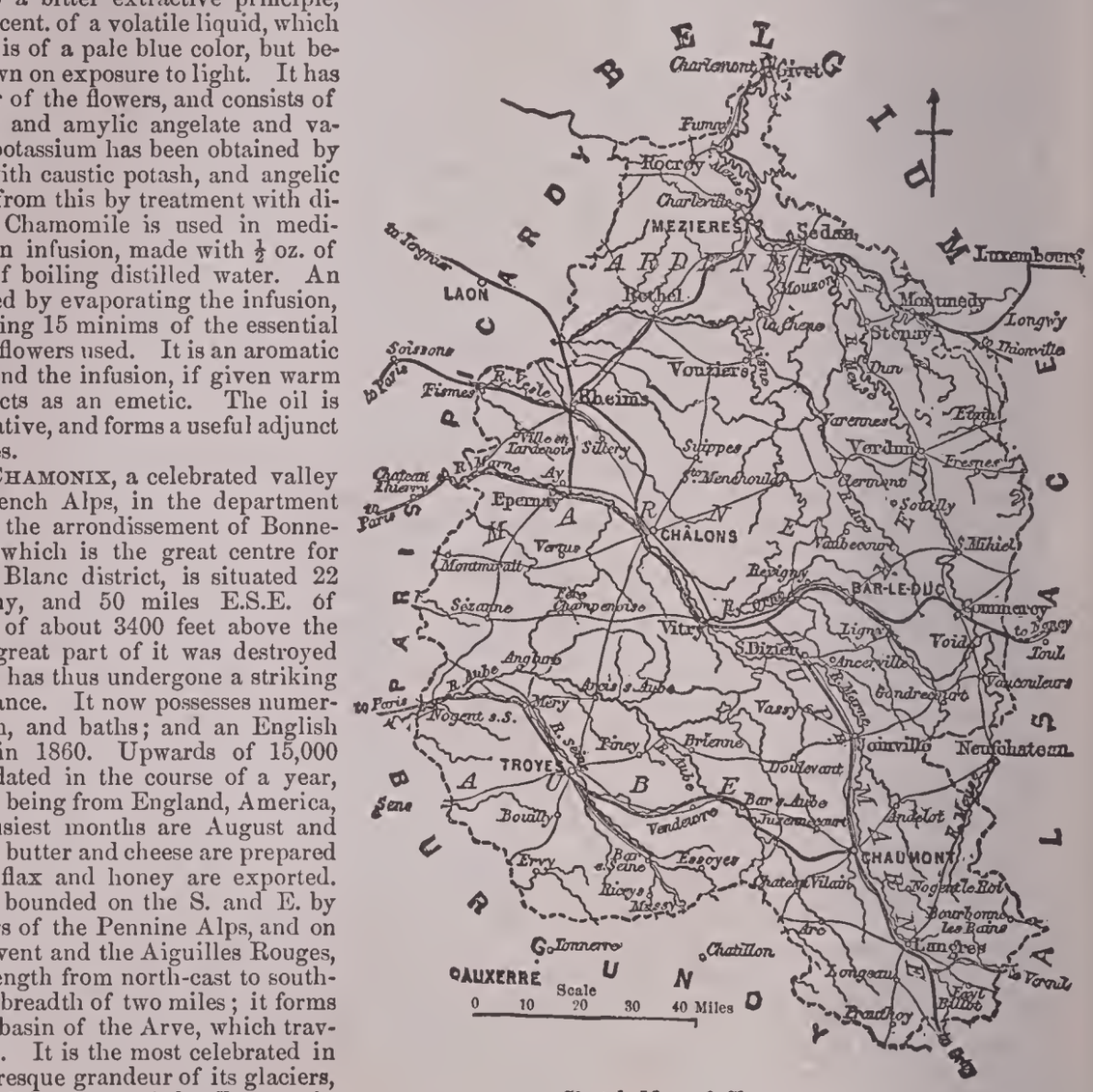
can be at least partially tamed, and in that state, according to Major Smith, it evinces all the mixture of impudence, timidity, and curiosity observed in goats.

CHAMOMILE, or CAMOMILE FLOWERS, the *flores anthemidis* of the *Pharmacopœia*, are the capitula or flower-heads of *Anthemis nobilis* (Nat. Ord. *Compositæ*), a plant indigenous to England and Southern Europe. It is extensively cultivated for medicinal purposes in Surrey, at several places in Saxony, and in France and Belgium,—that grown in England being much more valuable than any of the foreign chamomiles brought into the market. In the wild plant the florets of the ray are ligulate and white, and contain pistils only, those of the disc being tubular and yellow; but under cultivation the whole of the florets tend to become ligulate and white, in which state the flower-heads are said to be double. The flower-heads are destitute of pappus; they have a warm aromatic odor, which is characteristic of the entire plant, and a very bitter taste. In addition to a bitter extractive principle, they yield about 2 per cent. of a volatile liquid, which on its first extraction is of a pale blue color, but becomes a yellowish brown on exposure to light. It has the characteristic odor of the flowers, and consists of a mixture of butylic and amylic angelate and valerate. Angelate of potassium has been obtained by treatment of the oil with caustic potash, and angelic acid may be isolated from this by treatment with dilute sulphuric acid. Chamomile is used in medicine in the form of an infusion, made with ½ oz. of the flowers to 10 oz. of boiling distilled water. An extract is also prepared by evaporating the infusion, and subsequently adding 15 minims of the essential oil for each pound of flowers used. It is an aromatic tonic and stomachic, and the infusion, if given warm and in large doses, acts as an emetic. The oil is stimulant and carminative, and forms a useful adjunct to purgative medicines.

CHAMOUNI, or CHAMONIX, a celebrated valley and village of the French Alps, in the department of Upper Savoy, and the arrondissement of Bonneville. The village, which is the great centre for tourists in the Mont Blanc district, is situated 22 miles S. of Martigny, and 50 miles E.S.E. of Geneva, at a height of about 3400 feet above the level of the sea. A great part of it was destroyed by fire in 1855, and it has thus undergone a striking change in its appearance. It now possesses numerous hotels, a museum, and baths; and an English chapel was opened in 1860. Upwards of 15,000 tourists are accommodated in the course of a year, the greater proportion being from England, America, and France. The busiest months are August and September. Excellent butter and cheese are prepared by the peasants, and flax and honey are exported. The valley, which is bounded on the S. and E. by Mont Blanc and others of the Pennine Alps, and on the W. and N. by Brévent and the Aiguilles Rouges, is about 12 miles in length from north-east to south-west, with an average breadth of two miles; it forms the upper part of the basin of the Arve, which traverses its entire length. It is the most celebrated in the Alps for the picturesque grandeur of its glaciers, which are only rivalled by those of the Zermatt in the Bernese Oberland. The view from the village up to the top of Mont Blanc is remarkable for its simple and massive sublimity.

The name of Chamouni is a corruption of the words *Campus Munitus*, or Champ Muni, the Defenced Field, applied by the Benedictine monks to the site of the monastery here, probably with allusion to the protection afforded by the "strength of the hills." This establishment was founded some time before 1099, on the spot that is now occupied by the village church; and it has left but little trace of its existence save the name of Le Prieuré, sometimes used instead of Chamouni. In 1530 the right of holding fairs at the priory was granted by Philip of Savoy, and the place thus became a rendezvous for the surrounding population. The reputation of the valley, however, for the savagery of its inhabitants was so great that the nickname of The Cursed Mountains—Les Montagnes Maudites—was given to the district; and in the 17th century it was regarded as a proof of remarkable heroism on the part of Francis de Sales that he ventured to visit that part of his diocese. General interest was excited by the explorations of Pococke and Wyndham, who published an account of their adventures in the *Transactions of the Royal Society* for 1741. They were followed by Saussure (1760), De Luc (1774), Bourrit (1775), and others; and the number of visitors gradually increased, until the valley became the place of resort it now is.

CHAMPAGNE, a former province of the kingdom of France, with an area of about 10,500 square miles, bounded on the N. by Liége and Luxembourg, on the E. by Lorraine, on the S. by Burgundy, and W. by Isle de France and Picardy. It now forms the departments of Ardennes, Marne, Aube, and Haute Marne, with part of Seine-et-Marne, Meuse, Aisne, and Yonne. The details in regard to its physical features will be found under these separate headings. It was divided into three principal parts, Lower Champagne, Upper Champagne, and Brie. Of these the first comprised Champagne Proper, Sénonais, Vallage and



Sketch-Map of Champagne.

Bassigny, Champagne Proper being the central district, which included the towns of Troyes, Châlons-sur-Marne, Vertus, La Fère, Pleurs, Planci, Arcis-sur-Aube, Pont-sur-Seine, Nogent, Villemaure, and Aumont. That portion of the district which extended from near Rheims in the N. to near Troyes in the S., was further distinguished as Champagne Pouilleuse, on account of the poverty of its soil. Upper Champagne comprised the districts of Rethelois, Rémois, and Pertois, of which the chief towns were respectively Rethel and Mézières, Rheims and Rocroy, Vitry and Saint-Dizier; while Brie included Meaux, Château-Thierry, Coulommiers, Sézanne, Provins, and Bray-sur-Seine. Physically the province belonged for the most part to what is known as the great basin of Paris, only a small part being drained by the Meuse. The eastern portion has consequently the greatest elevation, and the whole surface has a general slope to the west. The principal heights are the mountains of the Meuse, the Forest of Argonne, and the Western Ardennes, which

reach an altitude of 1000 or 1500 feet, but have a very irregular formation. The greater part of the province consists of undulating plains, broken here and there by small clusters of gently swelling hills. Its wines have made its name known over the world. The most valuable grape-districts are the arrondissements of Rheims and Epernay in the department of Marne; and the wine trade is principally centred in Rheims, Epernay, Avisc, and Châlons-sur-Marne.

Champagne, which in the time of the Romans was inhabited by the Lingones, the Sinones, the Remi, the Tricasses, and the Catalauni, began to be known by its modern name of Campania, or the Plain-Country, in the 6th century, when it formed a duchy of the kingdom of Austrasia. During the 9th century it was part of the great countship of Vermandois, and on the disintegration of that domain about 943, it took the rank of an independent countship. In 1030 the title passed to the house of Blois in the person of Odo II., who was succeeded by Stephen II., Theobald I., Hugh I., Theobald II., surnamed the Great, Henry I., Henry II., Theobald III., Theobald IV., Theobald V., and Henry III. Of these the most important was Theobald IV., famous for his romantic passion for Blanche of Castile, his political versatility, and his poetic skill. By the death of Henry III., who was also king of Navarre, Champagne passed into the hands of his daughter Jeanne, who afterwards married Philip the Fair of France. Assigned to her son Louis (Hutin), it was united to the royal domain on his accession to the throne of France in 1314. By Philip VI. it was incorporated with the kingdom, and it has ever since been one of the most important and truly national districts of France. Its frontier position and its physical configuration have made it the scene of military operations in almost all the French invasions, and more especially in the Austrian war of the 16th century, the campaign of 1814, and the Prussian war of 1870. During the wars of religion it was governed by the Guises, and sided with the Catholic party; and on the accession of Henry IV. it was one of the last provinces to recognize his legitimacy. Up to the Revolution it formed one of the twelve governments of France, and was within the jurisdiction of the parliament of Paris. Its various bailliages were governed by separate "Coutumes," those of Troyes, Meaux, and Chaumont being remarkable for the transmission of nobility by the female side.

See Baugier, *Mémoires historiques de la province de Champagne*, 1721; Pithou, *Mém. des comtes héréditaires de Champagne et de Brie*, 1572; Deberey, *Recherches sur Champagne;* Beraud, *Hist. des comtes de Champagne et de Brie*, 1839; Arbois de Jubainville, *Hist. des ducs et des comtes de Champagne*, 1859–63.

CHAMPAGNE, Philippe de (1602–1674), a celebrated painter, was born at Brussels of a poor family. He was a pupil of Fouquier; and, going to Paris in 1621, was employed by Du Chesne to paint along with Nicholas Poussin in the palace of the Luxembourg. His best works are to be found at Vincennes, and in the church of the Carmelites at Paris, where is his celebrated Crucifix, a signal perspective success, on one of the vaultings. After the death of Du Chesne, Philippe became first painter to the queen of France, and ultimately rector of the Academy of Paris. As his age advanced and his health failed, he retired to Port Royal, where he had a daughter cloistered as a nun, of whom he painted a celebrated picture, highly remarkable for its solid unaffected truth. This, indeed, is the general character of his work,—grave reality, without special elevation or depth of character, or charm of warm or stately color. He painted an immense number of paintings, dispersed over various parts of France, and now over the galleries of Europe. Philippe was a good man, indefatigable, earnest, and scrupulously religious. He died on the 12th August, 1674.

CHAMPÁRAN, a British district in the Behar Province, under the jurisdiction of the Lieutenant-Governor of Bengal, lies between 26° and 28° N. lat., and between 84° and 86° E. long. It is bounded on the N. by the independent state of Nepál; on the E. by the River Bághmatí, which separates it from the district of Tirhut; on the S. by the district of Sáran and the Bará Gandak River; and on the W. by the Oudh district of Gorakhpur. A broad grass-covered road or embankment defines the Nepál frontier, except where rivers or streams form a natural boundary. The district is a vast level except in the north and north-west, where it undulates, and gradually assumes a rugged appearance as it approaches the mountains and forests of Nepál. Wide uncultivated tracts cover its north-western corner; the southern and western parts are carefully cultivated, and teem with an active agricultural population. The principal rivers are the Bará or Great Gandak, navigable all the year round, the Chhotá or Little Gandak, Panch Nadí, Lálbágiá, Kojá, and Teur. Old beds of rivers intersect Champáran in every direction, and one of these forms a chain of lakes which occupy an area of 139 square miles in the centre of the district. Of the total area of Champáran, viz., 3531 square miles, 2350 square miles are cultivated, 433 are grazing lands, and the rest uncultivable waste. The population in 1872 amounted to 1,440,815 persons, living in 2299 villages and 242,228 houses. Of these the Hindus numbered 1,240,264, or 86·1 per cent.; Muhammadans, 199,237, or 13·8 per cent.; Christians, 1307, or 1 per cent.; and persons of unspecified religion, 7. Only two towns contain upwards of 6000 inhabitants:—(1) Motihári, the headquarters of the district, population 8266; and (2) Bettiah, population 19,708. The principal crops are rice, Indian corn, barley, sugar-cane, opium, indigo; the mineral products,—gold, copper, and limestone. Gold is washed, generally in minute particles, but sometimes in nuggets of the size of a pea, in the sandy beds of the rivers flowing from the hills. Indigo, saltpetre, and rope form the only manufactures of the district, the first being chiefly conducted with European capital. The revenue of the district in 1870 was £82,159, of which the land revenue yielded £52,030, or 63 per cent.; the civil expenditure was £20,613. In 1872, Champáran had 78 schools under Government inspection, attended by 1222 pupils, costing £293, to which the state contributed £153. Champáran, with the rest of Bengal and Behar, was acquired by the British in 1765. Up to 1866 it remained a subdivision of Sáran. In that year it was separated and formed into a separate district.

CHAMPEAUX, William of, or *Gulielmus Campellensis*, a scholastic philosopher and theologian, so called from his birthplace, the village of Champeaux, near Melun, was born about 1070, and died in 1121. After studying under the realist Anselm of Laon, and the nominalist Roscellin, he commenced to teach in the school of the cathedral of Nôtre Dame, of which he was made canon in 1103. Many scholars gathered round him, and among them was Abelard, who was to prove his great and victorious adversary. In 1108 William, whose attempts to silence his rival had been all in vain, retired into the abbey of St. Victor, where he soon resumed his lectures. He afterwards became bishop of Châlons-sur-Marne, and took part in the dispute concerning investitures, on the side of Calixtus II. whom he represented at the conference of Mousson. Of William of Champeaux's works one on the Eucharist has been printed by Mabillon, and the *Moralia Abbreviata* and the *De Origine Animæ* by Martène. In the last of these there is an interesting discussion concerning the fate of children who die unbaptized. He holds that they must be lost, the pure soul being defiled by the grossness of the body; and he silences all objections as to the justice of their condemnation by declaring that God's will is not to be questioned. Ravaisson has discovered a number of fragments by him, among which the most important is the *De Essentia Dei et de Substantia Dei et de tribus ejus Personis;* and a *Liber Sententiarum*, consisting of discussions as to points of ethics and Scriptural interpretation, is also ascribed to him. William of Champeaux is, however, most important as a representative of realism. We possess no works of his own on philosophical subjects, and his views are only to be discovered in the writings of his pupil and rival Abelard. At first he taught that the essence of all the individuals of a genus is the universal (which, as a realist, he held to be an existence independent of the individuals), while the differences between the individuals are not in their essence, but in their accidents. Abelard afterwards—he tells us himself—brought him to admit that there are differences in the essences of different individuals of the same genus, and that the universal is not the whole essence, but only that which is common to the essences of all the individuals—that which exists in them all "*indifferenter.*" This admission, though not necessarily involving a surrender of realism, gave rise to suspicions that William was deserting that theory, and it is said that in consequence his popularity greatly diminished.

See Hauréau, *De la Philosophie Scolastique;* Prantl, *Geschichte der Logik;* Stöckl, *Geschichte der Philosophie des Mittelalters;* Cousin, *Abélard; Histoire Littéraire de la France* (vol. vii. p. 90, and vol. x. p. 307).

CHAMPLAIN, a considerable lake of North America,

lying between the States of New York and Vermont, and penetrating for a few miles into Canada. It is 126 miles in length, and from 1 to 15 in breadth, lying nearly north and south, and contains a great number of small islands, most of which belong to Vermont. The Champlain canal, 63 miles in length, connects it with the Hudson; the Sorel, Richelieu, or St. John's River forms a natural outlet towards the St. Lawrence, and the Chambly canal communicates with the ocean. The lake owes its name to Samuel Champlain the French explorer, by whom it was discovered about 1608; and during the War of 1812 it was rendered famous by the defeat of the English fleet in the engagement of September 11, 1814. Large steamboats and vessels of considerable tonnage navigate Lake Champlain from end to end. The scenery along its shores is highly picturesque, and its waters abound in salmon, salmon-trout, sturgeon, and other fish.

CHAMPLAIN, Samuel de (1567–1635), the governor of the first French settlers in Lower Canada, was born at Brouage, in 1567. His father was a sea-captain, and probably he was already skilled in navigation when, while still young, he entered the army of Henry IV. On the conclusion of the war he accompanied a Spanish fleet to Mexico and the West Indies, and on his return wrote an account of the expedition. In 1603, he made his first voyage to Canada, being sent out by De Chastes, on whom the king had bestowed some territory in that country. During 1604–1607 he was engaged, together with De Monts, to whom De Chastes's privileges had been transferred, in exploring the Canadian coast, in seeking a site for a new settlement, and in making surveys and maps. In 1608 he made his third voyage; and in this year he commenced the formation of a settlement at Quebec. But De Monts's influence was now waning; he had been deprived of some of his privileges; and the merchants who had ventured in the affair were losing heart. Under these circumstances Champlain prevailed upon the Duc de Soissons to interest himself in the matter, and to seek the post of Governor and Lieutenant-General of New France. Under him, and under his successor the duke of Condé, Champlain held the office of lieutenant, which made him in reality governor of the colony. Owing, however, to quarrels with the Indians, the settlement seemed likely to fail; but, under the viceroyalty of the Duc de Montmorenci and still more under that of the Duc de Ventadour, it began to flourish. In 1629 it met with a reverse, Champlain being forced to surrender to an English fleet commanded by three brothers named Kirk. He was carried to England, but was restored to liberty in 1632. He returned to Canada in the next year, and died there two years afterwards (1635).

Champlain published several volumes containing accounts of his life work. In 1603 appeared his *Des Sauvages;* in 1613 and 1619 *Voyages,* with valuable maps; and in 1632 an abridgment of the first two voyages, with a continuation bringing down his stay to 1629, and appendices containing a treatise on seamanship, and specimens of the Huron and Montagnais languages. In 1870 the whole series of his works was published, with the exception of the very interesting account of his visit to Mexico and the West Indies, which was translated by Alice Wilmere from the MS. kept in the public library at Dieppe, and published by the Hakluyt Society in 1859.

CHAMPOLLION, Jean François (1790–1832), one of the earliest and most distinguished of Egyptologists, called *le Jeune* to distinguish him from Champollion-Figeac, his elder brother, was born at Figeac, in the department of Lot, in 1790. He was educated by his brother Champollion-Figeac, professor of Greek at Grenoble, and was then appointed government pupil at the Lyceum, which had recently been founded. His first work was an attempt to show by means of their names that the giants of the Bible were personifications of natural phenomena. At the age of sixteen (1807) he read before the academy of Grenoble a paper in which he maintained that the Coptic was the ancient language of Egypt. He soon after removed to Paris, where he enjoyed the friendship of Langlès, De Sacy, and Millin. Champollion's wonderful acuteness is best displayed by his interpretation of the Rosetta stone, in regard to which there was keen discussion as to the share Dr. Young and he respectively had in the discoveries. In 1809 he was made professor of history in the Lyceum of Grenoble, and there published his earlier works. He was sent by Charles X., in 1824, to visit the collections of Egyptian antiquities in the museums of Turin, Leghorn, Rome, and Naples; and on his return he was appointed director of the Egyptian museum at the Louvre. In 1828 he was commissioned to undertake the conduct of a scientific expedition to Egypt in company with Rosellini, who had received a similar appointment from Leopold II., Grand Duke of Tuscany. He remained there about a year. In March, 1831, he received the chair of Egyptian Antiquities, which had been created specially for himself, in the Collége de France. He was engaged with Rosellini in publishing the results of Egyptian researches at the expense of the Tuscan and French Governments, when he was seized with a paralytic disorder, and died at Paris in 1832.

He wrote *L'Égypte sous les Pharaons,* 2 vols. 8vo, 1814; *Sur l'écriture hiératique,* 1821; *Sur l'écriture démotique; Précis du système hiéroglyphique, &c.,* 1824; *Panthéon égyptien, ou collection des personnages mythologiques de l'ancienne Égypte* (incomplete); *Monumens de l'Égpte et de la Nubie considérés par rapport à l'histoire, la religion, &c.; Grammaire égyptienne,* 1836, edited by his brother; *Dictionnaire hiéroglyphique; Grammaire copte* and *Dictionnaire copte* (not printed); *Analyse méthodique du texte démotique de Rosette; Aperçu du résultats historiques de la découverte de l'alphabet hiéroglyphique* (1827); *Mémoires sur les signes employés par les Égyptiens dans leurs trois systèmes graphiques à la notation des principales divisions du temps; Lettres écrites d'Égypte et de Nubie* (1833): and also several letters on Egyptian subjects, addressed at different periods to the duke de Blacas and others.

CHAMPOLLION-FIGEAC, Jean Jacques (1778–1867), elder brother of Jean François Champollion, was born at Figeac, in 1778. He became professor of Greek and librarian at Grenoble, then librarian of the imperial library at Paris, and, when he lost this post in 1849, librarian to Louis Napoleon at Fontainebleau. He edited several of his brother's works, and was also author of a number of original works on philological and historical subjects, among which may be mentioned—*Nouvelles recherches sur les patois ou idiomes vulgaires de la France* (1809), *Annales des Lagides* (1819), *Paléographie ancienne et moderne* (1839-41), *Louis et Charles d'Orleans* (1843).

CHANCELLOR. Various origins have been attributed to this word, so important in its modern use over the greater part of the civilized world; but all of them are of a trivial nature, bearing little reference to the subsequent application of the term. The word *chancel* is connected with the most ordinary and apt of these origins. It supposes the chancellor to have been so called because he sat within a lattice or screen partitioned from the court of justice or hall of audience. There was no such office in the early civil law, and even under the later Western emperors the cancellarius appears to have been a mere subordinate person, a sort of clerk of the chamber, or scribe, who saw the petitioners, and arranged about their business. Gradually he appears to have risen to the rank of an adviser or conscience-keeper, on whose decision the fate of suitors in a great measure depended. In the Eastern empire the chief cancellarius had become a powerful and important officer. As it was the principle of the popedom to be the spiritual counterpart of the empire, and possess a corresponding hierarchy, the office was imitated at the ecclesiastical court of Rome, and a chancery at the Vatican was repeated throughout the several bishoprics, where each diocese had its chancellor. The great monastic houses too had frequently a chancellor. In the universities an officer of the same name was the connecting-link between those republican institutions and the Romish hierarchy. While the rector was elected by the proctors of the nation or some other corporate constituency, the bishop of the diocese, or in some cases the head of the monastic house to which the university was subordinated, was *ex officio* the chancellor.

It was the ambition of the kings who rose on the fall of the Roman empire, even of those who reigned in Saxon England, to gather round them as many as they could obtain of the attributes of the emperor or basileus, and hence each generally had his cancellarius. In Central Europe the office would naturally descend from the imperial court of Charlemagne; and in France the chancellor became the head of the law and the minister of justice. The office was abolished at the first Revolution. At the Restoration the ministry of justice was made a separate office, and the chief function of the chancellor was to preside in the House of Peers.

It is perhaps in England that we have the most remarkable illustration of the struggle between the influence of the imperial usages and the constitutional spirit of the Northern nations. The existence of common law courts enforcing in its strictness what was deemed the old law of the land, and the chancery with its regal equity interfering to give redress, presents to us the English people with their common lawyers standing up for their rights and privileges, and the monarch, with his clerical advisers, endeavoring to acquire the imperial prerogatives. The chancellor was generally a churchman, who took his ideas of law from the canonists and the civilians, whose principles were intensely disliked by the common lawyers. Hence the two systems called law and equity grew up in antagonism, neither throughout a long contest being able to conquer the other; and hence it is that England has been burdened with the inconvenience of having two systems of jurisprudence, the one called common law, the other equity. The spirit of the former, indeed, may be said to have been so far triumphant in compelling equity to depart from her digressional vagueness, and become a fixed system as securely bound to statute and precedent as the common law itself. But even in Selden's day we find the laxity of the chancellor's equity so much suspected, that he says in his *Table Talk*,—"Equity is a roguish thing. For law we have a measure—know what to trust to: equity is according to the conscience of him that is chancellor, and as that is larger or narrower, so is equity. It is all one as if they should make the standard for the measure we call a foot a chancellor's foot. What an uncertain measure would this be! One chancellor has a long foot, another a short foot, another an indifferent foot; it is the same thing in the chancellor's conscience." How little, indeed, the chancery practice had been at that time moulded into a strict system, we may infer from the seals being held by a churchman, the celebrated Archbishop Williams, and this at the time when the common law had accumulated that amazing mass of intricate precedents which it tasked all the diligence and genius of Coke to reduce to order. Clarendon, when he became chancellor, had been twenty years out of practice, and his successor Shaftesbury had no pretensions to be acquainted with law. Lord Nottingham appears to have been the first who wished to apply strict rules in the court of chancery, but it does not seem to have been in a fit condition for their application. Roger North says, "He was a formalist; and took pleasure in hearing and deciding, and gave way to all kinds of motions the counsel would offer; supposing that if he split the hair, and with his gold scales determined reasonably on one side of the motion, justice was nicely done—not imagining what torment the people endured who were drawn from the law, and there tossed in a blanket." (*Life of Lord Keeper Guildford*, 423.) Guildford himself, who in the words of Lord Campbell, "had as much law as he could contain," made light of the mere judicial business of his office, which ere then, however, had begun to show his characteristic defects, for, according to his biographer, "the greatest pain he endured ensued from a sense he had of the torments the suitors underwent by the excessive charges and delays of the court."

The Lord High Chancellor of Great Britain is a great state officer, with varied and disconnected functions. He is in official rank the highest civil subject in the land out of the royal family, and when raised to the peerage, as he invariably is, he takes precedence immediately after the archbishop of Canterbury. His functions have sometimes been exercised by a "lord keeper of the great seal;" but there appears to be no essential difference between the two offices, save that the keeper is appointed by mere delivery of the seal, which is of itself sufficient to confer all the powers appertaining to the office, while a chancellor receives letters patent along with it. As a great officer of state, the chancellor acts for both England and Scotland, and in some respects for the United Kingdom, including Ireland. As an administrative officer, as a judge, and as head of the law, he acts merely for England. In the first class of functions he acts as prolocutor, speaker, or chairman of the House of Lords, and in this capacity it sometimes falls to him to adjudicate in Scottish law, since he often leads the judgment of the house on appeals. (See APPEAL.) By the Treaty of Union, one great seal was appointed to be kept for all public acts. Hence, in this department, the chancellor's authority extends to the whole of Britain, and thus the commissions of the peace for Scotland as well as England issue from him. His English ministerial functions are thus briefly described by Blackstone:—"He became keeper of the king's conscience, visitor, in right of the king, of all hospitals and colleges of the king's foundation, and patron of all the king's livings under the value of twenty marks per annum in the king's books. He is the general guardian of all infants, idiots, and lunatics, and has the general superintendence of all charitable uses in the kingdom." There is much convenience in the repetition of such vague definitions, from the difficulty of more specifically defining the chancellor's functions in these matters. His indistinct and unsatisfactory authority as to charitable foundations has been virtually superseded by the Charity Commissioners' Act of 1853 (17 Vict. cap. 137). The Lord Chancellor is by office a privy-councillor, and it has long been the practice to make him a cabinet minister. Hence he belongs to a political party, and is affected by its fluctuations. This has often been denounced as destructive of the independence and calm deliberativeness essential to the purity and efficiency of the bench. In defence, however, of the ministerial connection of the chancellor, it has been said that, while the other judges should be permanent, the head of the law should stand or fall with the ministry, as the best means of securing his effective responsibility to parliament for the proper use of his extensive powers. The addition of permanent judges to the Chancery Court has removed many of the objections to the fluctuating character of the office.

Under the Judicature Act, 1873, the Lord Chancellor is president of the Court of Appeal, and, although the Act is singularly indefinite on the subject, of the High Court of Justice also. He is named as president of the Chancery Division of the latter court. By the Amendment Act of 1875, he is not to be deemed a "permanent member of the High Court of Justice" within the meaning of the section of the original Act, limiting the number of permanent judges to twenty-one. His judicial patronage is very extensive, and Lord Campbell says that he is by usage the adviser of the Crown in the appointment of judges in the superior courts. His proper title is "Lord High Chancellor of Great Britain and Ireland." His salary is £10,000 per annum, and he is entitled to a pension of £5000 per annum.

In Ireland there is a lord chancellor at the head of the equity system, which arose in minute imitation of the English.

In Scotland a chancellor appears at a pretty early period in history, as the person who, being the adviser and conscience-keeper of the king, issued his writs or letters for the remedy of injustice done by judges or other persons in power. A comparison between the English and the Scottish chancellors of the 13th century would probably show them to have then been much alike. Subsequently, however, the civil law predominating in Scotland, the chancellor was its chief administrator, instead of leading on a system antagonistic to the common law. Hence he became the leading judge of the Court of Session on its establishment in 1533. While Episcopacy predominated he was generally an ecclesiastic, never a working lawyer; and after the Revolution he became an officer of state, who was not expected to be a working lawyer. Hence, when by the Treaty of Union the great seal for public transactions was appointed to be kept in England, the Lord Chancellor of Scotland dropped out of existence. A keeper of the great seal continued to be appointed for sealing writs as to private matters, and the office of director of chancery remained for the transaction of routine business connected with the department. When the method of certifying hereditary successions was simplified and placed on a uniform system in 1848, it was put under the direction of an officer called the Sheriff of Chancery.

The *Chancellor of a Diocese* is an officer who holds the courts of the bishop, and acts as his assessor or adviser in matters of ecclesiastical law. A bishop may be compelled to appoint a chancellor; and there is no appeal from the chancellor to the bishop.

The *Chancellor of the Duchy of Lancaster* is an officer appointed of old chiefly to determine controversies between the king and his tenants of the duchy land, and otherwise to direct all the king's affairs belonging to that court. By late practice, the office, nominally one of high

dignity, but demanding little exertion, has been given to statesmen who have grown old in other and more laborious offices, but whose services are still desired in the ministry.

The *Chancellor of the Exchequer* is an officer who, according to the old definitions of his functions, presides in the Exchequer Court, and takes care of the interest of the Crown. He is always in commission with the lord treasurer for the letting of Crown lands, &c., and has power, with others, to compound for forfeitures of lands upon penal statutes. While the treasury is understood to have the custody and distribution of the collected revenue, it is the function of the exchequer to realize it. Hence the Chancellor of the Exchequer, as the head of that department which proposes to parliament the plans for the annual revenue, and sees to its realization, is always an important member of the cabinet. Sometimes he is prime minister. His annual statement of the method by which he proposes to meet the exigencies of the exchequer is called "The Budget." The salary attached to the office is £5000 a year.

CHANCERY, the court of the Lord Chancellor, now consolidated along with the other superior courts in the Supreme Court of Judicature by the Act of 1873. Its origin has been briefly noticed under the head of CHANCELLOR.

It has been customary to say that the Court of Chancery consists of two distinct tribunals—one a court of common law, the other a court of equity. From the former have issued all the original writs passing under the great seal, all commissions of sewers, lunacy, and the like—some of these writs being originally kept in a *hanaper* or hamper (whence the "hanaper office"), and others in a little sack or bag (whence the "petty-bag office"). The court had likewise power to hold pleas upon *scire facias* for repeal of letters patent, &c. "So little," says Blackstone, "is commonly done on the common law side of the court that I have met with no traces of any writ of error being actually brought since the fourteenth year of Queen Elizabeth."

The equitable jurisdiction of the Court of Chancery was founded on the supposed superiority of conscience and equity over the strict law. The appearance of equity in England is in harmony with the general course of legal history in progressive societies. What is remarkable is that, instead of being incorporated with or superseding the common law, it gave rise to a wholly independent set of tribunals. The English dislike of the civil law, and the tendency to follow precedent which has never ceased to characterize English lawyers, account for this unfortunate separation. The claims of equity in its earlier stages are well expressed in the little treatise called *Doctor and Student*, published in the reign of Henry VIII.:—"Conscience never resisteth the law nor addeth to it, but only when the law is directly in itself against the *law of God*, or *law of reason*." So also King James, speaking in the Star Chamber, says, "Where the rigor of the law in many cases will undo a subject, then the chancery tempers the law with equity, and so mixes mercy with justice, as it preserves a man from destruction." This theory of the essential opposition between law and equity, and of the natural superiority of the latter, remained long after equity had ceased to found itself on natural justice, and had become as fixed and rigid as the common law itself. The jealousy of the common lawyers came to a head in the time of Lord Ellesmere, when Coke disputed the right of the Chancery to give relief against a judgment of the Court of Queen's Bench obtained by gross fraud and imposition. James I., after consultation, decided in favor of the Court of Equity. The substitution of lay for clerical chancellors is regarded by Mr. Spence (*Equitable Jurisdiction of the Court of Chancery*) as having at first been unfortunate, inasmuch as the laymen were ignorant of the principles on which their predecessors had acted. Lord Nottingham is usually credited with the first attempt to reduce the decisions of the court to order, and his work was continued by Lord Hardwicke. By the time of Lord Eldon, equity had become fixed, and the judges, like their brethren in the common law courts, strictly followed the precedents. Henceforward chancery and common law courts have exhibited the anomaly of two co-ordinate sets of tribunals, empowered to deal with the same matters, and compelled to proceed in many cases on wholly different principles. The Court of Chancery could in most cases prevent a person from taking advantage of a common law right, not approved of by its own system. But if a suitor chose to go to a court of common law, he might claim such unjust rights, and it required the special intervention of the Court of Equity to prevent his enforcing them. In many cases also a special application had to be made to chancery for facilities which were absolutely necessary to the successful conduct of a case at common law. Another source of difficulty and annoyance was the uncertainty in many cases whether the chancery or common law courts were the proper tribunal, so that a suitor often found at the close of an expensive and protracted suit that he had mistaken his court and must go elsewhere for relief. Attempts more or less successful were made to lessen those evils by giving the powers to both sets of courts; but down to the consolidation effected by the Judicature Act, our judicial system justified the sarcasm of Lord Westbury, that we set up one tribunal to do injustice and another to stop it. In one of the last cases, the custody of an infant, which had been granted by the Queen's Bench to one claimant, was transferred by the Court of Chancery to another. The payment of a sum of money into court for the benefit of the child made her a ward of court, and enabled the judge in chancery to apply the principles of equity to the case.

The equitable jurisdiction of chancery was commonly divided into *exclusive*, *concurrent*, and *auxiliary*. Chancery had exclusive jurisdiction when there were no forms of action by which relief could be obtained at law, in respect of rights, which ought to be enforced. Trusts are the most conspicuous example of this class, and are, in fact, the main staple of the business of the court. It also includes the rights of married women, infants, and lunatics. Chancery had concurrent jurisdiction when the common law did not give *adequate* relief, *e.g.*, in cases of fraud, accident, mistake, specific performance of contracts, &c. It had auxiliary jurisdiction when the administrative machinery of the law courts was unable to procure the necessary evidence.

The Judicature Act, 1873, enacts (§ 24) that in every civil cause or matter commenced in the High Court of Justice, law and equity shall be administered by the High Court of Justice and the Court of Appeal respectively, according to the rules therein contained, which provide for giving effect in all cases to "equitable rights and other matters of equity." The 25th section declares the law hereafter to be administered in England on certain points, and ordains that "generally in all matters not hereinbefore particularly mentioned in which there is any conflict or variance between the rules of equity and the rules of the common law with reference to the same matter, the rules of equity shall prevail."

Previous to being merged in the New Supreme Court of Judicature, the Court of Chancery consisted of the Lord Chancellor, the Master of the Rolls, two Lords Justices of Appeal, and three Vice-Chancellors. The Vice-Chancellors and Lords Justices of Appeal are comparatively recent creations.

Notwithstanding the fusion of the courts the great division between common law courts and chancery is not obliterated. The chancery judges form a division by themselves, to which all the pending business of the old court has been transferred, and to which all causes and matters which, but for the Act, would have been within the exclusive jurisdiction of that court are assigned. The Chancery Division still is, and probably will for a long time be, distinguished from the others by the peculiar nature of its business, by the peculiar nature of its administrative arrangements, and by having a separate bar. Another distinction is making itself apparent, and will assume great importance if finally established. The Chancery Division seems to be unwilling to try cases by jury; and in a recent case there has been a direct collision of opinion on this subject between the Chancery and the Common Law Judges.

CHÁNDÁ, a district of British India, in the Nágpur division of the Central Provinces, situated between 19° 7′ and 20° 51′ N. lat., and 78° 51′ and 80° 51′ E. long. It is bounded on the N. by the districts of Ráipur, Bhandára, and Wardhá, on the E. by Bastár and Ráipur, on the S. by Sironchá, and on the W. by the Wardhá and Pranhítá rivers, which divide it from Berar and the Hyderabad territory. Excepting in the extreme west, hills are thickly dotted over the country, sometimes in detached ranges, oc-

casionally in isolated peaks rising sheer out from the plain. Towards the east they increase in height, and form a broad table-land, at places 2000 feet above sea-level. The Waingangá River flows through the district from north to south, meeting the Wardhá River at Seoní, where their streams unite to form the Pranhítá. The census of 1872 returns the total area of the district at 9700 square miles, and the population at 534,431 souls, residing in 2392 villages and townships, and dwelling in 108,258 houses. Of the total population, 397,540, or 74·39 per cent., are Hindus; 8176, or 1·52 per cent., Muhammadans; 648, or ·12 per cent., Buddhists and Jains; 89, or ·02 per cent., Christians; and 127,978, or 23·95 per cent., aboriginal tribes and people returned in the census report under the heading of "others." Two towns in the district are returned as containing a population of upwards of 5000 souls; viz., Chándá, population 16,233, and Armorí, population 5271. Of the total area of the district, 9700 square miles, only 988 were actually under cultivation in 1873–74, 5200 square miles being returned as cultivable, and 3509 as uncultivable waste. The principal crops are rice, wheat, oil-seeds, sugar-cane, and cotton. Within the last few years extensive coal and iron beds have been discovered, and 20 mines were in operation in 1873–74. A branch line of railway will shortly connect the Chándá coal-measures with the Bombay railway system. Dense woods cover the country. Teak grows everywhere; and in the Government forests, in the eastern part of the district, it attains a large size. The chief manufacture of the district is cotton cloths, both of coarse and fine quality, which are largely exported to Western India. Silkworm breeding is largely carried on, and silk or silk and cotton fabrics are woven. Iron smelting is an important branch of industry. The district trade is conducted at annual fairs, which are held at the towns of Chándá, Bhándak, Chimur, Márkandí, and Warhá, and are numerously attended by visitors from all parts of India. The sales effected at these fairs in 1868–69 amounted to £152,224.

Chándá is thickly studded with fine tanks, or rather artificial lakes, formed by closing the outlet of small valleys, or by throwing a dam across tracts intersected by streams. The broad clear sheets of water thus created are often very picturesque in their surroundings of wood and rock. The chief architectural objects of interest are the cave temples at Bhándak, Winjbásaní, Dewálá, and Ghugus; a rock temple in the bed of the Wardhá River below Ballálpur; the ancient temples at Márkandí, Ambgáon, and elsewhere; the forts of Wairágarh and Ballálpur; and the old walls of the city of Chándá, its system of water-works, and the tombs of the aboriginal Gond kings.

The total revenue of the district in 1873–74 amounted to £38,922, 10s., of which £24,402 or 62·7 per cent. was derived from the land. For the education of the people, 67 schools, attended by 3347 pupils, were either entirely supported by the state, or were subsidized under the grant-in-aid rules. For the relief of the sick, 4 charitable dispensaries were maintained, at which 24,448 persons were treated, at a total cost of £660, of which £439 was contributed by Government. The annual rainfall at Chándá town averages 44·67 inches, but in the hilly wooded region to the east it is considerably higher. The rainy season lasts from the middle of June to the end of September. From the middle of September to the close of November fever of a malarious type prevails all over the district. Cholera and smallpox are also common.

CHÁNDÁ, the principal town in the district of the same name, is situated in 19° 57′ N. lat. and 79° 22′ E. long., at the junction of the Virái and Jharpat rivers. The town is surrounded by a wall of cut stone five and a half miles in circuit, and crowned with battlements still in perfect preservation. The town contains a total population of 16,233 souls, classified as follows:—Hindus, 14,350; Muhammadans, 1294; Buddhists and Jains, 53; Christians, 76; and "others," 460. The municipal revenue in 1871 was £1120. The population of the town is chiefly Marhattá and Telingá; the traders, shopkeepers, and craftsmen belong to the latter. The principal manufactures are coarse and fine cotton cloths, silk fabrics, brass utensils, leather slippers, and bamboo work. The town is the seat of considerable external trade, the value of the imports in 1868–69 being returned at £178,044, and the exports at £114,342. The civil station lies a little to the north of the city, having the military cantonments to the west, with the civil lines in the centre and east.

CHANDARNAGAR (popularly *Chundernagore*), a French settlement, with a small adjoining territory, situated on the right bank of the River Húglí, 20 miles above Calcutta, in 22° 51′ 40″ N. lat. and 88° 24′ 50″ E. long. Chandarnagar has played an important part in the European history of Bengal. It became a French settlement towards the close of the 17th century, but did not rise to any importance till the time of Dupleix, during whose administration more than two thousand brick-houses were erected in the town, and a considerable maritime trade was carried on. In 1757, Chandarnagar was bombarded by an English fleet and captured; the fortifications and houses were afterwards demolished. On peace being established, the town was restored to the French in 1763. When hostilities afterwards broke out in 1794, it was again taken possession of by the English, and was held by them till 1816, when it was a second time given up to the French; it has ever since remained in their possession. All the former commercial grandeur of Chandarnagar has now passed away, and at present it is little more than a quiet suburb of Calcutta, without any external trade. The European town is situated at the bottom of a beautiful reach of the Húglí, with clean wide thoroughfares, and many elegant residences along the river bank. The total area of the territory is only 2330 acres, including a few villages outside the town. The authorities of Chandarnagar are subject to the general jurisdiction of the Governor-General of Pondicherrí, to whom is confided the general government of all the French possessions in India.

CHANDLER, RICHARD, D.D. (1738–1810), a British antiquary, was born in 1738, at Elson, in Hampshire, and was educated at Winchester school, and Queen's College, Oxford. His first work consisted of fragments from the minor Greek poets, with notes (1759); and in 1763 he published a fine edition of the Arundelian marbles, *Marmora Oxoniensia*, with a Latin translation and a number of suggestions for supplying the lacunæ. In 1763 Chandler, together with Revett, the architect, and Pars, a painter, was sent by the *Dilettanti Society* to explore the antiquities of Ionia and Greece. After spending above a year in Asia Minor the travellers passed another year in Greece, examining Attica and the Peloponnesus, and returned to England in the end of 1766. The result of their joint investigations was the two magnificent folios of Ionian antiquities published in 1769. Chandler also published a very valuable collection of inscriptions, entitled *Inscriptiones Antiquæ pleræque nondum editæ, in Asia Minore et Græca, Præsertim Athenis collectæ* (Oxford, 1774). In 1775 he published his *Travels in Asia Minor;* in 1776 his *Travels in Greece;* and in 1800 his *History of Ilium*, in which he asserted the accuracy of Homer's geography. His *Life of Bishop Waynflete*, Lord High Chancellor to Henry VI., did not appear till after his death, in 1810. After his return from Greece, Chandler obtained several church preferments, including the rectory of Tylehurst, in Berkshire; and after marrying and travelling for some time in Switzerland and Italy, he settled down in England, where he died in 1810.

CHANDLER, SAMUEL, D.D. (1693–1766), a learned Dissenting minister, was born at Hungerford, in Berkshire, where his father was an eminent Nonconformist minister. He was sent to school at Gloucester, where he commenced a life-long friendship with Bishop Butler and Archbishop Secker; and he afterwards studied at Leyden. His talents and learning were such that he was elected fellow of the Royal and Antiquarian Societies, and was made D.D. of Edinburgh and Aberdeen. He also received offers of high preferment in the Established church. These he decidedly refused, remaining to the end of his life in the position of a Presbyterian minister. For some time he preached at Peckham, and for forty years he was pastor of the meeting-house in the Old Jewry. During two or three years, having fallen into pecuniary distress through the failure of the South Sea Scheme, he kept a book-shop in the Poultry. On the death of George II. Chandler published a sermon in which he compared that king to King David. This view was attacked in a pamphlet entitled *The History of the Man after God's own Heart*, in which the author complained of the parallel as an insult to the late king, and, following Bayle, exhibited King David as an example of perfidy, lust, and cruelty. Chandler condescended to reply in *A Critical History of the Life of David*, which is perhaps the best of his productions. This work was just completed

when he died, on May 8, 1766. He left 4 vols. of sermons (1768), and commentaries on St. Paul's Epistles to the Galatians, Ephesians, and Thessalonians (1777), several works on the evidences of Christianity, and a work on subscription to articles of faith (1748).

CHANG-CHOW, a town of China, in the province of Fuh-keen, on a branch of the River Lung Keang, 35 miles west of Amoy. It is well built, and surrounded with a wall 4½ miles in circumference, which, however, includes a good deal of open ground. The streets are paved with granite, but are very dirty. The river is crossed by a curious bridge, 800 feet long, constructed of wooden planks supported on 25 piles of stones about 30 feet apart. The city is a centre of the silk-trade, and carries on an extensive commerce in different directions. Brick-works and sugar-factories are among its chief industrial establishments. Its population is estimated at about 1,000,000.

CHANNEL ISLANDS, a number of islands politically attached to Great Britain, but connected with France by geographical position, being situated in the great bay of St. Michael, which is bounded by the coasts of the departments of Manche, Ille-et-Vilaine, and Côtes-du-Nord. They are naturally divided into four principal groups—the northern, which includes Alderney, Burhou, and the Casquets, lying off the Cape de la Hogne; the north-central, comprising Guernsey, Herm, and Sark, about eighteen miles to the south-west; the south-central, or Jersey and its adjacencies, more towards the centre of the bay; and the southern, or the Minquiers and Chausseys, with their multitudinous islets. The total area is about 75 square miles, or 48,000 acres.

The geological character of all the groups is in their principal features the same, for the islands consist almost exclusively of igneous rocks in various stages of decomposition. They have been denuded of nearly all the fossiliferous and stratified rocks with which at an earlier period they would seem to have been covered. The process which has thus stript the islands is still going on around the coasts, wearing the cliffs into caves and gullies, and grinding the rocks into shingle and sand. The tide in St. Michael's bay is of very considerable force, and rises to a height of about forty feet at Jersey, and to about thirty at Guernsey, while the difference of high water at spring and neap tides is seventeen feet at the former island, and eleven at the latter.

Channel Islands.

The minerals belonging to granitic rocks are very abundant, such as crystals of felspar and hornblende, and many kinds of quartz and felspar. Asbestos is found, and chlorite is everywhere abundant.

The *flora* of the islands is remarkably rich considering their extent, nearly 2000 different species of plants having been counted throughout the group. Of timber, properly speaking, there is hardly any, but the evergreen oak, the elm, and the beech grow well and are abundant. Wheat is the principal grain in cultivation; but far more ground is taken up with turnips and potatoes, mangold, parsnip, and carrot. The tomato ripens as in France, and the Chinese yam has been successfully grown. There is a curious cabbage, chiefly cultivated in Jersey, which shoots up into a long woody stalk from 10 to 15 feet in height, fit for walking-sticks or palisades. Grapes and peaches come to perfection in green-houses without artificial heat; and not only apples and pears, but oranges and figs, can be reared in the open air. The arbutus ripens its fruit, and the camellia clothes itself with blossom, as in more southern climates; the fuchsia reaches a height of 15 or 20 feet, and the magnolia attains the dimensions of a tree. Of the flowers, both indigenous and exotic, that abound throughout the islands, it is sufficient to mention the Guernsey lily with its rich red petals, which is supposed to have been brought from Japan.

The number of the species of the mammalia is little over twenty, and several of these have been introduced by man. There is a special breed of horned cattle, and each island has its own variety, which is carefully kept from all intermixture. The animals are small and delicate, and marked by a peculiar yellow color round the eyes and within the ears. The red deer was once indigenous, and the black rat is still common in Alderney and Herm. Nearly 300 species of birds have been found, or more than half the whole British list. There are few localities in the northern seas which are visited by a greater variety of fish, and the coasts abound in crustacea, shell-fish, and zoophytes.

Owing to the Norman system of land-tenure being still in force, the land is parcelled out among a great number of small proprietors, and in Alderney, for example, five or eight acres of arable land is accounted a fair estate. The results of this arrangement seem to be favorable in the extreme. Every corner of ground is carefully and intelligently cultivated, and a considerable proportion is allotted to market-gardening. The cottages are neat and comfortable, the hedges well trimmed, and the roads kept in excellent repair. Wealth is for the most part pretty equally distributed, and poverty or pauperism is comparatively unknown. There is a very considerable export and import trade, the value of the produce and manufactures of the islands despatched to England in 1874 amounting to £459,639, or between £9 and £10 for every acre of land; while the total importation of British and foreign articles reached the sum of £982,656. The population of the whole group has largely increased during the present century, though, on account of exceptional causes, the numbers in Alderney, Sark, and a few of the smaller islands are not so great as they were a few years ago. In 1821 Jersey had 28,600 inhabitants, as compared with 56,627 in 1871; and Guernsey and the dependent islands, inclusive of Alderney, Sark, &c., had 20,827, as compared with 33,699. For further details on the economical condition of the islands the reader may consult the separate articles ALDERNEY, JERSEY, &c.

The language spoken in ordinary life by the inhabitants of the islands is in great measure the same as the Old Norman French, though modern French is used in the law courts, and English is taught in all the parochial schools, and is familiar to a gradually increasing proportion of the population, especially in Jersey and Alderney. The several islands have each its own dialect, differing from that of the others at once in vocabulary and idiom; and a very marked difference is observable between the pronunciation in the north and the south of Guernsey. It has even been asserted that every parish in that island has some recognizable peculiarity of speech; but if this is the case, it is probably only in the same way in which it could be asserted of neighboring parishes throughout the country. None of the dialects have received much literary cultivation, though Jersey is proud of being the birthplace of one of the principal Norman poets, R. Wace, and has given a number of writers to English literature. The Guernsey patois is rendered pretty well known to the philologist by the *Rimes Guernêsiaises* of George Métivier, who has since published a *Dictionnaire Franco-Normand, ou Recueil des mots particuliers au dialecte de Guernesey*, 1870; and a fair idea of that of Jersey is obtainable from the *Rimes et Poësies Jersiaises de divers auteurs*, by A. Mourant, 1865.

The original ethnology and pre-Christian history of the Channel Islands are largely matters of conjecture and debate. Of early inhabitants abundant proof is afforded by the numerous megalithic monuments—cromlechs, kistvaens, and maenhirs—still extant in various quarters, and it is well known that the number of these memorials was much greater in recent centuries. One of the most important, indeed—a cromlech near St. Helier's—was only removed in 1788. But little trace has been left of Roman occupation, and such remains as have been discovered are mainly of the portable description that affords little proof of actual settlement. According to tradition St. Marcou or Marculfus visited the islands as a Christian missionary in 540, and in 568 he was followed by St. Magloire (a friend and fellow-evangelist of St. Samson of Dol), who founded monasteries at Sark and at Jersey. In 933 the islands were made over by Rodolph of Brittany to William of Normandy, the son of Rollo; and after the Norman conquest of England, their allegiance shifted between the English crown and the Norman coronet according to the vicissitudes of war and policy. During the purely Norman period, they had been enriched with numerous ecclesiastical buildings, some of which are still extant, in a more or less perfect condition. In the reign of John of

England, the future of the islands was decided by their attachment to the English crown, in spite of the separation of the duchy of Normandy. To John it has been usual to ascribe a document, at one time regarded by the islanders as their Magna Charta; but modern criticism leaves little doubt that it is not genuine. An unauthenticated "copy" of uncertain origin alone has been discovered, and there is little proof of there ever having been an original; while it is plain that the islands were in possession of several of the privileges which it professes to accord previous to the supposed date. The reign of Edward I. was full of disturbance and trouble; and in 1279 Jersey and Guernsey received from the king, by letters patent, a public seal as a remedy for the dangers and losses which they had incurred by lack of such a certificate. Edward II. found it necessary to instruct his collectors not to treat the islanders as foreigners; his successor, Edward III., fully confirmed their privileges, immunities, and customs in 1341; and his charter was recognized by Richard II. in 1378. In 1343 there was a descent of the French in Guernsey; the governor was beaten, and Castle Cornet besieged. In 1380 Pius IV. issued a bull of anathema against all who molested the islands; it was formally registered in Brittany in 1384, and in France in 1386; and in this way they acquired the right of neutrality, which they retained till 1689. Henry V. confiscated the alien priories which had kept up the same connection with Normandy as before the Conquest, and conferred them along with the regalities of the islands on the duke of Bedford. During the Wars of the Roses, Queen Margaret, the consort of Henry VI., made an agreement with Maulevrier, the seneschal of Normandy, that if he afforded assistance to the king he should hold the islands independently of the Crown. A force was accordingly sent to take possession of Jersey Castle. Orgueil was captured and a small part of the island subjugated, but the rest held out under Philip de Carteret, and in 1467 the vice-admiral of England, Sir Richard Horbiston, recaptured the castle and brought the foreign occupation to an end. By a charter of 1494, the duties of the governors of Jersey were defined and their power restricted; and the educational interests of the island were furthered in the same reign, by the foundation of two grammar schools by John Neal. The Reformation was heartily welcomed in the islands; and under the influence of French pastors, the form of worship adopted was the Presbyterian. The greatest severity was exercised in the maintenance of the new ecclesiastical discipline. In 1554 one Richard Girard was flogged through the town of St. Helier's for defending the doctrine of the mass; in 1576 several persons were thrown into prison by the royal court for not having taken the communion, and they were not to be liberated till they could repeat the commandments and the Lord's prayer; and in 1592 it was enacted that all persons should attend divine service morning and evening under the penalty of a fine.

The Presbyterian form of church government was formally sanctioned in Jersey and Guernsey by Queen Elizabeth; and in 1603 King James enacted that "they should quietly enjoy their said liberty." During the governorship of Sir John Poyton, however, disputes arose between him and the Presbyterian "colloquy" or synod about nomination to benefices, and both parties appealed to the king. A commission was appointed in 1609, but peace was not established. An Episcopal party had been formed in Jersey, and in 1619 David Bandinal was declared Dean of the island. A body of canons which he drew up agreeable to the discipline of the Church of England was accepted after considerable modification by the people of his charge; but the inhabitants of Guernsey maintained their Presbyterian practices. Of the hold which this form of Protestantism had got on the minds of the people even in Jersey abundant proof is afforded by the general character of the worship at the present day. Having taken different courses in religion the two islands naturally attached themselves to different sides in the great struggle between king and parliament. Jersey was for Charles and Guernsey for the Commons. The former island maintained its loyalty till 1651, when the royal cause became hopeless, and even Sir George Carteret, who had been its principal support, was obliged to surrender. Both islands had suffered severely from the struggle, and the people of Guernsey complained that two-thirds of the land was out of cultivation, and that they had lost "their ships, their traffic, and their trading." After the Restoration there was considerable improvement, and in the reign of James the islanders got a grant of wool for the manufacture of stockings—4000 tods of wool being annually allowed to Jersey, and 2000 to Alderney. By William of Orange the neutrality was abolished in 1689, and during the first American War there were two unsuccessful attacks on Jersey. In 1767 an attempt was made to introduce the English custom-house system; but it proved practically a failure, and the islands throve on smuggling and privateering down to 1800. Since then their history has been one of quiet progress, with no more serious disturbance than can arise from local rivalries.

Heylin, *Relation of two Journeys*, 1656; Philip Falle, *Cæsarea, or an Account of Jersey*, London, 1694, revised edition, 1734; Dicey, *An Hist. Account of Guernsey*, 1750; E. Allen, *Argument to His Majesty's Royal Commissioners in the Island of Jersey*, 1812; Berry, *Hist. of Island of Guernsey*, 1815; Plees, *Account of Jersey*, 1817; Inglis, *Channel Islands*, 1835; Duncan, *Hist. of Guernsey*, 1842; F. B. Tupper, *Chronicles of Castle Cornet, Guernsey*, 1851; Hoskins, *Charles II. in Channel Islands*, 1854; Le Quesne, *Constit. Hist. of Jersey*, 1856; Girardin and Morière, *Rapport d'une Excursion Agricole à Jersey en* 1856, 1857; De la Croix, *Jersey, ses antiquités, ses institutions, &c.*, 1859; D. T. Ansted and R. G. Latham, *The Channel Islands*, 1865. The last work is an interesting compilation, and treats of the islands in their geographical, botanical, zoological, and historical relations. See also a paper in the *Fortnightly Review* (1876) by the Rev. F. Barham Zincke.

CHANNING, William Ellery (1780–1842), was the son of William Channing and Lucy Ellery, and was born at Newport, Rhode Island, U.S., on the 7th of April, 1780. The place of his birth is situated amidst scenery of great and varied beauty, the influence of which upon his mind may be traced in many allusions in his writings, and in the vivid admiration which he ever expressed for it in after-life. To the society of the town of Newport he owed but little; it was a bustling, crowded seaport, where a certain Puritanic strictness, inherited by tradition from the founders of the State, was kept up, not only in connection with, but too much as a salvo for, a considerable amount of laxity both of speech and practice. As a bathing-place it was a resort for strangers from other parts, and the interfusion of French and British officers tended to modify the peculiarities which the unmixed influence of retired sea captains, West Indian traders, and keen New England lawyers might have rendered too strong.

As a child, Channing was remarkable for a refined delicacy of feature and temperament, which made him an object of admiration and affection in the household. From his father he inherited a fine person, simple and elegant tastes, sweetness of temper, and warmth of affection; from his mother (who appears to have been a remarkable woman) he derived the higher benefits of that strong moral discernment and straightforward rectitude of purpose and action which formed so striking a feature of his character. By both parents he was carefully instructed in those strict religious principles which were characteristic of the people of New England; and by both, but especially by his mother, was his moral training most sedulously cared for. Other influences, however, were in the meantime operating upon him. The excitement of the revolutionary war was inspiring him with a profound and ardent love of freedom. The sick chamber of an aunt of his father, who was a woman of much piety and sweetness, was the source of many serious and hallowed lessons of gentleness and goodness. An amateur Baptist preacher, who was by trade a cooper, by refusing, though very poor, to manufacture any of the articles of his trade used for containing ardent spirits, gave him an impulse which he never lost in favor of temperance. A female servant, whose religious views were of a more cheerful cast than those prevalent in his circle, used to talk to him in a way that greatly engaged him, and probably sowed the germ of not a few of the ideas which afterwards regulated his modes of religious sentiment. Able and free-minded men, like Dr. Stiles and Dr. Hopkins, frequented his father's house, and the quiet and thoughtful boy listened to their conversations, and laid many suggestive words that fell from them to heart. While but a child he had begun to draw inferences from what he heard from the pulpit and elsewhere that were not quite such as his guardians would have wished him to draw; and he "was even then quite a theologian, and would chop logic with his elders according to the fashion of that controversial time," as he himself tells us.

Whilst very young, he was sent to a dame's school, who exacted from the incipient republicans the title of *Madam*, and enforced her authority and her lessons by means of "a long round stick." From this he passed under the care of two excellent women, by whose instructions he profited greatly. His next step was to the school of a Mr. Rogers, considered the best at that time in the town; and in his twelfth year he was sent to New London to prepare for college, under the care of his uncle the Rev. Henry Channing. His career at school does not appear to have been marked by any remarkable aptitude for letters; on the contrary, his progress was at first somewhat slow, though after the few initiatory difficulties were overcome, he advanced rapidly, both in a knowledge of the classics

and an appreciation of their excellences. His disposition was thoughtful and retiring, though among his companions he showed no absence of relish for lively conversation or hearty amusement. A certain mingled dignity and sweetness gave him a commanding influence in the school, where he went by the name of "the Peacemaker," and "Little King Pipin," and where he was obeyed, though "small and delicate," with more readiness than mere physical strength could ever have commanded.

Shortly after he went to reside with his uncle, his father died. This event, however, though it produced a great change in the circumstances of the family, was not allowed to interrupt the course of his studies. After the funeral he returned to the house of his uncle, where he remained till he had reached his fifteenth year, when he was removed to Cambridge, Massachusetts, and entered at Harvard College as freshman in 1794. Before leaving New London he came under the influence of a religious revival which took place there, a circumstance to which he was accustomed to trace the commencement of a decidedly religious life.

The four years he remained at college seem to have been most profitably spent. Besides acquiring an extensive acquaintance with classical and general literature, he read largely and thought earnestly in the department of psychology and ethics. The books which appear to have exerted most influence upon his mind and opinions were Price's *Dissertations*, Hutcheson on *Beauty and Virtue*, and Ferguson on *Civil Society*. To the study of Shakespeare also (the interest in whose works was then newly awakened in that quarter) he owed much; and so deep was the impression made on him by the genius of the poet, that to the close of his life one of the greatest of his intellectual treats was furnished by recitations from his writings. By patient and well-directed assiduity he trained himself to the mastery of that copious and vigorous style of composition to which his subsequent position in the world of letters is in no small measure due, and at the same time also laid the basis of his success as a public speaker, by the formal study of rhetoric, and by frequent practice in addressing assemblies of his fellow-students.

For a year and a half after leaving college in 1798, Channing was resident at Richmond in Virginia, as tutor in the family of Mr. David Meade Randolph. Here he had time for study, which he employed chiefly on theological subjects. In regard to many points, touching both the evidences of Christianity and its doctrines, his mind was burdened with doubt and anxiety; and so earnestly did he labor to attain satisfaction, that his constitution sank under the incessant toil. When, in 1800, he returned to Newport, his friends were shocked to find him changed to "a thin and pallid invalid;" and unhappily, at this time were sown the seeds of that depressed condition of health which continued through life his severest trial. He remained in the bosom of his family for another year and a half, engaged in the pursuit of his studies, and in preparing himself, by physical and moral as well as intellectual training, for the work to which he was looking forward—that of the ministry. In 1802 he returned to Cambridge, having been elected to the office of regent in Harvard University, a situation which, without exacting from him any large amount of service, secured to him the advantage of independence, and an opportunity of prosecuting his studies within reach of a valuable library, and under influences favorable to success. In the autumn of 1802 he began to preach, having received approbation to do so from the Cambridge Association; and in the beginning of the following year he accepted the invitation of the Congregational Church, Federal Street, Boston, to be their pastor. To this office he was ordained in June, 1803.

Channing entered on his ministry with a deep and almost painful sense of the responsibility of the office he had assumed, and with an earnest desire to acquit himself faithfully of its obligations. His theological views were at this time probably not definitely fixed. We have his own assurance that he was not a Trinitarian, but he had not at this time severed himself from those holding orthodox views. In 1808 he took part in the ordination of the Rev. J. Codman, a well-known minister of the Congregational order, when he delivered a sermon which was afterwards published. In this sermon, though the language and sentiments are such as any evangelical divine might use, there is nothing that certainly indicates that the author held any of the views peculiarly distinctive of evangelical orthodoxy unless it be the application of the title "Divine Master" to Jesus Christ, and the use of such expressions as that the blood of Christ was "shed for souls," and that for man's salvation "the Son of God himself left the abodes of glory and expired a victim on the cross." It is not thus that Unitarians, in England at least, are wont to speak of Christ and his death. But Channing never identified himself with any theological party. He called himself a Unitarian, and so in a sense he was, but his views were Arian rather than what are commonly known as Unitarian. He reverenced in Jesus Christ not only a sublimely perfect character, but a nature higher than that of man. He believed in His pre-existence in heaven, and that He came down from heaven for man's salvation; and he taught that "the Scriptures ascribe the remission of sins to Christ's death with an emphasis so peculiar that we ought to consider this event as having a special influence in removing punishment, as a condition or method of pardon, without which repentance would not avail us, at least to that extent which is now promised by the gospel" (*Sermon at the ordination of the Rev. Jared Sparks*). The truth is, that Channing was too much a lover of free thought, and too desirous to hold only what he saw to be true, to allow himself to be bound by any party ties. "I wish," he says, "to regard myself as belonging not to a sect but to the community of free minds, of lovers of truth, and followers of Christ, both on earth and in heaven. I desire to escape the narrow walls of a particular church, and to stand under the open sky in the broad light, looking far and wide, seeing with my own eyes, hearing with my own ears, and following Truth meekly but resolutely, however arduous or solitary be the path in which she leads" (*Sermon at Installation of the Rev. M. J. Motte*). Thus refusing to be enclosed within the limits of party, and acting freely as respected religious association, he may be claimed as one whom men of all parties honor for his abilities, his integrity, and his work.

In 1814 Channing married his cousin, Ruth Gibbs, a union which brought him an increase of worldly substance, as well as a rich addition to his personal happiness. "Inwardly and outwardly," his biographer tells us, "his lot henceforward was singularly serene." He was now fast rising in reputation, both as a preacher and as a public man. Interested in all that concerned his country and the cause of humanity, his voice was heard on most of the questions that came before the American public, and always with marked and growing effect. He had begun also to command attention as a writer for the press. His *Address on War*, some of his sermons, and especially his able tract on *The Evidences of Christianity*, had given him a position of eminence among the writers of his country. In 1821 he received the title of D.D. from Harvard University. In 1822 he undertook a journey to Europe, in the course of which he visited Great Britain and some parts of the Continent. When in England he made the acquaintance of some distinguished men of letters, especially Wordsworth and Coleridge, on both of whom he appears to have left a most favorable impression. Coleridge wrote of him, "He has the love of wisdom and the wisdom of love." On his return Dr. Channing resumed his duties as a minister, but with a more decided attention than before to literature and public affairs. In 1824 he received as colleague the Rev. Ezra Stiles Gannett,[1] at whose ordination he preached one of his published discourses. From this time forward his energies were devoted, in addition to his pulpit labors, chiefly to the furtherance of great schemes of social reform. Of the anti-slavery cause he was throughout the firm, eloquent, and uncompromising advocate; and in every question that bore upon the happiness of the people he took a lively interest. Of his publications, the most extensively read are his *Remarks on the Life and Character of Napoleon Bonaparte*, his *Remarks on the Character and Writings of John Milton*, his *Essay on the Character and Writings of Fénelon*, his *Essay on Self-Culture*, and his *Essay on the Importance and Means of a National Literature*. He died in the sixty-third year of his age, on Sunday, the 2d of October, 1842, whilst on a journey, at Bennington, Vermont, and was buried at Boston, on the 7th of that month. An extended memoir of him by his nephew, William Henry Channing, appeared in 1848 (republished in 1870). His *Complete Works* were published in 2 vols., London, 1865. (W. L. A.)

CHANTIBAN, a large town of Siam, the capital of a

[1] [Grandson (1801–71) of president of Yale College, educated at Harvard, Unitarian apologist, pastoral successor of Channing, killed on a railroad.—Am. Ed.]

province of the same name, on the south bank of a small river near its mouth in the Gulf of Siam, 150 miles S.E. of Bangkok, in 12° 45′ N. lat. and 102° 18′ E. long. It is the seat of one of the Siamese arsenals, and has a considerable export trade in pepper, cardamoms, rosewood, dyewoods, ship-timber, hides, horns, and ivory. In the vicinity there are mines of precious stones. The population, which is estimated at 30,000, contains a large proportion of Chinese traders.

CHANTILLY, a small town of France, in the department of Oise, 25 miles north of Paris by the main line of the great northern railway. It is finely situated near the River Nonette, and is one of the favorite Parisian resorts. Its name has long been associated with the manufacture of lace and blonde, and it is still more celebrated for its châteaux and pleasure grounds, and as the scene of the great annual races of the French Jockey Club. The old castle must have been in existence in the 13th century, and in the reign of Charles VI. the lordship belonged to Pierre d'Orgemont, Chancellor of France. In 1484 it was transferred by his grandson to the house of Montmorency, and in 1632 it passed from that family to the house of Condé. The Prince de Condé, surnamed the Great, was specially attached to the spot, and did a great deal to enhance its beauty and splendor. Here he enjoyed the society of La Bruyère, Racine, Molière, La Fontaine, Boileau, and other great men of his time; and here his steward Vatel killed himself in despair, because something had gone wrong with the preparations for the reception of his majesty Louis XIV. Of the two splendid mansions that then existed, and were known as the Grand Château and the Petit Château, the former was destroyed about the time of the Revolution, but the latter still remains as one of the finest specimens of the Renaissance architecture in France. On the death of the duke of Bourbon, the last representative of the house of Condé, the estate passed into the hands of the Duc d'Aumale, fourth son of Louis Philippe. In 1853 the house of Orleans was declared incapable of possessing property in France, and Chantilly was accordingly sold by auction. Purchased by the English bankers Coutts & Co. for the sum of 11,000,000 francs, it has since passed back into the hands of the duke. There is a hospital in the town, built and endowed by the last Prince de Condé, and the parish church contains the grave of the Admiral Coligny, who perished in the massacre of St. Bartholomew. Among the modern buildings is an Episcopalian church, erected for the English residents, who are mainly jockeys or grooms. Population in 1872, 3461. See Du Cerceau-Perelle; Mérigot, *Promenade des Jardins de Chantilly*, 1791; and Fauquemprez, *Histoire de Chantilly*, 1840.

CHANTREY, Sir Francis (1782–1841), a sculptor of repute, was born on 7th April, 1782, at Norton near Sheffield, where his father cultivated a small property of his own. His father died when he was eight years of age; and, his mother having married again, his profession was left to be chosen by his friends. In his sixteenth year he was on the point of being apprenticed to a lawyer in Sheffield, when, having seen some wood-carving in a shop-window, he requested to be made a carver instead of a solicitor, and was accordingly placed with a Mr. Ramsay, wood-carver in Sheffield. When in this situation, he became acquainted with Mr. Raphael Smith, a distinguished draftsman in crayon, who gave him lessons in painting; and Chantrey, eager to commence his course as an artist, procured the cancelling of his indentures, and went to try his fortune in Dublin and Edinburgh, and finally in London. Here he first obtained employment as an assistant wood-carver, but at the same time devoted himself to portrait-painting, bust-sculpture, and modelling in clay. The sculptor Nollekens showed particular zeal in recognizing his merits. His first imaginative work was the model of the head of Satan, which was exhibited at the Royal Academy in 1808. He afterward executed for Greenwich Hospital four colossal busts of the admirals Duncan, Howe, Vincent, and Nelson; and so rapidly did his reputation spread that the next bust which he executed, that of Horne Tooke, procured him commissions to the extent of £12,000. From this period he was almost uninterruptedly engaged in professional labor. In 1819 he visited Italy, and became acquainted with the most distinguished sculptors of Florence and Rome. He was chosen an associate, and afterwards a member, of the Royal Academy (1816 and 1818), received the degree of M.A. from Cambridge, and that of D.C.L. from Oxford, and in 1837 was knighted. He died after an illness of only two hours' duration, on the 25th November, 1841, having for some years suffered from disease of the heart, and was buried in a tomb constructed by himself in the church of his native village. The works of Chantrey are extremely numerous. The principal are the statues of Washington in the State-house of Boston, of George III. in London, of George IV. at Brighton, of Pitt in Hanover Square, London, of Watt in Westminster Abbey and at Glasgow, of Roscoe and Canning at Liverpool, of Dalton at Manchester, of Lord-President Blair and Lord Melville in Edinburgh, &c. Of his equestrian statues the most famous are those of Sir Thomas Munro at Calcutta, and the Duke of Wellington in front of the London Exchange. But the finest of Chantrey's works are his busts, and his delineations of children. The figures of two children asleep in each other's arms, which form a monumental design in Lichfield Cathedral, have always been lauded for beauty, simplicity, and grace. So is also the statue of the girlish Lady Louisa Russell, represented as standing on tiptoe and fondling a dove in her bosom. Both these works, it should, however, be explained, were executed from designs by Stothard; for Chantrey knew his own scantiness of ideal invention or composition, and on system sought aid from others for such attempts. In busts, his leading excellence is facility —a ready unconstrained air of life, a prompt vivacity of ordinary expression. Allan Cunningham and Weekes were his chief assistants, and were indeed the active executants of many works that pass under Chantrey's name. Chantrey was a man of warm and genial temperament, and is said to have borne a noticeable though commonplace resemblance to the usual portraits of Shakespeare. He bequeathed his valuable collection, and his whole fortune, after the death of Lady Chantrey, to the Royal Academy, for the encouragement of British sculpture and painting. It is but very recently that this bequest has taken actual effect; and the precise form in which the Academy mean to administer the trust still (1876) remains indefinite.

CHAPELAIN, Jean (1595–1674), a French poet and man of letters, was the son of a notary, and was born in Paris. His father destined him for his own profession; but his mother, who had known Ronsard (she was the daughter of a certain Michel Corbière, an intimate friend of the great poet), had determined otherwise. At an early age Chapelain began to qualify himself for literature, acquiring by his own unaided efforts, not only Greek and Latin, but also Italian and Spanish, and even applying himself to medicine. Having finished his studies, he was engaged for a while in teaching Spanish to a young nobleman. He was then appointed tutor to the two sons of a M. de la Trousse, grand provost of France. Attached for the next seventeen years to the family of this gentleman, the administration of whose fortune was wholly in his hands, he seems to have published nothing during this period, yet to have acquired a great reputation as a probability. His first work given to the public was a preface for the *Adone* of Marini, who printed and published that notorious poem at Paris. This was followed by an excellent translation of Mateo Aleman's novel, *Guzman de Alfarache*, and by four extremely indifferent odes, one of them addressed to the great Richelieu, whom Chapelain had the honor of grounding in the dramatic unities. Rewarded with a pension of a thousand crowns, and appointed from the first a member of the newly-constituted Academy, Chapelain drew up the plan of the grammar and dictionary, the compilation of which was to be a principal function of the young institution, and at Richelieu's command prepared a criticism of the *Cid*. In 1756 he published, in a magnificent form, the first twelve cantos of his celebrated epic *La Pucelle*, on which he had been engaged during twenty years. His reputation at this time was so great that six editions of the poem were disposed of in eighteen months. But this was the end of Chapelain, "the legist of Parnassus." The epigrams of Montdor and Furetière, the slashing satire of Boileau (in this case fairly master of his subject), had done their work, and Chapelain ("le plus grand poète-Français qu'ait jamais été et du plus solide jugement," as he is called in Colbert's list) had taken his place among the failures of modern art. The last twelve cantos of *La Pucelle* were never published. A complete manuscript of it exists, with corrections and a

preface in the author's autograph in the *Bibliothèque Nationale;* but its readers, it may be presumed, are few.

In 1662 Chapelain was employed by Colbert to draw up an account of contemporary men of letters, destined to guide the king in his distribution of pensions. In this pamphlet, as in the extracts from his letters published by Camusat in 1726 (*Mélanges de Littérature tirés des Lettres manuscrites de Chapelain*), he shows to far greater advantage than in his unfortunate epic. His prose is said to be incomparably better than his verse; his criticisms are remarkable for their justice and generosity; his erudition and kindliness of heart are everywhere apparent; the royal attention is directed alike towards the author's firmest friends and bitterest enemies. The man, indeed, appears to have been as excellent as the poet was worthless. He does not seem to have known jealousy; Corneille was the object of his warmest praises; and to him the young Racine was indebted not only for kindly and seasonable counsel, but also for that pension of six hundred livres which was so useful to him. Moving in the best society, polite and literary, and loaded with honors and pensions, in his old age Chapelain is reported to have become a miser of the most sordid type, the clothes he wore being so patched and clouted as to procure for him the nickname of the Chevalier de l'Araignée; while Ménage relates that, calling upon the old man after a long estrangement, he found on the hearth the same cinders that he had remarked thereon twelve years before. His avarice, moreover, is said to have been indirectly the cause of his death, which happened in his seventy-ninth year. Some 50,000 crowns, a large fortune for those days, were found in his apartments.

As a poet, Chapelain seems to occupy on the French side of Parnassus a place analogous to that one filled on the English side by Sir Richard Blackmore. *La Pucelle* is an enormous allegorical nightmare, towards a correct appreciation of which the satire of Boileau is said to be the best guide. As a prose writer and critic, Chapelain seems to have had real merit; in a passage of his, concerning the legendary epic of the Middle Ages, quoted by Sainte-Beuve (who calls him "homme instruit, sinon poète"), he would appear to have anticipated much of what modern criticism has had to say on the subject.

CHAPEL-HILL, a village of the United States, in Orange county, North Carolina, 27 miles north-west of Raleigh. It is the seat of the North Carolina university, founded in 1789, and has about 2800 permanent inhabitants.

CHAPMAN, George, translator of Homer, dramatist, and gnomic poet, was born in 1559, and died in 1634. At fifteen, according to Anthony Wood, "he being well grounded in school learning, was sent to the university" of Oxford; at thirty-five he published his first poem, *The Shadow of Night.* Between these dates, though no fact has been unearthed concerning his career, it is not improbable that he may have travelled in Germany. At thirty-nine he was reckoned "among the best of our tragic writers for the stage;" but his only play published at that age was a crude and formless attempt at romantic comedy, which had been acted three years before it passed from the stage to the press; and his first tragedy now extant in print, without name of author, did not solicit the suffrage of a reader till the poet was forty-eight. At thirty-nine he had also published the first instalment of his celebrated translation of the *Iliad,* in a form afterwards much remodelled; at sixty-five he crowned the lofty structure of his labor by the issue of an English version of the *Hymns* and other minor Homeric poems. The former he dedicated to Robert Devereux, Earl of Essex, the hapless favorite of Elizabeth; the latter to Robert Carr, Earl of Somerset, the infamous minion of James. Six years earlier he had inscribed to Bacon, then Lord Chancellor, a translation of Hesiod's *Works and Days.* His only other versions of classic poems are from the fifth satire of Juvenal and the *Hero and Leander* which goes under the name of Musæus, the latter dedicated to Inigo Jones. His revised and completed version of the *Iliad* had been inscribed in a noble and memorable poem of dedication to Henry Prince of Wales, after whose death he and his *Odyssey* fell under the patronage of Carr. Of the manner of his death at seventy-five we know nothing more than may be gathered from the note appended to a manuscript fragment, which intimates that the remainder of the poem, a lame and awkward piece of satire on his old friend Jonson, had been "lost in his sickness."

Chapman, his first biographer is careful to let us know, "was a person of most reverend aspect, religious and temperate, qualities rarely meeting in a poet;" he had also certain other merits at least as necessary to the exercise of that profession. He had a singular force and solidity of thought, an admirable ardor of ambitious devotion to the service of poetry, a deep and burning sense at once of the duty implied and of the dignity inherent in his office; a vigor, opulence, and loftiness of phrase, remarkable even in that age of spiritual strength, wealth, and exaltation of thought and style; a robust eloquence, touched not unfrequently with flashes of fancy, and kindled at times into heat of imagination. The main fault of his style is one more commonly found in the prose than in the verse of his time,—a quaint and florid obscurity, rigid with elaborate rhetoric and tortuous with labyrinthine illustration; not dark only to the rapid reader through closeness and subtlety of thought, like Donne, whose miscalled obscurity is so often "all glorious within," but thick and slab as a witch's gruel with forced and barbarous eccentricities of articulation. As his language in the higher forms of comedy is always pure and clear, and sometimes exquisite in the simplicity of its earnest and natural grace, the stiffness and density of his more ambitious style may perhaps be attributed to some pernicious theory or conceit of the dignity proper to a moral and philosophic poet. Nevertheless, many of the gnomic passages in his tragedies and allegoric poems are of singular weight and beauty; the best of these, indeed, would not discredit the fame of the very greatest poets for sublimity of equal thought and expression: witness the lines chosen by Shelley as the motto for a poem, and fit to have been chosen as the motto for his life.

The romantic and sometimes barbaric grandeur of Chapman's Homer remains attested by the praise of Keats, of Coleridge, and of Lamb; it is written at a pitch of strenuous and laborious exaltation, which never flags or breaks down, but never flies with the ease and smoothness of an eagle native to Homeric air. From his occasional poems an expert and careful hand might easily gather a noble anthology of excerpts, chiefly gnomic or meditative, allegoric or descriptive. The most notable examples of his tragic work are comprised in the series of plays taken, and adapted sometimes with singular license, from the records of such part of French history as lies between the reign of Francis I. and the reign of Henry IV., ranging in date of subject from the trial and death of Admiral Chabot to the treason and execution of Marshal Biron. The two plays bearing as epigraph the name of that famous soldier and conspirator are a storehouse of lofty thought and splendid verse, with scarcely a flash or sparkle of dramatic action. The one play of Chapman's whose popularity on the stage survived the Restoration is *Bussy d'Ambois* (d'Amboise)—a tragedy not lacking in violence of action or emotion, and abounding even more in sweet and sublime interludes than in crabbed and bombastic passages. His rarest jewels of thought and verse detachable from the context lie embedded in the tragedy of *Cæsar and Pompey,* whence the finest of them were first extracted by the unerring and unequalled critical genius of Charles Lamb. In most of his tragedies the lofty and laboring spirit of Chapman may be said rather to shine fitfully through parts than steadily to pervade the whole; they show nobly altogether as they stand, but even better by help of excerpts and selections. But the excellence of his best comedies can only be appreciated by a student who reads them fairly and fearlessly through, and, having made some small deductions on the score of occasional pedantry and occasional indecency, finds in *All Fools, Monsieur d'Olive, The Gentleman Usher,* and *The Widow's Tears* a wealth and vigor of humorous invention, a tender and earnest grace of romantic poetry, which may atone alike for these passing blemishes and for the lack of such clear-cut perfection of character and such dramatic progression of interest as we find only in the yet higher poets of our heroic age.

So much it may here suffice to say of Chapman as an original poet, one who held of no man and acknowledged no master, but throughout the whole generation of our greatest men, from the birth of Marlowe well-nigh to the death of Jonson, held on his own hard and haughty way of austere and sublime ambition, not without kindly and graceful inclination of his high grey head to salute such younger and still nobler compeers as Jonson and Fletcher. With Shakespeare we should never have guessed that he had

come at all in contact, had not the keen intelligence of a living critic, Mr. Minto, divined or rather discerned him to be the rival poet referred to in Shakespeare's sonnets with a grave note of passionate satire, hitherto as enigmatic as almost all questions connected with those divine and dangerous poems. This conjecture the critic has fortified by such apt collocation and confrontation of passages that we may now reasonably accept it as an ascertained and memorable fact.

The objections which a just and adequate judgment may bring against Chapman's master-work, his translation of Homer, may be summed up in three epithets: it is romantic, laborious, Elizabethan. The qualities implied by these epithets are the reverse of those which should distinguish a translator of Homer; but setting this apart, and considering the poems as in the main original works, the superstructure of a romantic poet on the submerged foundations of Greek verse, no praise can be too warm or high for the power, the freshness, the indefatigable strength and inextinguishable fire which animate this exalted work, and secure for all time that shall take cognizance of English poetry an honored place in its highest annals for the memory of Chapman. (A. C. S.)

CHAPPE, Claude (1763–1805), a French engineer, and the inventor of the simple French telegraph, was born in Normandy in 1763. His invention consisted of an upright post, on the top of which was fastened a transverse bar, while at the ends of the latter two smaller arms moved on pivots. The positions of these four bars represented words or letters; and by means of machines placed at intervals such that each was distinctly visible from the next, messages could be conveyed through 50 leagues in a quarter of an hour. It was said that Chappe borrowed the design from Hooke and Amontons, and the charge so deeply affected him that, notwithstanding the success of his machine, which had been adopted by the Legislative Assembly in 1792, he was seized with deep melancholia, under which he committed suicide in 1805.

CHAPTAL, Jean Antoine (1756–1832), count of Chanteloup, an eminent French chemist and statesman, born at Nogaret, Lozère, 4th June, 1756. At Montpellier, where he first studied chemistry, he obtained his doctor's diploma in 1777, when he repaired to Paris. In 1781, the States of Languedoc founded a chair of chemistry for him at the school of medicine in Montpellier, where he taught with success the doctrines of Lavoisier, in opposition to those of Stahl. The capital he acquired by the death of a wealthy uncle he employed in the establishment of chemical works for the manufacture of mineral acids, alum, white-lead, soda, and other substances. His labors in the cause of applied science were at length recognized by the French Government, which presented him with letters of nobility, and the cordon of the order of Saint Michel. A publication by Chaptal, entitled *Dialogue entre un Montagnard et un Girondin*, caused him to be arrested; but being speedily set at liberty through the intercession of his friends, he undertook, in 1793, the management of the saltpetre works at Grenelle. In the following year he went to Montpellier, where he remained till 1797, when he returned to Paris. After the revolution of the 18th of Brumaire (9th November, 1799) he was made a councillor of state by the first consul, and succeeded Lucien Bonaparte as minister of the interior, in which capacity he established a chemical manufactory near Paris, a school of arts, and a society of industries; he also reorganized the hospitals, introduced the metrical system of weights and measures, and otherwise greatly encouraged the arts and sciences. A misunderstanding between him and Napoleon occasioned Chaptal's retirement from office in 1804; but before the end of that year he was again received into favor by the emperor, who bestowed on him the grand cross of the legion of honor, and made him treasurer to the conservative senate. On Napoleon's return from Elba, Chaptal was made director-general of commerce and manufactures and a minister of state. He was obliged after the downfall of the emperor to withdraw into private life; and his name was for a time removed from the list of the peers of France. In 1816, however, he was nominated a member of the Academy of Sciences by Louis XVIII. Notwithstanding the many vicissitudes of fortune which he underwent, Chaptal continued to promote the interests of science until his death, which took place at Paris, 30th July, 1832.

His literary works exhibit both vigor and perspicuity of style; he wrote, in addition to various articles for chemical journals, *Elémens de Chimie* 3 vols. 8vo, 1790; *Traité sur le Salpètre*, 8vo, 1796; *Essai sur le Perfectionnement des Arts Chimiques en France*, 8vo, 1800; *Art de faire, de gouverner, et de perfectionner les Vins*, 1 vol. 8vo, 1801; *Traité Théorique et Pratique sur la Culture de la Vigne*, &c., 2 vols. 8vo, 1801; *Essai sur le Blanchiment*, 1801; *Chimie appliquée aux Arts*, 4 vols. 8vo, 1807; *Art de la Teinture du Coton en rouge*, 8vo, 1807; *Art du Teinturier et du Dégraisseur*, 8vo, 1800; *De l'Industrie Francaise*, 2 vols. 8vo, 1819; *Mémoire sur le Sucre de Betteraves*, 8vo; *Chimie appliquée à l'Agriculture*, 2 vols. 8vo, 1823.

CHAPTER, the community of clergymen connected with a cathedral or collegiate church. See Cathedral.

CHAPU, an important maritime town of China, in the province of Che-keang, 50 miles N.W. of Chinhai, situated in one of the richest and best cultivated districts in the country. It is the port of Hang-chow, with which it has good canal communication, and it was formerly the only Chinese port trading with Japan. The town has a circuit of about five miles, exclusive of the suburbs that lie along the beach; and the Tatar quarter is separated from the rest by a wall. It was attacked and much injured by the British force in 1842, but was abandoned immediately after the engagement.

CHARADE, a trifling species of composition, or quasi-literary form of amusement, which may perhaps be best defined as a punning enigma propounded in a series of descriptions. A word is taken of two or more syllables, each forming a distinct word; each of these is described in verse or prose, as aptly and enigmatically as possible; and the same process is applied to the whole word. The neater and briefer the descriptive parts of the problem, the better the charade will be. In selecting words for charades, special attention should be paid to the absolute quality of the syllables composing them, inaccuracy in trifles of this sort depriving them of what little claim to merit they may possess. The brilliant rhythmic trifles of W. Mackworth Praed are well known. Of representative prose charades, the following specimens are perhaps as good as could be selected:—"*My first*, with the most rooted antipathy to a Frenchman, prides himself, whenever they meet, upon sticking close to his jacket; my *second* has many virtues, nor is its least that it gives its name to my first; my *whole* may I never catch!" "My *first* is company; my *second* shuns company; my *third* collects company; and my *whole* amuses company." The solutions are *Tar-tar* and *Co-nun-drum*. "Acting charades" are simply punning enigmas described dramatically. A brilliant description of this variety of the species will be found in Thackeray's *Vanity Fair*.

CHARCAS. See Sucre.

CHARCOAL, the more or less impure form of carbon obtained from various vegetable and animal materials by their ignition out of contact with air.

Wood Charcoal is a hard and brittle black substance, that retains the form and external structure of the wood from which it is made. It rings when struck, and has a conchoidal fracture; it is infusible, and is not dissolved by water or acids; at ordinary temperatures it is a bad conductor of heat and electricity. Charcoal varies much in degree of compactness, box-wood giving a very solid, and willow a porous variety. Exclusive of its pores, it has a specific gravity 1·5, or, if made at a high temperature, of 2·0. Charcoal from Scotch fir weighs from 10·3 to 10·9 lb per cubic foot; that made from oak is heavier. Very light charcoal is prepared from dogwood, alderwood, and willow. Charcoal contains, besides carbon, varying (but small) quantities of hydrogen, oxygen, and nitrogen; and when consumed, it yields from 1 to 5 per cent. of ash, or the greater part of the mineral matter contained in the original wood. Charcoal burns without flame, and has in air a calorific intensity of about 2700° C.; its specific heat, according to Regnault, is 0·2411. The higher the temperature to which it has been exposed, the higher is the igniting point of charcoal; and that made at the melting point of platinum requires a temperature of 1250° C. to kindle it.

Fresh-burnt charcoal rapidly absorbs from 9·6 to 18 per cent. of its weight of atmospheric moisture, of which the commercial article usually contains about 12 per cent. It has also a remarkable absorptive action on gases, condensing them within its pores. To the heat thus developed has been attributed the occasional spontaneous ignition of char-

coal that has been stacked too soon after manufacture. Recently-made box-wood charcoal absorbs, at 12° C. and 28·5 in. pressure, 90 volumes of ammonia, 85 of hydrochloric acid, 65 of sulphurous anhydride, 55 of sulphuretted hydrogen, 35 of carbonic anhydride, 9¼ of oxygen, and 6½ of nitrogen; only 1¼ vols., however, of hydrogen (Saussure). The absorptive power for gases is nearly in the ratio of the pressures to which the charcoal is exposed, the temperature being constant.

Charcoal can be made at a temperature as low as 300° C. It is produced in greatest quantity at a heat just sufficient thoroughly to char the wood. The charcoal so made contains a larger percentage of hydrogen, oxygen, and nitrogen than that formed at higher temperatures, and, being readily inflammable, is adapted for the manufacture of gunpowder. The quantity of charcoal obtainable from wood varies according to the nature of the wood employed and the method of manufacture. By distillation 25 to 27 per cent. of the weight of the wood can be obtained. Ordinarily, beech yields about 15 per cent. of its weight, box 20¼ per cent. Mr. Mushet obtained in his experiments the following percentage composition of various kinds of wood, the amount of each kind taken being 1 lb avoirdupois:—

	Volatile Matter.	Charcoal.	Ashes.
Oak	76·895	22·682	0·423
Ash	81·260	17·972	0·768
Birch	80·717	17·491	1·792
Norway Pine	80·441	19·204	0·355
Mahogany	73·528	25·492	0·980
Sycamore	79·20	19·734	1·066
Holly	78·92	19·918	1·162
Scotch Pine	83·095	16·456	0·449
Beech	79·104	19·941	0·955
Elm	79·655	19·574	0·761
Walnut	78·521	20·663	0·816
American Maple	79·331	19·901	0·768
American Black Beech	77·512	21·445	1·033
Laburnum	74·234	24·586	1·180
Lignum Vitæ	72·643	26·857	0·500
Sallow	80·371	18·497	1·132
Chestnut	76·304	23·280	0·416

Rumford, who employed a long-continued moderate heat, obtained a much larger quantity of charcoal from wood. During the charring of the wood, pyroligneous or acetic acid, creosote, pyroxylic spirit, and empyreumatic oils are produced, and much carbonic oxide, carbonic anhydride, hydrogen, and water are evolved.

Charcoal can be prepared in a variety of ways. In its purest form it is obtained by the ignition of organic substances such as starch and sugar. That made for powder-mills, as also that produced in acetic acid factories, is the product of the distillation of wood in iron cylinders. In China charcoal is prepared in pits, preferably in a clayey soil. In some parts of Sweden it is made from rectangular piles of wood, the process being regulated by the careful admission of air through holes in the covering of the wood. In Foucauld's process, a portable shroud or *abri* of wood coated with a mixture of loam and grass is used to cover the heap to be charred. In most countries where wood is abundant, charcoal-burning is carried on by firing conical piles of billets of wood, about 12 feet in height, and 10 to 40 feet in diameter, from the top of a central hole or chimney. The wood is felled in winter, and must be tolerably dry; it is built up with the bark outermost, the largest billets being placed in the interior of the pile; over the whole is laid a covering of turf, or of charcoal-dust ("brecze") and soil. The combustion of the wood is conducted from above downwards, and from the exterior towards the centre; so that the charcoal in a half-burnt heap forms an inverted cone. At the sides of the heap are holds for the admission of air, the number and size of which are a matter of importance. The first or "sweating" process lasts three or four days, during which the cover becomes moist with condensed water. The openings round about the base of the pile are then covered, and a series of holes is made about half-way from the top of the heap; as the smoke ceases to issue from these they are closed, and other series of holes are made below, as required. The tarry products which collect towards the close of the operation are removed from the heap by means of gutters or pipes.

Sometimes the base of the heap is made in the shape of a flat funnel, from which proceeds a channel for the tar and acid. When the air-holes of the burning heap no longer emit smoke and flame, they are carefully stopped, and the pile is allowed to cool for two or three days. The charcoal is then drawn, and any pieces which may still be glowing are quenched by plunging them into water or sand. By the above-described method, 128 cubic feet (one cord) of wood yield about 30 bushels of charcoal.

Besides being employed as a fuel, and as a reducing agent in metallurgy, wood-charcoal is applied to a variety of purposes. It is much used in the manufacture of filters, and as a medicine it may be administered in some cases of dyspepsia. On account of the resistance of charcoal to the action of water, stakes for wet soils and the insides of casks are charred previous to use. Charcoal is valuable as an absorbent of noxious effluvia, which it decomposes by bringing them into contact with condensed oxygen within its pores. Its absorbent power is greater than that of spongy platinum, but its efficacy as a promoter of chemical union is not so great. Dr. Stenhouse has been able to unite the properties of charcoal and spongy platinum in what he calls "platinized charcoal," which is made by boiling charcoal in a solution of platinic chloride, and then heating it to redness in a closed vessel. This preparation may be employed in ventilators and respirators, and, on account of its oxidizing properties, has been proposed for use as a mild caustic.

Coal-Gas Charcoal, or *Gas-Carbon*, is a dense and pure variety of charcoal, of a greyish black color, which is deposited in the inside of gas-retorts. It is used for making the negative poles of Bunsen's batteries.

Lamp Black is a finely-divided form of charcoal, obtained by condensing the smoke of burning resinous and oily substances in cylindrical chambers hung with sacking or sheep-skins. The crude lamp black is purified by heating to redness in closed vessels.

Peat Charcoal.—This variety of charcoal is produced by the carbonization of peat in kilns or circular shafts of brick and stone-work. The ignition is made to proceed from above downwards. Peat may also be economically charred by means of the waste-gas of smelting-furnaces, or of heated gases produced by the combustion of wood. In Bohemia a muffle-like chamber, heated at the sides and end by peat-fires, has been successfully employed—8 to 9 cubic metres of charcoal being produced from 20 cubic metres of peat, by the consumption of 10 cubic metres of the same, and at a cost of 5s. 2½d. per cubic metre of charcoal. According to Stöckhardt, 100 lb of wood-charcoal will by their combustion evaporate as much water as 113 lb of peat-charcoal. The use of charred peat in some metallurgical operations must depend upon the cost of its preparation. Its friability renders it unfit for the blast-furnace; but it may be advantageously used on blacksmiths' hearths. Hitherto it has not been employed on an extensive scale, the large amount of ash it produces (45 per cent.) being one objection to its consumption.

Animal Charcoal, or *Bone-Black*, is prepared by igniting fresh and coarsely comminuted bones, which have been previously boiled to remove fat, in closed vessels of iron or earthenware. The bone-black so produced, which weighs about half as much as the bones employed, is hermetically sealed, as soon as made, in iron canisters. Animal charcoal contains of carbon about 14 per cent. in a state of fine division, of calcic phosphate 80 per cent., of calcic carbonate 5 per cent., with nitrogen and minor impurities. It is largely employed as a decolorizing, deodorizing, and filtering agent. It removes many organic substances from their solutions; thus it has been found that whilst the color of ale can be made paler by its means, the bitterness is at the same time wholly removed. This action of animal charcoal is due to the separation of the particles of carbon by the earthy matter present in it. The precipitant action of bone-black on matters in solution is much greater than that of wood-charcoal. Its decolorizing properties are found to be greatly enhanced by washing with hydrochloric acid and subsequent calcination with potash. A good decolorizing charcoal is made by igniting nitrogenous animal matter, such as horn and clippings of hides, in contact with pearl-ash, and washing the product with water. Animal charcoal can be re-purified after use by treating it with acids: or by putrefying and dissolving out organic impurities, washing, and finally igniting it. Animal char-

coal is used as a pigment, more especially in the form of *ivory black*, and also as a manure for vegetable soils; and it has been recommended by Drs. Eulenberg and Wohl as an antidote in cases of phosphorus poisoning.

See Wurtz, *Dictionnaire de Chimie*, vol. ii., 1868, pp. 843–847; Hunter, "On the effects of Pressure on the absorption of Gases by Charcoal," *Journ. Chem. Soc.*, 1871, p. 76; Percy, *Metallurgy*, Lond., 1875; Wanklyn, "On the Process of Combustion which takes place in the Interior of certain Porous Filters," *Chem. News*, vol. xxxiii. p. 243, and vol. xxxiv.

CHARD, a municipal borough and market-town of England, in Somersetshire, with a railway junction, 18 miles south of Bridgewater, and 139 miles from London. It was allowed to return two members to parliament by Edward I., but was deprived of that privilege in the reign of Edward III. The town stands upon an eminence on the south border of the county, is well built, and has a town-house and market-hall of recent erection. It manufactures lace and woollen goods, and iron and brass wares. Population in 1871, 2400.

CHARDIN, Sir John (1643–1713), a celebrated traveller, was born at Paris in 1643. His father, a wealthy jeweller, gave him an excellent education and trained him in his own art; but instead of settling down in the ordinary routine of the craft, he set out in company with a Lyons merchant named Raisin in 1665 for Persia and India, partly on business and partly to gratify his own inclination. After a highly successful journey, during which he had received the patronage of Shah Abbas II. of Persia, he returned to France in 1670, and there published in the following year *Récit du Couronnement du Roi de Perse Soliman III.* Finding, however, that his Protestant profession cut him off from all hope of honors or advancement in his native country, he set out again for Persia in August, 1671. This second journey was much more adventurous than the first, as instead of going directly to his destination, he passed by Smyrna, Constantinople, the Crimea, Caucasia, Mingrelia, and Georgia, and did not reach Ispahan till June, 1673. After four years spent in researches throughout Persia, he again visited India, and returned to Europe by the Cape of Good Hope in 1677. The persecution going on in France led him, in 1681, to settle in London, where he was appointed jeweller to the Court, and received from Charles II. the honor of knighthood. In 1683 he was sent to Holland as representative of the English East India Company; and in 1686 he published the first part of his great narrative—*The Travels of Sir John Chardin into Persia and the East Indies*, &c. (London). It was not till 1711, however, that the complete account of his travels appeared, under the title of *Journal du Voyage du Chevalier Chardin*, at Amsterdam. The Persian portion is to be found in vol. ii. of Harris's *Collection*, and extracts are reprinted by Pinkerton in vol. ix. The best complete reprint is by Langlès, Paris, 1811. Sir John Chardin's narrative has received the highest praise from the most competent authorities for its fulness, comprehensiveness, and fidelity; and it furnished Montesquieu, Rousseau, Gibbon, and Helvétius with most important material. Sir John died in London in 1713 and was buried in Westminster Abbey, where his monument bears the inscription *Nomen sibi fecit eundo.*

CHARENTE, an inland department in the south-west of France, comprehending the ancient division of Angoumois, and inconsiderable portions of Saintonge, Poitou, and Limousin. It is bounded N. by the departments of Deux-Sèvres and Haute-Vienne, E. by those of Vienne and Dordogne, and S. and W. by Dordogne and Charente-Inférieure. The greater part of its area of 2295 square miles consists of the valley of the River Charente, which rises in Haute-Vienne, and after a circuitous course passes into the department of Charente-Inférieure, where it falls into the sea opposite Isle-Madame, having received in its progress the waters of the Tardoire, Touvres, Né, Antoine, and Boutonne. The Charente, though rapid, has been artificially rendered navigable, and steamers ply between Angoulême and Saintes, although the tide ascends no higher than the latter town. The surface of the department is comparatively level, and subject to frequent inundations; and in the arrondissement of Confolens alone there are upwards of sixty small lakes. The hills, which belong to the Limousin range, are generally uniform in height, and abound in marine deposits; some of them are covered with chestnut forests, which supply the district with a large amount of fruit. The climate is temperate, and the prevailing winds are the west and south-west. The principal productions are wine, corn, hemp, flax, and potatoes, the wine being largely distilled into brandy, for which the town of Cognac is famous. Pigs, sheep, and poultry are extensively reared for the consumption of the capital; and the value of the truffles annually brought to market is estimated at several million francs. The mineral productions consist chiefly of iron, lead, antimony, and gypsum, of which iron and gypsum only are worked to any extent. Among the manufactures paper occupies the foremost place; but canvas, linen cloth, hats, cordage, hoops, and pottery are also made. Charente is divided into five arrondissements, which derive their names from the five principal towns of Angoulême, Cognac, Ruffec, Barbézieux, and Confolens. Angoulême is the chief town. The population in 1872 amounted to 367,520.

CHARENTE-INFÉRIEURE, or Lower Charente, a maritime department of France, comprehending the old provinces of Saintonge and Aunis, and including the islands of Ré, Oléron, Aix, and Madame. It has an area of 2636 square miles, and is bounded N. by Vendée and Deux-Sèvres, E. by Charente, S. by Gironde, and W. by the Bay of Biscay. The surface is exceedingly flat throughout the whole department, and along the coast-line it is so far depressed as to require in many places the erection of sea-dikes and extensive artificial draining. The facilities of the department for internal communication are greatly increased by the number of navigable streams, the formation of two canals (from La Rochelle to the Sèvre-Niortaise, and from Brouage to Rochefort), and the development of an extensive railway system in the hands of a company known as the Company of the Charentes. The productions very nearly coincide with those of Charente, with this difference—that its wines and brandy are greatly inferior, but its fruits and vegetables greatly superior to those of the upper province. It has also more extensive pasturage, and considerable revenue accruing from the pilchard and oyster fisheries on the coast, but its mineral wealth and manufactures are neither so various nor so productive. The former is confined to iron pyrites and the salt supplied by the marshes along the coast; the latter includes coarse woollen stuffs, leather, soap, earthenware, staves, timber, and chemicals. It has several sheltered bays on the coast, and several good harbors, such as Rochefort, Tonnay-Charente, Royan, and Marans, at which a brisk coasting trade is carried on. There is considerable trade in colonial produce, and ship-building is prosecuted to some extent. The climate is salubrious except along the coast, where fevers and ague prevail. There are six arrondissements, cognominal with the towns of La Rochelle, Rochefort, Marennes, Saintes, Jonzac, and St. Jean d'Angely,—La Rochelle being the chief town of the department. The total population in 1872 was 465,653.

CHARENTON-LE-PONT, a town of France in the department of Seine, situated on the right bank of the Maine, near its confluence with the Seine, a short distance south-east of Paris, of which it may almost be regarded as a suburb. It derives the distinctive part of its name from the stone bridge of ten arches which crosses the Marne and unites the town with the village of Alfort, famous for its veterinary school. It has always been regarded as a point of great importance for the defence of the capital, and has frequently been the scene of sanguinary conflicts. Of its fortifications the most important is the Fort de Charenton, which lies on the left bank of the river near Alfort. In the 16th and 17th centuries Charenton was the scene of the ecclesiastical councils of the Protestant party, which had its principal church in the town. At present its most remarkable institution is the lunatic asylum, or Maison de Santé, which was originally founded by Le Blanc in 1664 as a general hospital, and only received its present appropriation by a decree of the tenth year of the Republic. In 1814 the bridge was gallantly defended by the pupils of the veterinary school against the Austrians and Würtembergers. Population in 1872, 7141.

CHARIOT, in antiquity, was a conveyance used in battle, for the chase, in public processions, and in games. It had two wheels, and was made to be drawn by two horses; if a third or, more commonly, two reserve horses were added, they were attached on each side of the main pair by a single trace fastened to the front of the chariot, as may be seen

on two prize vases in the British Museum from the Panathenaic games at Athens, on which *quadrigæ* are represented. On the monuments there is no other sign of traces, from the want of which wheeling round must have been difficult. Immediately on the axle, without springs of any kind, rested the basket or body of the chariot, which consisted of a floor to stand on, and a semicircular guard round the front about half the height of the driver. It was entirely open at the back, so that the combatant might readily leap to the ground and up again as was necessary. There was no seat, and generally only room for the combatant and his charioteer to stand in. The pole was probably attached to the middle of the axle, though it appears to spring from the front of the basket; at the end of the pole was the yoke, which consisted of two small saddles fitting the necks of the horses, and fastened by broad bands round the chest. Besides this the harness of each horse consisted of a bridle and a pair of reins, mostly the same as in use now, made of leather and ornamented with studs of ivory or metal. The reins were passed through rings attached to the collar bands or yoke, and were long enough to be tied round the waist of the charioteer in case of his having to defend himself. The wheels and body of the chariot were usually of wood, strengthened in places with bronze or iron; the wheels had from four to eight spokes and tires of bronze or iron. This description applies generally to the chariots of all the nations of antiquity; the differences consisted chiefly in the mountings. The chariots of the Egyptians and Assyrians, with whom the bow was the principal arm of attack, were richly mounted with quivers full of arrows, while those of the Greeks, whose characteristic weapon was the spear, were plain except as regards mere decoration. Among the Persians, again, and more remarkably among the ancient Britons, there was a class of chariot having the wheels mounted with sharp sickle-shaped blades, which cut to pieces whatever came in their way. This was probably an invention of the Persians; Cyrus the younger employed these chariots in large numbers. Among the Greeks and Romans, on the other hand, the chariot had passed out of use in war before historical times, and was retained only for races in the public games, or for processions, without undergoing any alteration apparently, its form continuing to correspond with the descriptions of Homer, though it was lighter in build, having to carry only the charioteer. On two Panathenaic prize vases in the British Museum are figures of racing *bigæ*, in which, contrary to the description given above, the driver is seated with his feet resting on a board hanging down in front close to the legs of his horses. The *biga* itself consists of a seat resting on the axle, with a rail at each side to protect the driver from the wheels. The chariot was unsuited to the uneven soil of Greece and Italy, and it is not improbable that these nations had brought it with them as part of their original habits from their former seats in the East. In the remains of Egyptian and Assyrian art there are numerous representations of chariots, from which it may be seen with what richness they were sometimes ornamented. The "iron" chariots in use among the Jews appear to have been chariots strengthened or plated with metal, and no doubt were of the form above described, which prevailed generally among the other ancient nations.

CHARITIES. There are few features of English society more remarkable than the strength of its charitable organization. It is not merely that the voluntary contributions of individuals to the purposes usually described as charitable are on the largest scale, but that endowments in aid of every variety of public use abound in all parts of the country. These endowments are mostly of private foundation, and but for comparatively recent legislation, would be almost entirely beyond the cognizance or control of the state. So far, indeed, as real property is concerned, the state has for various reasons discouraged its application to such purposes. During the feudal period of English law, the rights of the lords of the soil were continually being invaded by the alienation of land to ecclesiastical corporations. These societies had perpetual succession, whereby the rights of the superior incidental to the tenancy of individuals were destroyed. It was to prevent such alienations that the Mortmain Acts were passed. The statute De Religiosis, 7 Edward I. st. 2, c. 1, and the statute of Westminster 2d enacted that if any body politic, ecclesiastical or lay, sole or aggregate, should buy or sell lands or by any engine or craft appropriate lands in such a way that they should in anywise come into mortmain, the lord of the fee might enter within a year of the alienation, and in default of the mesne lord, the land should go to the king. The 15 Ric. II. c. 5 extended this statute to all lands, &c., purchased to the use of guilds and fraternities, &c. When testamentary power over freehold lands was established in the reign of Henry VIII., bodies politic and corporate were expressly excepted from the benefit of the statute. Alienations in mortmain, as they were called, were not absolutely void, but voidable only at the option of the intermediate lords or the king, and the license of the lords and the king confirmed the alienation. A devise of realty to a corporation was ineffectual, and the land descended to the heir, either for his own use or charged with the trust imposed on it by the intended devise. The preamble to the important statute 43 Eliz. c. 4 gives us an idea of the number and variety of the public objects on which testators and other donors were in the habit of expending their wealth:— "Whereas land, tenements, rents, annuities, profits, hereditaments, goods, chattels, money, and stocks of money have been heretofore given, limited, appointed, and assigned, as well by the Queen and her progenitors as by sundry other well-disposed persons; some for relief of aged, impotent, and poor people; some for maintenance of sick and maimed soldiers and mariners, schools for learning, for schools and scholars in universities; some for repair of bridges, ports, havens, causeways, churches, sea-banks, and highways; some for education and preferment of orphans; some for or towards relief, stock, or maintenance of houses of correction; some for marriages of poor maids; some for supportation, aid, and help for young tradesmen, handicraftsmen, and persons decayed; and others for relief or redemption of prisoners or captives, and for aid or ease of any poor inhabitants, concerning payments of fifteens, setting out of soldiers, and other taxes, which lands, tenements, &c., have not been employed according to the charitable intent of the givers and founders thereof, by reason of frauds, breaches of trust, &c." The statute gives the Lord Chancellor power to appoint commissioners to inquire into such cases. A charity under the statute has been defined to be a gift to a general public use, which extends to the rich as well as to the poor. By a series of judicial interpretations, the power of devising lands to corporations for charitable uses was established, and the subject of the Mortmain Acts was to a certain extent frustrated.

The Act 9 Geo. II. c. 36 takes notice of the public mischief caused by alienations or dispositions made by languishing or dying persons to uses called charitable uses, to the disherison of their lawful heirs. It is accordingly enacted that no real property, or money to be laid out in the purchase of real property, shall be transferred in any way in trust for the benefit of any charitable use whatsoever, unless such gift be executed by deed at least twelve months before the donor's death, and enrolled in the Court of Chancery within six months of its execution. Gifts to the universities and colleges are excepted under the Act. Gifts to uses which are superstitious within the Acts of Henry VIII. and Edward VI. are still held to be void.

Many Acts have been passed within the present century for the better regulation of charities. The Lord Chancellor was always understood to have a prerogative jurisdiction, as representing the king, who is *parens patriæ*, over these public trusts. The Act of Elizabeth, as we have seen, gave him authority to appoint commissioners of inquiry, and under that Act the Court of Chancery developed some very important doctrines regarding charities. The chancellor's commissions fell into disuse, and it was found more convenient to proceed by way of information on the part of the Attorney-General. It will be easily understood that great abuses must have sprung up under a system of control which was by its very nature casual, litigious, and intermittent. In the case of charitable corporations with visitors of their own, the power of the court to interfere was to a certain extent restricted by the visitatorial jurisdiction. In 1818 began a series of public investigations into charitable funds, which has by no means yet come to an end. At the instance of Lord Brougham, a commission was appointed to inquire into the educational charities, but the universities and large schools were exempted from its operation. A second commission with further powers was appointed under the 59 Geo. III.

c. 81, and continued until 1830. Charities under special visitors were still exempted, but this exemption was discontinued when the third commission, under 1 and 2 Will. IV. c. 34, was appointed. In the reports of the commission it is stated that the worst cases of abuse and maladministration were found in charities having special visitors. Grammar-schools in that position are described as being especially deplorable. A fourth commission was appointed in 1835. The reports of these various commissions, and of a House of Commons committee on the same subject, called public attention to the abuses of charity administration. After many efforts the Charitable Trusts Act of 1853 was passed. By this and the amending Acts, permanent commissioners were appointed with extensive powers. It is their duty to inquire into the management of charities, and to insist on accounts being laid before them, and they are now enabled to undertake the administrative business in respect of charities which belonged to the Court of Chancery. Contentious business is still remitted into court, but the rest is carried through in the office of the commissioners. In cases requiring such intervention, they send a certificate to the Attorney-General, who takes such proceedings thereon as he may think proper. The universities and their colleges, cathedrals, and generally all charities connected with religious worship, or supported solely by voluntary contributions, are exempted from the jurisdiction of the commissioners. Endowed schools were, by the Endowed Schools Act 1869, handed over to a separate commission, and the powers of the Court of Chancery and Charity Commissioners were restricted with respect to them. More recently the Endowed Schools Commission has been allowed to expire, and its duties have been assigned to the Charity Commission. There are still many charities in England which the powers of the Charity Commissioners do not seem to be able to reach.

CHARITON, of Aphrodisias in Caria, probably one of the last of the Greek erotic writers, lived about the 5th century A.D., and was the author of a romance entitled *The Loves of Chæreas and Callirrhoe.* It has been translated into German and French. The best edition is that by D'Orville, reprinted by Beck, Lips., 1783.

CHARLEMAGNE, or CHARLES THE GREAT, was born in 742, succeeded his father Pepin as king of the Franks in 768, was crowned emperor of the Romans in 800, and died in 814 after an eventful and beneficent reign of forty-six years. His father had divided the Frankish kingdom between him and his younger brother Carloman, but the latter dying in 771, Charlemagne was proclaimed sole ruler. The monarchy he thus inherited was a very extensive one; for, in addition to the Frankish territory, stretching from the Loire to the east of the Rhine, there were Burgundy and Allemania, which had been incorporated by his ancestors, while almost all round the direct empire of the Franks stretched a group of vassal nations. Aquitaine, Brittany, Frisia, Thuringia, and Bavaria were in more or less close subjection to them. They were, moreover, the protectors of the popes against the Greeks and Lombards, and the champions of Christianity against the Saracens on the south-west and the heathen Saxons of the north-east. In fact, before the accession of Charlemagne the Franks had attained to a real supremacy over most of the Germanic nations, and were the bulwark of the Christianity of the West. This many-sided and lofty position imposed a corresponding complexity of duty on the new king, which he fulfilled with an energy and success almost unexampled in the history of the world, maintaining and extending on all hands the influence of Christian culture, and taking the first steps towards converting the military monarchy of the Franks into an organized polity. His first task was to suppress a rising in Aquitaine. In 772 commenced the great mission of his life, the conquest and conversion of the Saxons, a work which could be effected only after thirty-two years of the fiercest and most passionate warfare. With the doubtful exception of the Frisians, the Saxons were the last remnant of the old Germanic resistance to the military supremacy of the Franks, and the last Germanic champions of the religion of Odin against the onward progress of Christianity. Charlemagne never had much difficulty in vanquishing the badly-organized Saxon forces, and in compelling a temporary or partial submission; but with a loose confederation like the Saxons, which had no definite organization and no properly-recognized representative, it was difficult to make a fixed and universally accepted arrangement. Hence the incessant renewal of an apparently decided conflict, and the outcry of the Franks against the treachery of their enemies. The encroachments of the Saxons on his eastern frontier was the occasion of his first expedition, which was directed into the ancient forest of Teutoberg, famous as the scene of the old Germanic resistance to the Romans. Here he stormed the fortress of Ehresburg, overthrew the Irminsul, a mysterious column-shaped idol much revered among the Saxons, destroyed the sanctuary of Odin, and compelled the Westphalian Saxons to submit. Events in Italy now summoned Charlemagne to the other side of the Alps, in order to chastise the Lombards who were invading the possessions of the Pope. The Frankish king was victorious, dethroned Desiderius the Lombard king, and placed the Lombard crown on his own head (774). Meanwhile, the Saxons had profited by his absence to expel the Frankish garrisons, and even to renew their old ravages. Charlemagne immediately set out against them, and in two campaigns enforced the submission of the entire Saxon confederation. In a great Champ-de-Mai at Paderborn the Frankish king, surrounded by his chiefs and by ambassadors from distant nations, received the homage of the Saxon warriors, many thousands of whom submitted to be baptized (777). The Saxons apparently subdued, Charles crossed the Pyrenees, and received the submission of the country as far as the Ebro. On his return, however, the rear-guard was assailed and cut off by the mountaineers in the pass of Roncesvalles; Roland their leader was slain, and the overthrow of the Franks, transformed and wrought up in every possible way, became one of the great themes of song and romance (778). His march home from Spain had been unseasonably hastened by a general revolt of the Saxons, this time assisted by the Danes. Charles was again easily victorious, but no sooner had he left the country than the Saxons, mad with revenge, and animated by the fiercest national and religious hate, resumed the struggle. Even the massacre of Verden (782), in which 4500 Saxon prisoners were slain in cold blood, served only to intensify the spirit of resistance; but their rude courage was no match for the large and well-disciplined armies of the Frankish king. They were again completely defeated; even Wittikind, the hero of the whole war, was compelled to confess the superiority of the God of Charlemagne, and at Attigny received the rite of baptism (785). His example was generally followed; and the Frankish organization, political and ecclesiastical, was systematically introduced. Germany had become Christian; it was now the Northmen, among whom thousands of Saxons had found refuge, that took up the task of supporting a gradually-declining cause. But though this may be looked upon as the deciding act in the drama of old Germanic resistance, there were still many bloody and almost general revolts of the Saxons. To punish these Charles adopted even a more effective method than the planting of Frankish garrisons; thousands of Saxon families were deported into other provinces of the empire, and more loyal subjects introduced to fill the vacant space. It was not till 804 that the last sparks of resistance were quenched.

In the year 788, Bavaria was incorporated with the Frankish empire. Its duke, Thassilo, had more than once incurred the displeasure of Charles by too pronounced measures towards the recovery of his independence, and had even alienated his subjects by schemes of alliance with the heathen Avars and the heretic Greeks. Consequently Charles had no difficulty in dethroning him. This was followed in 791 by a vast and well-organized expedition against the Avars, a savage robber nation of Mongols inhabiting the modern Hungary. The Franks were again victorious everywhere; but other work of a more pressing kind prevented Charles from completing their reduction, which was afterwards effected chiefly by his lieutenants. Their immense circular encampments, or rings, from which they had issued to carry havoc into all the surrounding countries, were forced, and their treasures became the spoil of the Christian armies (798). They submitted; and German colonists were introduced into many of those regions. In this way Pannonia was added to the empire of Charles. Other campaigns carried on at various times by Charlemagne or his lieutenants, on the Elbe and even in Bohemia, against the Danes, the Wends, and the Czechs, still further increased the prestige of the Frankish armies, and enlarged the empire of their great monarch against Slavish and Scandinavian heathendom, while his troops maintained the

Spanish march against his south-western enemies, Moslem and Christian, and the duke of Benevventum in Southern Italy was obliged to become his vassal. Thus from the Eider to Sicily, and from the Ebro to the Theiss, the will of Charles was supreme; while over the Slavonic tribes, as far as the Oder or even the Vistula, his influence was felt in no feeble way. The genius and energy of one man had succeeded in arresting the progress of political disintegration, and, in the interest of culture and constructive order, in welding into one great monarchy all the races of continental Germany. It was no wonder that men who associated the ideas of imperial order and constructive civilization with the name of Rome should have recognized in the monarchy of Charles the restoration of the power of the Cæsars. When, therefore, at Rome, on Christmas eve of the year 800, he was crowned emperor of the Romans, it seemed the natural consummation of his whole career. And when in 801 an embassy arrived with curious presents from Harun-al-Raschid, the great caliph who held in the East the same place as Charles in the West, men recognized it as becoming testimony to the world-wide reputation of the Frankish emperor.

Charles was far more than an ordinary conqueror. He displayed not less energy in the internal organization and administration of his kingdom than in foreign affairs. The whole empire was divided into districts, presided over by counts, who were responsible for their good government; while in the exposed frontiers or marches, other counts (*Markgrafen*) were stationed with forces capable of defending them. In order to superintend these provincial authorities, to give effect to the royal will, to preserve the due subordination of the outlying portions of the empire to the central power, and in this way to complete and secure the organization of the empire, the *missi dominici*, experienced men both of the laity and clergy, were despatched in all directions. Two great assemblies were held every year,—the Champ-de-Mai, which was a kind of national muster, essentially military, and another in autumn, of the high officials, of a deliberative and advisory nature. In the capitularies (edicts issued as the necessities of the empire required), in his endeavors to promote education, in his organization of the church and the definitive institution of tithes, in the unsuccessful attempt to join the Danube and the Rhine by a canal, he gave proof of the noblest desire to conserve and propagate the culture of former times. Learned men—Eginhard, Paul Warnefried, and, above all, Alcuin—were his intimate friends and teachers; Guizot calls Alcuin his intellectual prime minister.

Charlemagne died on 28th January, 814, at Aix-la-Chapelle, and was buried there. The empire created and organized by his genius gradually fell to pieces after his death. His endeavor to resuscitate an old civilization, to engraft the Christian Roman culture on the vigorous stem of the Teutonic races, and to unite all the Germanic tribes in one empire, before the long action of historic influences had stamped upon them a distinct national character—this was to a great extent a failure, because one life-time was too short for its accomplishment. His greatness lies in the nobility of his aim, in the energy and wisdom with which he carried it out during his life, and also in the enduring traces of valuable work which remained notwithstanding the general wreck of his empire; for, though the central organization was swept away, the provincial authorities remained, to be transformed into the new feudal organization of Western Europe, whilst the idea of the revival of the Christian Roman Empire was to be taken up by other sections of the Germanic race. Though the circumstances of his time prevented him from being the founder of a new epoch in history, like Cæsar or Alexander, yet, in the greatness of his character, in his marvellous many-sided activity, and in the magic influence of his name on subsequent generations, he was equal to either.

The works of Charlemagne are—1. His *Capitularies*, first collected by Ansegise, abbot of St. Wandrille, the best edition of which is that of Etienne Baluze, Paris, 1677, 2 vols. folio; 2. *Letters*, contained in the collection of D. Bouquet; 3. A *Grammar*, of which fragments are to be found in the *Polygraphia* of Trithemius; 4. His *Testament*, contained in Bouchel's *Bibliothèque du Droit Français*, tom. iii., printed at Paris, 1667, folio; 5. Some Latin poems, *e.g.*, the *Epitaph of Pope Adrian* and the *Song of Roland*; 6. The *Caroline Books*. The great contemporary authority for the life of Charlemagne is the *Vita Caroli Magni*, by Eginhard, who also wrote *Annales*. There is a good *Life*, in English, by G. P. R. James. Sketches of Charlemagne in histories of a more general kind are innumerable; probably the best recent one is to be found in Martin's *Histoire de France*. (T. K.)

CHARLEMAGNE, Jean Armand (1759–1838), a French dramatic author, was born at Bourget in 1759. He was intended for the church, but only remained a few months at the theological seminary. He first became a solicitor's clerk, and then entered the army, and served in the American war of Independence. At the age of twenty-four he returned to France, and commenced publishing tracts on social subjects, but it was ten years later before he began to write for the stage. He is the author of a large number of comedies and poems and romances, and of an essay, published in 1794, and entitled *Observations de quelques patriotes sur la nécessité de conserver les monuments de la littérature et des arts.*

CHARLEMONT, a great fortress on the Franco-Belgian frontier, on a rock above the town of Givet. See Givet.

CHARLEROI, a town of Belgium, in the province of Hainault, about 33 miles south of Brussels, on the Sambre, a navigable tributary of the Meuse. It is the seat of a court of primary instance, and possesses a gymnasium, an academy of painting, a hospital, a parish church dating from the time of Louis XIV., and a prison erected in 1852 in the style of a feudal castle. Situated in the midst of an extensive mining district, it has developed into one of the most important industrial centres in the country, carrying on a large manufacture of glass, iron, cutlery, cotton cloth, and woollen yarn. Several thousand persons are engaged in the nail trade alone; and the forges of Couillet, about two miles from the town, supply a third of the whole quantity of cast-iron produced in the kingdom. In 1870 upwards of 24,000 people were employed in the coal mines of the district; and 3,832,850 tons of coal were brought to the surface. Abundant means of transit are afforded by the railways, which form a junction at the town, and by the Brussels and Charleroi canal, which was opened in 1832, and forms a connection at the capital with the Willebroek canal to Antwerp. In 1866 the population of the town was 12,150.

Charleroi was founded in 1666 by Charles II. of Spain, on the site of the village of Charnoy, which changed its name to the present form in honor of the king. The fortifications, however, which the Spaniards had commenced, were interrupted by the approach of the French, and their completion was due to the genius of Vauban. During the rest of the century it passed more than once from French to Spanish, and from Spanish to French possession; in 1746 it was captured by the prince of Conti, but in 1749 it was restored to the house of Austria. During the Revolutionary War in 1794 it was four times besieged by the French, to whom it was ultimately compelled to surrender on the 25th of June. The following year saw the destruction of the fortifications, but they were restored in 1815.

CHARLES I. (1600–1649), king of England, born at Dunfermline on the 19th November, 1600, was the second and favorite son of James I. By the death of his brother Henry, he became Prince of Wales in 1612, but the first public matter of importance in which he was concerned was the Spanish marriage. At first he was quite indifferent to the affair, and in 1622 he was full of a dream that he would lead an army into the Palatinate, and set his dear sister upon her throne. But, by the beginning of the next year, Buckingham had filled him with the romantic notion of setting off, in defiance of all policy, on a private visit to Spain. His conduct while at Madrid displays the weakest side of his character. He took a violent fancy for the Infanta, whom he seriously alarmed by leaping over the wall of the garden in which she was walking, in order that he might enjoy the private conversation which Spanish etiquette refused to permit. With a mixture of infatuation and duplicity, he bore with repeated insults; he allowed his chaplains to be excluded from the palace, and his retinue to be sent back to England, and gave way to each of the ever-growing demands of the Spanish favorite Olivarez. He promised what he knew he had no power to fulfil, the abrogation of the penal laws against the Catholics within three years; he listened respectfully to the arguments of the Spanish theologians, and promised to listen whenever the princess should require it; he addressed to the Pope a disgraceful letter, which, while binding him to nothing, gave rise to the greatest expectations; and thus he held out hopes of a conversion which, according to his own sub-

sequent declaration, he believed would never take place. At last the Spaniards made up their minds to the match; but, though immediately before leaving Spain Charles swore to carry out the marriage, his ardor had cooled, and Buckingham was throwing cold water on the dying embers. James was persuaded to demand the restoration of the Palatinate to the elector Frederick as an essential preliminary; the match was broken off; and in 1624 Buckingham had arranged a marriage with Henrietta Maria of France. Not the least dishonorable part of Charles's conduct in connection with this affair was his treatment of the earl of Bristol, the English ambassador to Spain. This only too faithful servant of the Crown he was mean enough to subject, at the instigation of his favorite, to a persistent and illegal persecution. On the summons of the second parliament of his reign he commanded that Bristol's writ should be withheld; he sought to punish him in an underhand way by forbidding his attendance; and when the earl continued to insist on his rights, and, after two years of confinement to his house, laid the king's letter before the Lords with a request for leave to impeach the duke, he even accused him of high treason, and employed his personal influence against him. The reason of all this was that Bristol had offended Buckingham; and the faults which were laid against him were really chargeable to his accusers. In the first place, he had been too well deceived by Charles's acting, had imagined that he was really inclined to Catholicism, and had offered, if this were so, to keep the matter secret; and, secondly, he had sought to preserve his country's honor by striving to prevent the capricious rupture of the treaty which had been completed with Spain.

In March, 1625, Charles came to the throne. The excited joy with which he had been welcomed home from Spain had given way to suspicion as fuller reports of his conduct spread abroad, and there was now prevalent an anxious dread of the growth of Catholicism. The first Parliament sent Montagu to the Tower for preaching the doctrines of divine right and the real presence; and, as difficulties arose concerning the old method of levying tonnage and poundage, it refused to grant the impost for more than a year. From a paper of Sir John Eliot's,[1] it would seem that this was intended merely as a temporary measure; but to please the duke of Buckingham, Charles dissolved the Parliament, and took a pitiful revenge by making Montagu royal chaplain.

The king was now at the disposal of his favorite, who was full of great and warlike schemes. All were, however, doomed to failure. The English sailors refused to fight against the Huguenots of Rochelle; the expedition against Cadiz was mismanaged from first to last; and, worst of all, the pawning of the crown jewels brought in but a very small sum. It was necessary to summon another Parliament.

But this Parliament was not less determined than the first. The House of Lords vindicated its independence by acquitting the earl of Bristol. The Commons, led by the ardent and eloquent Sir John Eliot, ventured on the bold step of exhibiting eight articles of impeachment against the duke of Buckingham. His majesty replied with a haughty message that the duke had acted only at his direction, threw Eliot and Sir Dudley Digges into prison, and finally dissolved the Parliament again, without any improvement of his finances. Forced loans were resorted to; the common people who refused to pay were pressed for the navy; the gentlemen were summoned before the council, or committed to prison *per speciale mandatum regis*. At this inopportune moment Buckingham provoked a war with France, and led an expedition against Rhé, which proved an utter failure. In 1628 Charles was compelled to call a third Parliament.

The House of Commons which now assembled was remarkable alike for the social standing of its members and for their wealth, which was three times that of the House of Lords. But equally with the other two which had met in this reign, it was determined to obtain redress of grievances. Its first act was to draw up the Petition of Right, which declares the illegality of forced loans, of martial law in time of peace, and of the billeting of soldiers on private houses. Characteristically, Charles at first attempted an evasive reply—"The king willeth that right be done according to the laws and customs of the realm." When, however, the Commons proceeded to censure Buckingham, he gave the regular formal assent. Yet such was his insincerity that he caused 1500 copies of the Petition to be distributed with the first answer attached. The Commons now made known their readiness to vote tonnage and poundage, provided that the king would admit that his arbitrary levy had been illegal; and Hollis and Valentine held the speaker in the chair while Eliot read a protest against Arminians and Papists, and against the irregular levy of tonnage and poundage. A few weeks before, Buckingham had fallen by the dagger of a disappointed officer. But the king's policy was unchanged. The usual plan of dissolution was resorted to; and Eliot, Hollis, and Valentine were heavily fined, and so strictly imprisoned that, though Eliot's health gave way, his petitions for a temporary release were repeatedly refused by Charles, and he was allowed to die in the Tower.

From this time there was no Parliament for eleven years (March, 1629, to April, 1640). Every year made the people better acquainted with the character of their king, who showed an unhappy ignorance both of the history and the temper of the nation; and taught them to feel more and more deeply that stronger safeguards were needed to withstand the arbitrary power of the sovereign. The London merchant who compared the rule of Charles to that of the sultan of Turkey was not altogether unjust. A paternal government was his *beau-ideal;* and Parliament was to be summoned only to give advice to the king, and to acquaint him with the needs of the people. The Petition of Right, to which he had recently given his assent, he utterly disregarded. He descended to a puerile exercise of authority. His proclamations forbade the country people to come up to the metropolis, commanded all the shops in Cheapside, except those of the goldsmiths, to be shut, and prohibited the building of more houses in London, unless special leave (to be well paid for) were first obtained. But the great necessity was to procure money. The Council of the North was directed to compound with recusants. Monopolies were granted to companies in defiance of the spirit of the law. Neglect of the knighthood which was no longer an honor was punished by a fine, which was often extremely severe. Pretensions to forest-lands, which prescription had long made unjust, were revived. And, lastly, the famous ship-money was levied. Besides, Charles must also be held personally responsible for other tyranny than that which was executed at his direct command. During these years Strafford was maturing his policy of "Thorough," by which England was to be made subject to a standing army; and if Charles did not carry out this scheme as far as might have been possible, it was not because it was too bad, but only because it was too great for him. Though he had no love for its inventor he showed his respect for his absolute policy by making him president of the Council of the North, and sending him to govern Ireland with an iron sternness, which, though it certainly added to the prosperity of some parts of the island, as certainly helped to arouse in others the feeling which resulted in the horrors of the Irish massacre. He allowed the Star Chamber to sentence a clergyman to perpetual imprisonment, mutilation, and whipping for a libel against the bishops, and to reduce a gentleman to poverty for merely sneering at the badge of a nobleman. He sanctioned the inquisitorial Court of High Commission. He supported Laud's oppression of the Puritans, his inculcation of celibacy among the clergy, of auricular confession, of prayers for the dead, and of the doctrine of purgatory, and he advanced men like Montagu, whom he knew to be desirous of a reunion of the English Church with Rome, confirming by all this the suspicions which the disclosures of Bristol had awakened.

At length, on his own sole authority, he commanded Scotland to receive a liturgy and a book of canons. The fatal results of this act belong to the history of Scotland. Unable to meet the Scottish army with a sufficient force, Charles summoned the Short Parliament; but as it refused to vote supplies till it made inquiry into the causes of the imprisonment of Eliot and his two companions, into ship-money, and other matters of that kind, it was speedily dissolved. A great council of the peers would not act alone; and in November, 1640, he was compelled to summon the Long Parliament. The Commons were now happy in a leader magnificently fitted for the times. His fiery energy was repressed, not quenched, by the ripeness of his age; his courage and determination were too firm to be shaken; his

[1] See Forster's *Sir John Eliot*, vol. i. p. 214.

respect for law and order was deep and strong; but deeper still and stronger were his love of liberty, and his resolve that nothing should serve as a bulwark against despotism. With the sagacity of the true statesman, Pym struck the first blow at the strongest pillar of the hateful structure. He exhibited articles of impeachment against the earl of Strafford. The impeachment was allowed to drop (against his wish), but it was only in favor of a bill of attainder. The preachers preached and the mob yelled against the great delinquent. The king went in person to the House of Lords, and tried to buy him off by promising never to employ him again; and then listened to a scheme, hatched by certain hot-headed officers and some of the fierier of the courtiers, to bring up the army of the north and overawe the Parliament. But his entreaty was voted irregular; the plot was discovered, and the earl was condemned to death. Charles's weakness was now fatal to himself. A few months later the splendid ability of Strafford would have been invaluable to him. But he had no affection for the stern, haughty "dark earl," and when the Lords refused his humiliating request that they would suggest to the Commons some milder punishment, he sacrificed his greatest servant. At the same time, Charles, who never knew the true place for firmness, yielded on another fatal point by confirming a bill, according to which the Parliament then sitting was not to be dissolved without its own consent. Before the triumphant course of the Commons everything had now to give way. The Triennial Bill was passed, ship-money, the Star Chamber, the High Commission, the Council of the North, the Council of Wales, the Council of Lancaster and Cheshire, the whole system of illegal exaction and injustice were swept away. The religious passion of the Houses manifested itself in an impeachment of Laud, and a proposal to abolish episcopacy.

Charles once more resorted to the crooked policy which he usually employed in extremity. He visited Edinburgh, attended the Presbyterian worship, and loaded Argyll, Hamilton, and the other Presbyterian leaders with marks of favor, while all the time he was intriguing with the earl of Montrose, Argyll's open enemy. There was a darker suspicion at the time that an attempt, known as the "Incident," had been made by Montrose, with the king's knowledge, to assassinate Argyll; but this worse treachery is by no means proved. At this moment, while men's minds were full of excitement and apprehension, a massacre of thousands of Protestants took place in Ireland. It was known that O'Neale, the leader of the butchery, professed to have the king's written warrant and the ardent support of the queen; and many believed the hideous charge. They would have been more strongly convinced had they seen the letter in which his majesty coldly remarked that he trusted this trouble in Ireland would help to cure the folly at home. Other plots were also being discovered, of which men more naturally ascribed some knowledge to the king. Pym's life was in constant danger. An attempt was made to convey plague infection to him in a letter, and a gentleman was stabbed by mistake for him in Westminster Hall.

But Pym and the Parliament yielded not one step. On he 1st December, 1641, the Grand Remonstrance was presented to the king, who received the committee which presented it in the highest spirits. He had returned from Scotland but a few days before, had been entertained at a great banquet by the Lord Mayor, and had made up his mind to show the Parliament that he was not to be trifled with. He had already appointed Colonel Lunsford, a disreputable scapegrace, to the command of the Tower. He now replaced the guard, which had protected Parliament since the news of the Army Plot, by a company under the earl of Dorset, who did not pass his first day of duty without firing on the people. Mobs far from orderly began to assemble round Westminster Hall, and a petition against the bishops was presented to the Commons. The bishops themselves were mobbed on their way to the House, and when they protested against the legality of what should be done in their absence, were summarily silenced by an impeachment. The excitement in the city grew dangerously intense, and Charles fanned the flame by accepting a company of armed soldier-adventurers as guard, and allowing them to quarrel with the unarmed crowd.

It was on the 3d of January, 1642, that the final breach was made. Pym was not to be gained over, for only a few days before he had refused office. The king now practically declared war against the Parliament. How far he acted alone is disputed; but Clarendon is very likely right in saying that he was goaded on by the queen, who had retained from the political theory in which she had been educated some very lofty notions about the rights of kings and the duties of parliaments. On the morning of the 3d, he commanded Attorney-General Herbert to impeach Lord Kimbolton (against whom, however, the matter was not pressed), Pym, Hampden, Haslerig, Hollis, and Strode on a charge of high treason, founded upon their parliamentary conduct. The rooms, drawers, and trunks of the five members were illegally sealed at the king's command, and the king's sergeant-at-arms was illegally sent to demand their persons. The Commons behaved with the greatest dignity. The sergeant was commanded to show his respect for the House by laying aside his mace, and four members, of whom two were privy-councillors, were sent with a message to the king that the House would give him an answer as speedily as the greatness of the business would allow, and that the members should meet any legal charge against them. But Charles had determined to crush the Parliament by force, and to make it for ever subservient to the Crown. He sent orders to the lord mayor that the guard sought by the Parliament should be employed to disperse all crowds, and to "shoot with bullets" all who resisted. On the morning of the 4th, at the head of his attendants, his pensioners, and the Whitehall guard, armed with partisans, swords, and pistols, to the number of three or four hundred men, he entered the House of Commons, and demanded the persons of the five members, declaring that treason has no privilege. But, with the formal consent of the House, they had taken refuge in the city; to the king's demands the sole reply was that given by the Speaker, bravely, though tremblingly, and on his knees, that he could speak only as he was commanded by the House; and Charles was obliged to retire with undignified threats upon his lips. The consequence of this act was the most terrible excitement. Some members of the Commons cried "Privilege" in the very presence of his majesty. In London the shops were shut; there was a report that the cavaliers, with the king at their head, were about to fire the city, and it became known that a seizure of the arms of the citizens was contemplated. When the king visited the city next day, in the streets and in the court-room of the common council, he was met by cries of "Privilege of Parliament!" The panic still grew; the streets were thronged with almost frenzied crowds; the train bands were collected. Other crowds poured in from the country, one with a petition signed by thousands for the protection of Pym, another, from Buckinghamshire, eager to live and die with Hampden, to serve the Commons, respectfully to petition the king. The very sailors in the river caught the enthusiasm, and offered their assistance. And the House of Commons, declaring itself no longer safe at Westminster, adjourned first to Guildhall and then to Grocer's Hall. On the 10th Charles, seeing that the true magnitude of his attempt had been understood, and that he was met with his own weapons, retired in alarm to Hampton Court. On the following morning the five members returned to their seats in triumph, amid salutes from the river, the shouts of the crowd, and a parade of the train band.

The Parliament retaliated the king's attack by passing a bill assuming the command of the militia, and appointing the lieutenants of counties. But the king on his journey from Dover, where the queen had embarked with the crown jewels, had met with so many expressions of loyalty that he refused his consent. He requested, however, that all requirements should be drawn up in one document, and submitted to him. Accordingly, in June, 1642, Parliament presented "The Nineteen Propositions." They were such as would have entirely altered the constitution. Constitutional concessions could no longer avail the king; fifteen years of unconstitutional rule had made that impossible. He had striven to obtain the tyranny; he had appealed to force; and the Civil War had already begun with the Westminster tumults. On the 22d August, 1642, it was formally commenced by the erection of the royal standard at Nottingham. At first success was on the side of the king, and the Parliament suffered so severely in the west that they began to discuss terms of peace, while several defections to the royalist party took place. But Charles was too highly elated; having summoned a parliament of his own at Oxford, he declared that which met at Westminster to be none; and

when the earls of Holland, Bristol, and Clare came over to his party, he treated them with so much neglect and insult that after three months they turned back, and no others risked the treatment they had received. But as the troops of the Parliament became accustomed to the use of arms, and its officers to the tactics of war, the inferiority of the royalists became apparent. In the beginning of 1645 the Parliament was in a position to demand, in the treaty of Uxbridge, that Presbyterianism should be established, and that it should have the command of the army and navy and the direction of the war with Ireland.

In the same year, after the decisive victory at Naseby, the king's cabinet, containing a number of letters which proved that he was promising toleration to the Catholics and seeking aid from several foreign powers, fell into the hands of the Parliament, and the letters were published. Soon after a still more important discovery was made,—that of a treaty entered into, by means of the earl of Glamorgan, with the Irish Catholics, whose aid was to be bought at the price of great religious concessions. Charles denied all knowledge of the affair, and Glamorgan was imprisoned for a short time; but subsequent evidence gives strong reason for believing that he was deeply implicated in the matter. Owing to the anti-popish bigotry which they offended, and the insincerity which they manifested, these disclosures were extremely damaging to the king.

In May of the next year Charles had fled to the Scots at Newark; and in January, 1647, he was delivered by them into the hands of the English Parliament, who placed him in Holmby House, six miles from Northamptom. Terms similar to those offered at Uxbridge were again tendered at Newcastle; but Charles, being sincerely attached to Episcopacy, was most unwilling to yield concerning church affairs, and, holding himself necessary to any settlement, believed that he had only to insist upon more favorable offers. In June the army took possession of his person, and finally brought him to his palace at Hampton Court. He was treated with respect and kindness; Cromwell and Ireton sought to bring about a secure peace; and the latter on behalf of the Agitators or Adjutators, who formed the parliament of the army, drew up most favorable terms. But unable to see that the army was now supreme, and hoping, contrary to his whole experience, to obtain something more from the Parliament or the Scots, with whom he was treating, Charles haughtily broke with the officers, and scornfully refused their offers. To many it was now apparent that it was vain to hope for a settlement by means of compromise.

From this moment the ascendency was taken by a party of enthusiasts, who held that a crown should not excuse the crime of treason against the country, and sternly called for justice on the grand delinquent. Fearing assassination, Charles fled to the Isle of Wight, where, however, he was captured. But trusting in the Scots, who now prepared to protect him by force, he still rejected the offers of the Parliament, which were again tendered to him at Carisbrook and at Newport. At length the army impatiently seized him once more, removed him to Hurst Castle, and thence to Windsor and St. James's, purged the Parliament by excluding some hundred and forty members, and resolved to bring him to trial. On the 1st of January, 1649, though the Peers adjourned, refusing to consider the question, the Commons voted the appointment of a High Court of Justice "to the end no chief officer or magistrate might presume for the future to contrive the enslaving and destruction of the nation with impunity." One hundred and thirty-two commissioners were elected, of whom about half took part in the trial. Bradshaw was elected Lord President, and Cook solicitor against the king. On the 20th, the 22d, and the 23d, Charles was brought before this court; but with a calm and admirable dignity, due to a sincere belief in his own pretension, he proudly refused to acknowledge the court, declaring that obedience to kings is commanded by Scripture, that by the law the king can do no wrong, that the commons have no authority of themselves to erect a court of judicature, and that they had not received such authority from the people, whose power to confer it he, besides, declined to admit. On the 26th the court went through the form of listening to evidence that he had appeared in arms against the Parliament, which was declared to represent the nation. On the 27th Bradshaw pronounced sentence of death against Charles Stuart, as a tyrant, a murderer, and a traitor to his country; and on the afternoon of the 30th of January, 1649, Charles was beheaded in front of the Banqueting House at Whitehall. His body was conveyed to Windsor, and on the 8th of February was buried in St. George's Chapel without any service.

In person and in demeanor Charles presented a most favorable contrast to his ungainly, babbling father. A somewhat painful stammer was his only physical defect. His manner, also, was grave and reserved; his scrupulous observance of the ordinances of religion was accompanied by strict decorum of conduct; and he possessed considerable taste for literature and art. Yet of almost all the essential kingly qualities he was utterly destitute. He had, indeed, a strong sense of personal and royal dignity, but this very feeling was fatal to him. It rendered intolerable the least limitation of the prerogative which he believed to be his divinely-appointed birthright; and thus it placed him in obstinate opposition to the strongest tendency of his time,—that tendency which had already resulted in the Reformation, and which now manifested itself in the development of Puritanism and the growth of the English constitution. Nor did he possess the qualities which might have given him a chance of success in the contest. Affectionate toward his intimate friends to a degree of weakness which often arouses contempt, he had no magnanimity for an enemy, nor even fidelity to a servant, however great, who did not awaken his fondness. In political sagacity he was utterly wanting; and so completely did he identify political skill with duplicity that, in public matters, he could never be trusted, and compromise with him was impossible.

About the time of Charles's death several works appeared purporting to be by his hand. Of these the chief is the *Eikon Basilike: The Portraiture of his Sacred Majesty in his solitude and sufferings*. After the Restoration Bishop Gauden declared himself its author, and his claim was not disputed either by Clarendon or by Charles II., who, on the contrary, gave him ecclesiastical preferments. The controversy as to its authorship has left little doubt that it is a forgery. A collection of the works was published at the Hague in 1851, under the title of *Reliquiæ Sacræ Carolinæ: The works of that Great Monarch and glorious Martyr, King Charles I.*

The chief contemporary authorities for the history of this reign are:—Rushworth, a barrister, and a member of the Long Parliament, who gives an account of the proceedings of the Parliament from 1615 to 1640, and also relates the trial of Strafford; Whitelocke, a moderate Parliamentarian, whose *Memorials* extend from the accession of Charles to the Restoration; Sir Ralph Verney and Sir Symonds D'Ewes, members of the Long Parliament; and May, author of the *History of the Long Parliament*. The *Hardwicke and Clarendon State Papers;* the recently published *Calendars of State Papers;* Carte's *History, Irish Massacre set in a clear light,* and *Life of Ormond;* Laud's *Diary;* Clarendon's *History of the Great Rebellion,* the work of a royalist partisan, whose great talents did not include political insight; and *The Letters and Speeches of Oliver Cromwell,* by Thomas Carlyle, also contain original information. As it deserves, this period has been more frequently treated by modern historians than any other in English history. In 1822 appeared Brodie's careful *History of the British Empire from the Accession of Charles I. to the Restoration;* in 1824–28 Godwin's republican *History of the Commonwealth;* in 1830 Isaac Disraeli's *Commentaries on the Reign of Charles I.* See also Hallam's *Constitutional History;* Forster's *Sir John Eliot, The Grand Remonstrance, The Impeachment of the Five Members,* and *Statesmen of the Commonwealth;* S. R. Gardiner's *Prince Charles and the Spanish Marriage;* Sanford's *Illustrations of the Great Rebellion;* Burton's *History of Scotland.* Especially on account of the analogy of this portion of English history with the French Revolution, it has been carefully studied by several French historians, among whom the most important is Guizot, who has published a *Histoire de la Revolution d'Angleterre,* and a *Histoire d'Oliver Cromwell.* It has also been treated in German by Dahlman. See ENGLAND. (T. M. W.)

CHARLES II. (1630–1685), king of England, born in 1630, though the second son of Charles I., was Prince of Wales from his birth. In the earlier and more important campaigns of the Civil War he held a nominal command in the west, but he was too young to take any real part in the conflict. After the battle of Naseby he passed by way of Scilly and Jersey to join his mother at St. Germain. Till 1649 he spent his time either at Paris or at the Hague, without interfering in public affairs, except when he attempted to save his father's life by forwarding a signed *carte blanche* to the Parliament to be filled up with any terms which they would accept as the price of his safety.

On the execution of Charles I., he immediately assumed the title of king. The Scotch Government offered to place him on the throne by force, and sent a deputation to the Hague. For a time Charles protracted the negotiations, meanwhile urging Montrose to make him independent of the Presbyterians. But when the rising was crushed, and Montrose himself executed, he accepted their invitation. In June, 1650, he landed in Scotland; and he was crowned at Scone on the 1st January, 1651. But as he had been obliged to sign the Covenant, and conform to the austere manners of the Covenanters, he soon began to feel the price of their assistance intolerably heavy. The secret efforts which, during the whole time he was treating with the Presbyterians, he had been making to bring together a sufficient force of Highlanders proved unsuccessful; and, on the defeat of Leslie at Dunbar, he was glad to march south, with the hope of arousing the loyalty of the English. The appeal failed; and the royalist forces were again routed by Cromwell at Worcester (1651). Thanks to his own great coolness and address, and the fidelity of those in whom he confided, Charles contrived to reach France. Here he remained till 1654, when, having received a pension from the French king, he retired to Cologne. Thence he removed to Bruges, where he principally resided till the death of Cromwell. For the most part, notwithstanding the smallness of his means and the wretchedness of his circumstances, he passed his time in careless dissipation, surrounded by a little court in which the few old cavaliers, like Clarendon, who maintained the dignified manners which had adorned the court of Charles I., were lost in a crowd of gay young libertines and sprightly women of disreputable character. His applications for assistance to France and Rome were all unheeded; and he was equally unsuccessful in his attempts to contract an advantageous marriage. At length, through the contrivance of General Monk, but still more through the open and enthusiastic wish of a large portion of the people, he was recalled to England; his conciliatory declaration from Breda was well received; and he entered London amid sincere public rejoicings on his thirtieth birthday, May 29, 1660.

Charles's course was at first attended by no difficulty. The loyalty of the Convention summoned by Monk was sufficient for the time. It sympathized in the one desire for vengeance in which he was earnest; it was resolved on the punishment of the regicides. Thirteen were executed, some in direct opposition to the apparent intention of the king's declaration of oblivion; the bodies of Cromwell and Ireton were hung in chains; and even the coffin which contained the ashes of Blake was cast out of Westminster Abbey, and thrown into a common churchyard. And, finally, though some of the measures of the Convention prove that it had not lost all the spirit of the Long Parliament which preceded it, it showed its enthusiastic loyalty in a manner very agreeable to Charles, viz., by granting him the dangerous gift of £1,200,000 a year for life. But if the Convention was sufficiently loyal, the royalism of the first regular Parliament of the reign was extravagant. It insisted on the prerogative of the sovereign, and abased itself before him. At his express request it repealed the Triennial Act; and it allowed him to declare that he would not be forced by that Act to summon frequent parliaments, if he believed that they would be disadvantageous to the Crown. It showed much reluctance to confirm the Act of Indemnity. It assisted him to complete his revenge by the sacrifice of Vane and Lambert, whom he had pledged his word to spare. But its royalism was equalled by its attachment to the Church of England; and thus commenced its opposition to the sovereign it professed to worship. Charles desired to tolerate the Catholics, and accordingly issued a General Declaration of Indulgence. Its illegality, however, raised so much opposition, even among the Protestant dissenters whom it benefited, that he prudently recalled it, and even published a proclamation banishing all Roman Catholic priests.

It was, indeed, the Protestant temper of the nation which was the most powerful influence against which Charles's policy had to contend. Fortunately for himself he was able to estimate its strength. Himself a Roman Catholic, he made several attempts to grant toleration to his co-religionists; but he always gave way when the anti-popish passion seized the people. Twice he yielded to a degree which more than any other of his acts displays the utter selfishness of his character. In order to blind the people, and prepare the way for the trial of Shaftesbury, he sacrificed the Catholic Archbishop Plunkett, the accusation against whom was supported only by the most worthless witnesses. But the basest compliance of which he was guilty was in the case of the pretended Popish plot. He did nothing to allay the popular frenzy; he allowed Oates to be handsomely pensioned, and located at Whitehall; the only case in which he is reported to have interfered was that of his wife, who was not, indeed, seriously threatened; and he calmly signed the death-warrants of men whom he must have regarded as martyrs.

It is remarkable that the matter in regard to which Charles most firmly withstood opposition was one in which he was not personally concerned—the exclusion of his brother, the duke of York, from the succession. This is the more remarkable as there is good reason to believe that his affection was much stronger for the duke of Monmouth, his own son by Lucy Walters. He treated him like a legitimate prince, and permitted him to wear the royal arms without the bar sinister, and to make progresses through the kingdom, on which he was received as if he had been heir to the throne. Towards the end of his life (in 1682), however, he was so seriously displeased with one of these progresses as to banish the duke to Holland; possibly the license which Monmouth assumed was only permitted by the king; and we may, perhaps, give him credit for having all along unselfishly desired that his brother and a Catholic king should succeed him.

Concerning the character of Charles historians are in general agreement. His selfishness, which was of the sensual, indolent, good-humored type, was such that he was incapable of understanding motives different from his own. His chief aim was to support, without trouble or censure, his own gay and dissipated life, and his troop of mistresses. This was no easy matter; his mistresses were numerous, and he was fond of indulging them to the utmost of his power. One was raised to the rank of duchess of Portsmouth, another to that of duchess of Cleveland; six of the sons they brought him were created dukes;[1] and means were supplied to maintain their lofty dignity. They occupied a recognized position at court; and the queen was obliged to humiliate herself, and to treat them without scorn, and even with familiarity. In short, the court of Charles was the most scandalous which England has seen. Yet, being affable and witty, and free from all vindictiveness, Charles enjoyed a good deal of popularity, if nothing of respect.

In 1662 Charles married Catherine, princess of Portugal, who brought him half a million of money, Bombay, and the fortress of Tangiers. He died, probably of apoplexy, without legitimate issue—for there is no evidence to support the popular belief in the legitimacy of Monmouth—on the 6th February, 1685, after receiving extreme unction from a Roman Catholic priest named Huddlestone.

Throughout his whole reign, and especially by his secret negotiations with Louis XIV. of France, whose pensioner he was not ashamed to be, Charles exerted a powerful and harmful influence on English politics; but his political action is matter of history, and is treated elsewhere.

See the *Diaries* of Pepys and Evelyn; the *Mémoires de Gramont;* the English histories of Burnet, Hallam, and Macaulay; Kennet's *Register;* and *The Calendar of State Papers of the Reign of Charles II.*, edited by Mary Anne Everett Green (1860–66).

CHARLES I., the Bald (823–877), king of France and emperor of the Romans, was son of Louis le Debonnaire, by his second wife Judith. To furnish him with a kingdom, his father deprived his elder brothers of some of the territory he had previously assigned to them, and war ensued, at the end of which, after many failures and successes, Charles was left in possession of a great kingdom in the west of the empire. On the death of his father in 840, Charles sought to succeed as emperor, and allied himself with his brother, Louis the German. In 841, in a battle at Fontenai, remarkable for the number of the slain and the fierceness with which it was contested, Charles's rival and eldest brother Lothaire was defeated; but such had been the loss even of the victor that it was impossible to follow up the victory. The alliance between Louis and Charles was renewed, the former taking his oath in words

[1] The dukes of Monmouth (by Lucy Walters), St. Albans (by Nell Gwynn), Richmond (by Louise de Querouaille), and Cleveland, Grafton, and Northumberland (by Barbara Villiers).

which form one o the earliest specimens of the Romance language; and in 843 the treaty of Verdun confirmed to Charles the possession of his kingdom, which comprised France to the west of the Meuse, Saône, and Rhone, and Spain from the Ebro to the Pyrenees. The weakness of Charles's government was, however, extreme. The Normans, sailing up the rivers in small companies of a few hundreds, pillaged the country almost without resistance; at length in 858 the people in despair, calling in the aid of his brother Louis, drove the king from the country for a time. Charles was entirely under the control of the bishops, and his submission did not go without reward; in 875 he was crowned emperor by the Pope. But Louis attacked him with great success; and his power was far from stable when, having been summoned into Italy by the Pope against the Saracens, he died in 877 near Mont Cenis. The last and perhaps most important act of his reign was the decree of Chiersi, by which the tenure of the counties was made hereditary.

CHARLES II., the Fat (832–888), king of France and emperor of the Romans, was the third son of Louis the German. Swabia he inherited from his father; the death of his brother Carloman of Bavaria made him king of Italy in 880; in 881 he was crowned emperor; the death of another brother, Louis of Saxony, gave him possession of all Germany in 882; and that of Carloman the French king in 885 left him the kingdom of France. Thus, by no effort of his own, he became sovereign of all the dominions of Charlemagne. But he was soon found to be utterly incapable of ruling. He was, in fact, given up to pleasure, especially to the pleasures of the table. When the Northmen besieged Paris, he made not the least attempt to repulse them by means of the vast army which he led against them, but bought them off with disgraceful presents. He was, therefore, justly rejected by the people; in 887 he was deposed at Tribur; and he died in the cloister during the following year.

CHARLES III., the Simple (879–929), king of France, was a posthumous son of Louis the Stammerer. On the deposition of Charles the Fat in 887, he was excluded from the throne by his youth; but during the reign of Eudes, who had succeeded Charles, he obtained the alliance of the emperor, and forced the former to cede Neustria. In 898, by the death of his rival he obtained possession of the whole kingdom. His most important act was the treaty which he made with the Normans in 911. They were baptized; the territory which was afterwards known as the duchy of Normandy was ceded to them; and their chief, Rollo, married the sister of the king, and was created duke. In 922 the barons, jealous of the growth of the royal authority, rebelled and elected Robert, brother of the late king, in place of Charles. Robert was killed in the battle of Soissons by Charles's own hand, but the victory remained with his party, who elected Raoul, duke of Burgundy, king. In his extremity Charles trusted himself to Herbert, count of Vermandois, who deceived him, and threw him into confinement. Released by his old enemy, Raoul, he died at Peronne in 929.

CHARLES IV., the Fair (1294–1328), king of France and Navarre, was the third son of Philip the Fair. In 1322 he succeeded his brother, Philip V., on the throne of France and Navarre. The chief aim of his domestic policy was to free the country from the Lombards and from the exactions of the barons and the judges; and he did something to improve the condition of the Jews. He assisted his sister Isabella in her contest with her husband, Edward II. of England. In 1325, being supported by the Pope, Charles sought the imperial crown, but without the least success.

CHARLES V. (1337–1380), king of France, born in 1337, was the son of John II. His physical weakness, precluding him from the usual ambitions of his rank, led him to cultivate the taste for literature and the political ability which gained for him the title of "the Wise." From the age of nineteen to that of twenty-three, during the exile of his father, a period of great disturbance and difficulty, he ruled as lieutenant of the kingdom. The first States-General which he summoned, led by Stephen Marcel, president of the tiers-état, and Robert Le Coq, president of the clergy, refused to raise levies or subsidies, and demanded, first, the trial before judges nominated by themselves of the ministers of justice and of finance, whom they accused of corruption; secondly, the establishment of a council chosen from the three chambers to be consulted in all cases by the dauphin; and lastly, the release of the king of Navarre. Next year (1357) they were equally determined; they forced the dauphin to give his assent to an ordinance which greatly extended the authority of the States, and the commission appointed to carry it out ruled for some time with dictatorial power. The authority of Marcel also was such that he was bold enough to enter the palace of the dauphin, and slay two of his chief officers,—the marshals of Champagne and Normandy. At the same time another enemy, Charles, the king of Navarre, was enjoying unbounded popularity among the people of Paris, and maintaining their cause. France, indeed, seemed ripe for revolution, for its condition was wretched in the extreme. The heartless ravages of the English, of the free companies, and of the French nobles themselves had laid waste the country, and maddened the peasantry till, under the name of *La Jacquerie*, they burst into hideous revolts, in which they committed the most brutal outrages against the hated nobility. But after a few months, by the assassination of Marcel, and the support of the nobles and of the provincial States, Charles regained the supremacy. When he again appealed to the States-General, in order to obtain the rejection of the ruinous treaty of London, which John had signed in his eagerness to procure his own release, he also received from them troops and money to carry on the war in Picardy. But he never again convoked them, except on one occasion (in 1369), when they are said to have proved extremely submissive. Ever after he had recourse to assemblies of notables, or to the provincial States, which never ventured to offer him serious opposition.

From 1360 to 1364 John, ransomed by the treaty of Bretigny, ruled in person; but in the latter year, to save his honor, he returned to London, and in April he died there, leaving the crown to Charles.

Charles at once set himself vigorously to the task of binding up the wounds of the kingdom, and preparing to expel the English. He employed Duguesclin, an able soldier of Brittany, to lead 30,000 men of the free companies into Spain, and to set Henry of Transtamare upon the throne. Thus he not only freed the country from a grievous scourge, but also obtained the friendship of the Spanish king. He had already made alliances with the king of Castile, with the count of Flanders, with Scotland, and even with Charles of Navarre; and after having carefully fortified the principal towns, he provoked a renewal of the war with England. The wise policy on which he had resolved was carried out with great firmness. Pitched battles were avoided, and the enemy, being repulsed by the towns, had nothing left but to ravage the country, with the result of deepening the hatred of the people. The Bretons were gained over, and soon all the land to the north of the Garonne ceased to belong to the English (1373). In 1380 the conquest of Guienne by the French left them only Bayonne, Bordeaux, Brest, and Calais.

At the same time Charles crushed his other great enemy, the king of Navarre. After accusing him of various plots against himself and other members of the royal family, he took his two sons as hostages, executed two of his ministers, and raised up enemies against him who seized great part of his territory, and forced him to give up twenty places as security for peace.

But Charles's last aggressive attempt was not equally successful. He summoned the duke of Brittany before him, and when he failed to appear, declared his dukedom confiscated to the crown. The result, however, was that the people recalled the duke, who had previously been banished, and formed an alliance with England. While affairs were in this condition Charles died at Vincennes on the 16th September, 1380.

His reign had left many important results. The country had been freed for a time—though, unfortunately, only for a time—from its two great scourges, the free companies and the English. The residence of a pope at Avignon under the influence of the king tended to make the Gallican Church more independent. The privileges of the nobility were somewhat invaded by Charles's favor to the burgesses of Paris. Something was done to increase the purity of the administration of justice, and the parliament of Paris was allowed to become self-elective,—a reform which, however, was only temporary, a retrogressive

change being made under Charles VII. On the other hand, the States-General were silenced; the personal power of the king was increased; and the weight of taxes, often from their nature peculiarly oppressive, was greatly multiplied, for, notwithstanding the grievous war expenses, Charles set no limit to the free indulgence of his tastes. He left several costly specimens of the expensive art of architecture, including the splendid palace of Saint Paul and the strong walls of the Bastille; and he distinguished himself still more honorably by founding the royal library at Paris.

See Froissart, Roy's *Histoire de Charles V.* (1849), and *The Chronicle of St. Denis.*

CHARLES VI. (1368–1422), king of France, was the son of Charles V., whom he succeeded in 1380, at the age of twelve. The treasure left him by his father was at once seized by his four uncles, the dukes of Berry, Burgundy, Anjou, and Bourbon, whose tyranny and rapacity aroused a general rebellion throughout France. It gained the supremacy in Paris (where the insurgents, from the weapon with which they armed themselves, took the name of *Maillotins*), in Rouen, and many other French towns, and also in the Flemish cities, of which the foremost was Ghent, now led by Philip van Artevelde. At first the union of the popular parties in the various towns was successful against the nobility, but in 1382 the latter won a great victory at Roosebeke, in which Artevelde was killed, and after which many of the rebels were punished by death or by heavy fines. In 1385 immense and costly preparations were made for an invasion of England, in which the king was to take part in person, but on account of various obstacles, over which he had not sufficient resolution to triumph, nothing was done. In 1388, with the advice and support of the cardinal of Laon, Charles, who had six years before reached the age fixed for his majority by his father, threw off the control of his uncles, the dukes of Berry and Burgundy. But in 1392, on his march against the duke of Brittany, who had seized and then attempted to assassinate the constable, De Clisson, the appearance of a rough-looking man, who declared that the king was betrayed, so affected him that, in a fit of madness, he killed four of his attendants, and was for some time after insane. During the next year another accident, by which he was nearly burnt to death, brought on a second fit, from which he never completely recovered. By these unfortunate events a field was opened for the ambition of the dukes of Burgundy and Orleans. The latter first obtained the government; but the former, John Sans Peur, as champion of the people of Paris, gradually became so powerful that, in 1407, he ventured to assassinate his rival and allow the mob to massacre his adherents. But a confederacy was formed against him, the duke of Orleans who succeeded his victim being joined by the dukes of Berry, Bourbon, and Brittany, and the powerful and able count of Armagnac. The Parisians opened their gates to the Armagnacs (as the party was now called), but they in turn treated Paris as if it had been a hostile city conquered by force. In 1415 Henry V. of England, the fulfilment of the treaty of Bretigny being refused, landed in France, and gained the victory of Agincourt. In 1418 the gates of Paris were opened to the duke of Burgundy, and another massacre of the Armagnacs took place. Famine and plague carried off thousands of others. Charles died, deprived of almost every sign of royal dignity, in 1422.

See *The Chronicle of St. Denis*, Monstrelet, Juvénal des Ursins, Le Laboureur, De Choisy, Saint-Remy.

CHARLES VII. (1403–1461), king of France, the son of Charles VI., was betrothed at ten to Mary of Anjou, daughter of Louis, king of Sicily, whom he married nine years after. He became dauphin at the age of thirteen; and while only fourteen, on account of the insanity of his father, he held the position of lord-lieutenant of the kingdom. At first the strong hand of Bernard of Armagnac, the constable, guided the government; but the triumph of the Armagnacs, crowned by the murder of John of Burgundy in the very presence of the dauphin, brought the most serious trouble upon France. Aided by the Burgundians, the English soon gained a mastery so complete that in 1420 the treaty of Troyes conferred the succession upon their king, Henry V., who had married Catherine, the daughter of Charles VI. In August, 1422, however, Henry died, and Charles VI. a few weeks after. Bedford became English regent of France; and the ability of his administration resisted all hostile attempts. The defeats of the French at Crevant (1423) and Verneuil (1424) were disastrous, and their successes were few and unimportant. It was plain that Charles, intent upon nothing but a round of frivolous dissipation, would never effect the independence of the country. Though he was capable of being roused to energy, the weakness of his character was conspicuous. He was dependent upon a succession of advisers, which included both the worst and the greatest men and women of his day. No king was ever cursed by more worthless favorites than Charles during his youth, and no French court was ever in a state of more miserable anarchy than that of the first years of his reign; but yet to none could the title of "Well-Served" have been more fitly applied, for none has borrowed more undeserved glory from the great men who surrounded him. Favorite at first rapidly followed favorite,—Tannegui Dûchatel, the lawyer Louvet, Pierre de Giac, the haughty Lecamus de Beaulieu, and La Trémouille.

But France was not entirely left to these selfish courtiers. A national spirit was rising, and she possessed many bold soldiers who were willing to fight her battles. The constable Richemont, though violent, and though he unfortunately labored under a superstitious terror of heresy and sorcery, was honest and capable. Under him fought Dunois the bastard of Orleans, La Hire, Xaintrailles, Brézé, Jean and Gaspard Bureau, and the three brothers Chabannes. But the greatest impulse was given to the French arms by the noble country maiden, Joan of Arc, who, after placing the king firmly on the throne, received from him as reward nothing but jealousy and the most heartless desertion (see JOAN OF ARC). The benefit which she wrought for France did not end with her life. The English were still forced to give way. In 1435, by the treaty of Arras, Philip the Good of Burgundy broke with them, and joined the French; the death of Bedford in the same year left them no chance of rallying, and soon Paris received its rightful sovereign.

In the meantime a great change had come over the court and the king. Charles had fallen into better hands. A most beneficial influence has been ascribed to Yolande of Aragon, his mother-in-law, Isabel of Lorraine, his sister-in-law, and Agnes Sorel, his mistress. And, more important still, a great revolution had taken place in the royal council, a large part of which now consisted, not of nobles, but of commoners. The greatest of these was Jacques Cœur, who, having amassed a vast fortune by financial speculations and commerce, had become the *argentier* of the king, and gradually acquired power in all the branches of administration. Surrounded by men of energy and patriotism, Charles's facile nature reflected both these virtues, and he appeared in the battle-field among his troops. Normandy was recovered by Dunois and Richemont (1449); the English were driven out of Guienne; and in 1453 there remained to them nothing but the single fortress of Calais. Among the other important events that had meanwhile taken place may be mentioned the ratification in 1438 of the "Pragmatic Sanction," and extensive army reforms whereby both privates and officers became immediately dependent upon the sovereign.

In 1450 Agnes Sorel died. Soon after, and in connection with her death, occurred Charles's second great act of ingratitude. Jacques Cœur, by aid of whose abilities and money much of the success of the reign had been achieved, was accused of intrigues with the dauphin, and charged with poisoning Agnes at his instigation. He cleared himself of these charges, but others were immediately substituted, which, so far as they were true, afford no excuse for Charles. He was condemned to death; and though his life was spared, his property was confiscated, and himself banished from the country (1453).

Towards the close of Charles's life his condition became even more scandalous and wretched than it had been in the troublous times of his youth. With the death of Agnes all show of dignity and decency was cast aside, and the king at length died, the miserable victim of his own faults. Bitter ill-feeling had arisen between him and the dauphin; the latter had fled; his father's repeated entreaties could not induce him to return; and Charles, insane through his fear that his son would seek to get rid of him by means of poison, refused to eat, and on the 22d July, 1461, died at Mehun of starvation.

During this reign there had taken place three events of the first importance to France,—the expulsion of the English and of the free companies, the establishment of a standing army, supported by a large permanent tax, and the enactment of the Pragmatic Sanction. Besides these, the university of Paris had been brought under the jurisdiction of the Parliament, and other reforms, such as the shortening of the legal processes, and the strict prohibition of all presents to members of the court, had been effected. In case of vacancies it was decreed that the Parliament should nominate two or three persons, from whom the king should select one. The Court of Aids was also instituted, to decide all cases connected with the levying of taxes; but its constitution was extremely faulty, as it gave to the same persons, viz., the treasurers, the power of extortion and of trying for extortion.

See Vallet de Viriville, *Charles VII. et son époque* (1862–5), and Clément, *Jacques Cœur et Charles VII.* (1873).

CHARLES VIII. (1470–1498), king of France, born in 1470, succeeded in 1483 to the power acquired by the astute policy of his father Louis XI. His sister, Anne of Beaujeu, though only twenty-two, by the firmness and craft which she inherited from her father, gained the supreme authority as regent. She was opposed by the duke of Orleans and Count Dunois, who were supported by the duke of Brittany and the emperor Maximilian; but Dunois was defeated in Guienne; and in the battle of St. Aubin the duke of Orleans was routed and taken prisoner. One important internal reform took place under the government of Anne,—a change was made in the mode of election of the States-General. In the first place, members were no longer called as feudatories of the king, even barons and bishops appearing not by right of title but as representatives of the gentry and the clergy; and secondly, the right of voting for members of the tiers-état was given even to the peasantry. In 1490 Anne's authority came to an end, for the king released Orleans, and entered into the most familiar friendship with him, and also took Dunois as his chief adviser. Under his influence he broke off the contract of marriage with the daughter of Maximilian, and took as his wife Anne of Brittany, to whom Maximilian had been betrothed. In consequence a war broke out, in which England and Spain took part against France; but Henry VII. was bought off by a gift of money, and in the treaty of Senlis, Spain was persuaded to make peace by the surrender of Roussillon and Cerdagne, and Maximilian by the restoration of Franche-Comté and Artois.

Charles was now at liberty to attempt the realization of his dream of founding an Eastern empire. His father had purchased the claim of the House of Anjou to the throne of Naples, and he himself bought the title of Andrew Palæologus, the nephew of the emperor of Constantinople. Having made a treaty with the Pope, Charles in 1495 entered Naples unresisted. But he showed no favor to the Neapolitan nobility, and gave all offices to his own soldiers. In consequence much discontent arose, and a league was formed against him by the Pope, the emperor, Spain, and Venice. With 5000 men he defeated at Fornova an army greatly outnumbering his own; but the victory merely enabled him to reach France. Naples soon fell into the hands of Ferdinand of Spain; and Charles died at Amboise, through an accident, at the age of twenty-eight, before he could carry out his intention of returning to Italy (1498).

CHARLES IX. (1550–1574), king of France, was the second son of Henry II. and Catherine de' Medici. At the age of ten he succeeded his brother Francis II. His mother became regent, and Anthony of Navarre lieutenant of the kingdom. During Charles's youth there was fierce and continual war between the Huguenots, under Condé and Coligny, and the duke of Guise and his adherents. In the second period of the contest Catherine opposed the former party; but in 1570 Charles, declaring himself convinced that conformity in religion is impossible, and avowedly acting on his own judgment and in opposition to his mother, brought about a reconciliation with the Huguenots. His sister was married to the young Huguenot king of Navarre, Charles protesting that their union should not be prevented even by the Pope. Admiral Coligny was received into familiar friendship, made one of the council, and treated as the chief adviser of the king, while on the attempt to assassinate him Charles expressed deep regret and an earnest intention to punish the crime. His sincerity in this course of conduct has been questioned; we are reminded that he was neither scrupulous nor merciful, and it is said that his restless and apparently open manner concealed a long-conceived and terrible treachery. According to another and more probable account, he was not acquainted with the plots of his mother till their fulfilment was almost at hand, and it was on the ground that the Huguenots were conspiring against the throne that he was prevailed upon not to interfere in preventing the massacre of St. Bartholomew's day, 1572. His consent was wrung from him, it is said, in an agony of passion, and the memory of the event tortured him till his death, which occurred at Vincennes only two years later. But there is no doubt that his consent was given, for next day he avowed the act, declaring that it had proved necessary in order to check a dangerous rebellion. Charles left a work on hunting, entitled *La Chasse Royale*, an edition of which, published in 1857, contains also several poems by him.

Contemporary accounts of his reign were published by Des Portes, Sainte-Foy, and Favier in 1574, the year of Charles's death, and by Varillas in 1584.

CHARLES X. (1757–1836), king of France, a younger brother of Louis XVI., known before his accession as Charles Philippe, Count of Artois, was born in 1757. At the age of sixteen he married Maria Theresa of Savoy. His youth was passed in a course of scandalous dissipation; but for a short time he joined the French army at Gibraltar, and during the disturbances immediately prior to the Revolution he took a minor part in politics. In July, 1789, he left France, and visited several of the European courts, in order to procure assistance for the royalist cause. On the execution of Louis XVI., he assumed the title of Monsieur, and in the campaign of 1792 he commanded a regiment of French gentlemen; but in February, 1793, he retired to Russia, where he was warmly welcomed by Catherine. In August, 1795, he led an expedition, fitted out by the English, to assist the revolt in La Vendée; but he displayed no energy, and effected nothing. Retiring after this to England, he resided for a time at Holyrood Palace, and afterwards with his brother Louis at Hartwell. In April, 1814, he was cordially welcomed back to Paris by the Provisional Government. During the reign of his brother, Louis XVIII., he was the leader of the extreme royalist party, who aimed at bringing back the state of affairs which had existed before the Revolution; and on succeeding to the throne in September, 1824, he continued to follow the same policy. His frequent appearances in public, and the dignity of his address, at first awoke considerable enthusiasm; but his popularity was brief. M. Villèle, who had already directed the government for some time, continued to be chief minister. A bill was passed by which a thousand millions of francs were devoted to recompense the losses of the emigrés (March, 1825). The Jesuits were, it was believed, encouraged to return to France. Severe laws were made against sacrilege, death being assigned as the penalty for theft from consecrated ground, and profanation of the consecrated elements being regarded as a crime equal to parricide; and the censorship of the press, which he had abolished at his accession, was reimposed. At length, in January, 1828, Charles made a compromise by replacing the unpopular ministry of Villèle by a ministry headed by the Marquis of Martignac. But the change was temporary; soon after he called to the head of affairs Prince Polignac, a personal friend, whose views exactly coincided with his own, and the choice of whom consequently aroused the deepest dissatisfaction. But Charles refused to give way, and the address of the Chambers requesting the dismissal of the prince was answered with a dissolution. His foreign policy, meanwhile, was popular, for his troops gave assistance to Greece and conquered Algiers. But this could not save a king who so little understood the temper of his people. On the 25th June, 1830, he issued ordinances, of which one forbade the publication of any periodical without Government permission, another dissolved the new House of Deputies which had not yet met, and a third placed the elections under the power of the prefects. This excited a spirit of resistance which spread rapidly through Paris; barricades were thrown up; the troops were repulsed; and in three days the revolution was completed, Charles meantime doing absolutely nothing. At length he recalled his edicts; and

he afterwards resigned in favor of his grandson, the duke of Bordeaux. But all was now in vain. Louis Philippe was elected king; and Charles retreated from St. Cloud to Trianon, from Trianon to Rambouillet, and finally returned to Holyrood, where he lived four years. He died at Görtz in 1836. The close of his life was spent in religious austerities, which were intended to atone for his former dissoluteness.

CHARLES I., emperor. See CHARLEMAGNE.

CHARLES II., emperor. See CHARLES I. of France.

CHARLES III., emperor. See CHARLES II. of France.

CHARLES IV. (1316–1378), emperor of the Romans, was the son of John of Luxembourg, king of Bohemia. As a child he spent five years at Paris, but at the age of twelve he returned to his father's court. While only sixteen he was appointed viceroy of Italy,—a post of the greatest difficulty, from which it was not long before he was obliged to retire. He next took part in the Carinthian war against the Emperor Louis of Bavaria, the great enemy of the Pope. In 1346, on the death of his father at Crécy, he became king of Bohemia; and in the same year he was elected emperor in place of Louis, through the influence of Pope Clement VI. But Charles only gained this dignity at the cost of many humiliating concessions, which made him appear the mere tool of the Pope and robbed him of the respect of the electors. On the death of Louis in the next year, they refused to recognize him, and chose first Edward III. of England, then the Marquis of Meissen, and lastly, when both of these refused the honor, Count Günther of Schwarzburg. On the death of the last, however (an event which he was accused of having accelerated by poison), Charles, who had married Anne, daughter of the Elector Palatine, and given his own daughter, with Tyrol as dowry, to the duke of Austria, was unanimously elected. He devoted all his care to the aggrandizement of himself and his family; and the government of the empire was very negligently administered. In 1354 he visited Italy, and was crowned at Milan, Rome, and Ostia; but he received many indignities, being, for example, refused entrance to several cities, and only allowed to remain at Rome a single day. He was obliged to confirm the Viscontis in their usurpation; and he left the country, after amassing a large sum of money,—a mockery to both Guelf and Ghibelline. As third wife Charles took the daughter of the duke of Jauer, to whose dukedom he hoped thus to obtain the succession. He also added Brandenburg, Silesia, and Lower Lusatia to the possessions of the House of Luxembourg; and he obtained from the electors, by means of large bribes, the recognition of Wenceslas as his successor. He allowed the empire meanwhile to be overrun by banditti, and he only once took up arms. This was at the call of the Pope, to whom he was always submissive; but even on this occasion he allowed himself to be bought off by his adversaries, the tyrannous Viscontis. The only important measure which he effected was the publication of the Golden Bull (1356), which determined the method of election for the dignity of emperor. It decreed that the number of the electors should be seven:—three ecclesiastical, viz., those of Mayence, Cologne, and Trèves; and four secular, viz., the king of Bohemia, the Count Palatine, the duke of Saxony, and the margrave of Brandenburg. The king of the Romans, and future emperor, was to be elected by the majority in a meeting to be held at Frankfort. The Pope thus lost all influence over elections; and to escape his anger Charles granted him a tithe of all ecclesiastical incomes, together with some other concessions. Charles died at Prague in 1378, having immensely enriched the house of Luxembourg, but leaving the empire greatly the worse for his reign.

See Greschien, *De Constitutionibus Caroli IV.* (1617); Dönniges, *Geschichte des Deutschen Kaiserthums im 14 Jahrhundert* (1841); and Pelzel, *Geschichte Kaiser Karls IV.* (1780).

CHARLES V. (1500–1558), emperor, the ablest and most powerful monarch of the 16th century, was born at Ghent, February 24, 1500. He was the converging point and heir of four great royal lines, which had become united by a series of fortunate matrimonial alliances. His father was Philip of Austria, who being the son of the Emperor Maximilian and of Mary, only daughter and heiress of Charles the Bold, transmitted to him the possession of the Netherlands, and of the hereditary dominions of Austria, as well as a solid claim to the imperial crown of Germany at the next election. His mother was Joanna, second daughter, and finally heiress, of Ferdinand of Aragon and Isabella of Castile, joint rulers of Spain, who handed down to their grandson the united monarchy, increased by the conquest of Granada in 1492, by the addition of the two Sicilies in 1504, by the annexation of the southern part of Navarre in 1512, and by the discovery of the New World. Seldom, if ever, in the history of the world has any one been born to such vast possessions and to such weighty responsibilities. He fell heir to the Netherlands on the death of his father in 1506, to the crown of Spain and Naples on the death of his grandfather Ferdinand in 1516, and to the archdukedom of Austria on the death of his grandfather Maximilian in 1519. Before the future emperor was born, Columbus had been discovering for him territories of unlimited extent and fabulous wealth beyond the pillars of Hercules. When he was only fifteen years of age the first European saw the Pacific Ocean; and while the crown of Charlemagne and Barbarossa was being placed on his head at Aix-la-Chapelle, Magellan was prosecuting the great voyage which was to result in the circumnavigation of the globe, and Cortes was engaged in the arduous conquest of Mexico. Ere he had been twenty years on the throne of Spain, Pizarro had completed the conquest of Peru. This was not all. It must be remembered that two at least of the countries he was destined to rule were approaching the very highest point of their intellectual, moral, and material development. The ingenious and energetic population of the Netherlands were carrying industry to a pitch till that time unexampled in the history of the world, while the vast wealth they accumulated could in the hands of a politic ruler become an almost exhaustless source of revenue. It was the heroic period in the history of Spain, the period of final victory over the Moors, and of the romantic conquest of a new world, when religious and military enthusiasm elevated the national character in such an extraordinary manner; in war, diplomacy, and government the pre-eminence of the Spaniards was acknowledged and dreaded. In fact, the material wealth of great countries and the genius necessary to form it and to guide it were available to an extent which has seldom been surpassed.

On to 1517, when he went to enter upon the government of Spain, Charles lived in the Netherlands. He was carefully educated, though his tastes attracted him more to the active exercises of the chase and of the tilting ground than to the dry and pedantic learning of the time. William of Croy, Lord of Chièvres, was appointed to superintend his education, while under him Adrian of Utrecht, afterwards Pope by the name of Adrian VI., was the teacher of the young prince. The latter was not able to inspire him with any love for the scholastic learning in which he excelled, while the former did not attempt to lay any constraint upon his natural bent. He took care, however, to instruct him in the knowledge more directly useful to a prince, in the study of history and the science of government, and especially sought to interest him in the practical direction of affairs. If we may judge from the result he was perfectly successful, as his pupil grew up to be a great adept in the arts of government, and to be the active and direct moving power in everything that transpired during his reign. Yet his character was late in developing. His excessive deference to his teachers and the undue place he gave them in the government rendered him very unpopular during his first visit to Spain (1517–19).

In 1519 the news arrived of the death of his grandfather Maximilian and then of his own election to the imperial crown. The contest between him and Francis I. had excited universal attention in Europe. The crown had been first offered to Frederick the Wise, elector of Saxony, but that prince recommended Charles on the plea that the critical state of the empire, especially on account of the alarming progress of the Turks, required for it a powerful protector. And, indeed, now that Charles had attained to the highest position in Christendom, he found that the vast extent of an empire, consisting of nations geographically disconnected and brought under the same head, not through any real affinity, but by the accident of matrimonial alliances, had only increased the number of his rivals and the many-sided complexity of his duties. Between Charles's dominions in Spain and the Netherlands, holding the duchy of Burgundy, which Charles claimed by hereditary

right, and the duchy of Milan, over which he was bound to assert the old imperial claims, angry because of the Spanish conquest of Navarre, and chagrined by his defeat in the contest for the imperial crown, Francis ruled a compact and united kingdom, not capable certainly of matching the vast empire of Charles, yet not easily accessible to attack, and formidable on the battle-field. About the same time that Charles was crowned at Aix-la-Chapelle, the throne of Turkey was ascended by Soliman the Magnificent, who himself the heir of mighty conquests and of well-disciplined armies, carried the Ottoman empire to the very pinnacle of its power (1520–66); his progress through Hungary up to the walls of Vienna was marked by an ever-advancing line of fire and blood; his fleets commanded the Mediterranean, and threatened the coasts of Italy and Spain, while the corsairs of Tunis and Algiers, under the renowned Barbarossa, who was soon to acknowledge his allegiance, infested the seas, and spreading terror all along the northern shores of the Mediterranean, carried thousands of Christians into slavery. The Pope was a doubtful and suspicious ally or an open enemy, as the interests or passions of the Holy See seemed to dictate, and Henry of England, aspiring to be the arbiter of Europe, pursued an equally capricious course of vacillation. In Spain itself the discontent of the commons broke into open revolt, while the haughty nobles required to be skilfully managed. Above all, on the very year of the coronation, Martin Luther had burned the papal bull which condemned him at the gate of Wittenberg. No one could yet foresee the extent of the chasm opened up in the Christian world by the heroic defiance thus hurled at its spiritual chief; but it soon became clear that the heart of Germany was with the Augustinian monk, and that many powerful influences, in the empire and out of it, religious, social, and national,—science, culture, patriotism, morality, and piety—were working towards the overthrow of priestly domination. On all sides, then, Charles had difficult work to do. In Italy and Navarre, and on the Flemish frontier, he had to make head against the armies of Francis; in Hungary and in the Mediterranean he had to arrest the progress of the Turks; he required to watch the wayward king of England and the crafty popes, to manage the haughty susceptibility of Spanish grandees and the boisterous independent spirit of the Flemish cities, to compose the religious troubles, and to stay the growing spirit of revolt against the old state of things.

From his coronation at Aix-la-Chapelle, Charles proceeded to the Diet of Worms, which opened on the 28th of January, 1521. After a council of regency had been appointed, which under the presidency of his brother Ferdinand was to govern during the emperor's absence, and other business had been disposed of, the religious difficulty was taken up. Though political considerations always prevailed with Charles during his active career, he was a Catholic by conviction, and was by no means disposed to encourage the hopes entertained of him by the liberal party in Germany. Besides, the old traditions of the empire, in which he firmly believed, required that he should support the church. At the same time, the Reformation was too strongly supported to admit of the summary measures most congenial to his character and most suitable to his political position. Luther was therefore heard, and his safe-conduct respected; but at the close of the diet Charles had the ban of the empire pronounced upon him and his adherents. This edict, however, which had been obtained by unfair means, remained inoperative. The war with Francis which now broke out, and occupied the emperor for eight years, prevented him from obstructing the Reformation. In the meantime, disturbances had been going on in another part of his dominions (1519–21). The discontent of the commons of Castile at the summary proceedings of Ximenes, at the excessive preference given to Flemish officials in the government of Spain, and at the other unconstitutional measures of the new Government, broke into open revolt. Toledo was the first to rise, and the insurgent cause soon became powerful in Castile. Even many of the nobles sympathized with the movement; one of their number, Don John de Padilla, placed himself at the head of it; but divisions among the commons, and their alienation from the nobility, weakened their strength. An army was brought up against them, which defeated Padilla, and took Toledo after a hard siege. Like disturbances took place in Valencia. On his return from Germany, Charles treated the insurgents with great clemency, and wisely attached the nobility to his person; but the old liberties of Castile became little more than a dead letter.

After his return from the Diet of Worms, Charles remained in Spain till 1529, directing the war against Francis. The emperor was upon the whole decidedly victorious. The French were foiled in Navarre, and expelled from Milan and from the whole of Italy. The failure of the imperialists in an invasion of Provence and the siege of Marseilles was compensated by the splendid victory of Pavia, in which the French sustained enormous losses, and Francis himself was made prisoner (1525). The triumph was, indeed, too decisive, as it made Charles oblivious of every chivalrous principle in his treatment of the captive king, and alarmed his allies, Henry of England and Clement VII., into espousing the French cause. Francis nominally accepted, but immediately after his liberation repudiated the humiliating peace of Madrid, and with his allies recommenced the war. Thus Charles lost the fruits of his victory; but he was again successful. The mercenary army of Bourbon plundered Rome, and kept the Pope a prisoner in the castle of St. Angelo, while the efforts of Francis to maintain himself in Italy proved a failure. At length the rival monarchs composed their differences for a time at the peace of Cambray, 1529, by which Francis renounced his pretensions to Milan, and retained the duchy of Burgundy. The superior generalship of the Spaniards, the deeper and more persevering policy of Charles, and the defection of Bourbon (who, grievously injured at the French court, carried over to the enemies of his country his military skill and a thirst for revenge) had given him the foremost place in Christendom, in reality as well as in name, while the peace left him free for other labors. Leaving Spain under the regency of his beloved queen, Isabella of Portugal, whom he had wedded in 1526, he proceeded to Italy. At Bologna, where he had an interview with the Pope, he was crowned emperor and king of Italy; and Florence, which had expelled the Medici, was taken after a long siege, deprived of its republican constitution, and placed under a member of that celebrated family. After having arranged the affairs of Italy, the emperor crossed the Tridentine Alps into Germany to attend the diet which had been summoned to meet at Augsburg (1530). Notwithstanding the Peasants' War, the fanaticism of the Anabaptists, and the strenuous, often threatening, opposition of the powers temporal and spiritual, especially of Southern Germany, the Reformation had made marvellous progress during the nine years which had elapsed since the Edict of Worms, and was rapidly overspreading the whole empire. It was clear that if the influence of the church beyond the Alps was not altogether to be lost, the emperor must interpose with the whole weight of his authority. Accordingly, at Augsburg, Charles made every effort to bring about a peaceful arrangement of the religious differences; but he soon found that he had quite mistaken the strength and firmness of the new movement. The Protestants held resolutely by the confession they had presented; and when Charles proceeded to issue a hostile edict against them, they formed themselves into a league for mutual defence under the leadership of Saxony and Hesse. This was the famous Smalkald League, which from the end of 1530 continued to be the political bulwark of German Protestantism. The league entered into communication with both France and England; but it was from a much stranger quarter deliverance was to come. As at the Diet of Worms it was Francis, so now it was Soliman that averted an armed collision between the young Protestantism and the imperial power. Foiled in his attack on Vienna in 1529, the sultan was again threatening the south-eastern frontiers of Germany with a terrible army. Charles felt it necessary to unite the empire against him, and so at Nuremberg effected a compromise with the Protestants, by which freedom of worship was secured till the calling of a general council. With all enthusiasm they then armed against the Turk. At the head of one of the most splendid armies ever equipped by Christendom, Charles for the first time took the field in person. Great deeds were expected at this hostile meeting of the Eastern and the Western worlds; but the sultan, reckoning on the religious quarrels of Germany, did not anticipate that he would have to confront the united forces of the empire, and therefore soon withdrew within his own frontier (1532). Not being able to follow the enemy through the wasted

kingdom of Hungary, the emperor returned through Italy to Spain. His next expedition was against Tunis, now the stronghold of the great pirate Barbarossa. The emperor defeated Barbarossa, took the city, and released thousands of Christian slaves, who, returning to Europe, spread abroad the fame of their generous deliverer (1535). The same year war was resumed with Francis, who formed an alliance with the Turks, and invaded the territory of the duke of Savoy. Charles failed completely in an invasion of Provence, and the war ended without any important result by the truce of Nice (1538). Next year the emperor lost his wife Isabella, to whom he was deeply attached. Towards the end of the year (1539), when a revolt of the city of Ghent required his presence in Flanders, Charles passed through Paris on the special invitation of the French king, giving to Europe, as was thought, a noble example of chivalrous confidence and forgetfulness of past enmities. The emperor was too much occupied with present emergencies to introduce a systematic despotism into the Netherlands; but when the privileges of the cities came into conflict with his imperial plans they were little respected. The most cruel edicts had been issued against Lutheranism and a bloody persecution carried on. But to Charles the Netherlands were above all things an inexhaustible source of revenue, from which he drew the supplies for his many wars. They paid annually twice as much as Spain and the Indies put together, and were continually called upon for extraordinary contributions. The great city of Ghent, his own birthplace, had lately refused to contribute, and even entered into communication with Francis, who betrayed it to Charles. The emperor entered the city with a numerous army and an imposing retinue, caused the ringleaders to be executed, annulled the constitution of the city, and placed it entirely under the government of persons nominated by himself (1540). In the autumn of next year Charles made another expedition against the corsairs of North Africa, who had now made Algiers their great stronghold and the centre of their nefarious power. But he was unsuccessful; a tremendous tempest so disabled the army and injured the fleet that he was obliged to return before he had in the least accomplished the object of the expedition. He had unwisely persisted in it during a highly unfavorable season; but the bravery with which he exposed himself to danger and hardship of every kind to some extent atoned for his rashness. The reverses sustained by the emperor at Algiers encouraged the most persevering of his enemies, Francis, to renew the war in alliance with the Turks. Consequently, Charles was once more obliged on every side to make head against his old foes, against the French armies in Piedmont and on the Spanish and Flemish frontiers, against the Turkish armies in Hungary, and against a junction of the French and Turkish fleets in the Mediterranean. At length a fresh compromise with the Protestant princes enabled him to invade Champagne with a powerful German army, which so alarmed the French capital that Francis found it expedient to conclude the peace of Crespy (1544). This was the last war of Charles with his French rival. The emperor had all along maintained his superiority over the king, but except that the French had been expelled from Italy, they remained, territorially, as they had been at the beginning.

This peace with Francis, and a truce subsequently concluded with Soliman, now left Charles free to grapple with his last and most difficult labor, the suppression of the Reformation. The religious question always lay very near to the heart of the emperor. But during the first twenty-five years of his reign, it had only been at short and broken intervals, left him by his wars and other multiform relations with Francis, Henry, the Pope, and the Turk, that he had been able to take it in hand. Scarcely had he been able to enter on some deliberate method of dealing with it when one or other of those rivals or suspicious friends crossed his path, and called his attention elsewhere. And now, when he could devote seven years of almost uninterrupted leisure to the work, and could concentrate the entire strength of his empire on the execution of it, he was destined to discover that the Reformation had grown too strong to be arrested even by his imperial will. Its progress, great as it had been from the Diet of Worms to that of Augsburg, had been far greater from the Diet of Augsburg to the period at which we have arrived. At Augsburg the elector of Saxony and Philip of Hesse were the only considerable princes that supported the Reformation. By this time Würtemberg, Brandenburg, the dukedom of Saxony, and the Palatinate of the Rhine had declared for it. Northern Germany was almost entirely Protestant, whilst in Southern Germany the imperial cities, and even to some extent the nobility of the Austrian hereditary states, were in favor of it. Bohemia was strongly inclined in the same direction; and towards the West the orthodoxy of the Netherlands was threatened by the duke of Cleves, who was going to enter the Smalkald League, when his plans were cut short by the emperor, and still more so by Hermann, archbishop of Cologne, who was engaged in inaugurating a moderate reformation of his province under the advice of Bucer and Melanchthon. Thus had the new movement profited by the distractions of an emperor who wished to arrest it. Now it was clearly time for the most strenuous and comprehensive effort. It was to be expected of the politic nature of Charles that he would not have recourse to extreme measures till all means of accommodation had been exhausted. Accordingly, in 1541, at Ratisbon, a great religious conference had been held by some of the most moderate theologians on either side. No little harmony of opinion had been arrived at, but they differed as to transubstantiation and the powers of the church, the more decided heads of both parties were afraid that compromise was being carried too far, and the result was that they separated without any common platform being secured. Towards the end of 1545 another of the methods all along proposed for the arrangement of the religious difficulty, and constantly urged on the popes by the emperor, was at length to be tried. But the Protestants were resolved to have nothing to do with a so-called general council which was composed almost entirely of Italians and Spaniards, where the Pope and the old party were absolutely predominant, and where, consequently, the Church of Germany had no chance of a fair representation or even of a fair hearing. The calling of the Council of Trent, therefore, had the sole effect of widening the chasm between the old and the new; and the course its deliberations were to take had the same result in signalizing the contradiction between the Catholic and the Protestant point of view. Perceiving that milder methods were of no avail, Charles now made preparations to compel the submission of the Protestant princes. The dissensions among them greatly facilitated his plans. Maurice, duke of Saxony, always at feud with his kinsman the elector, was ready, with reasonable prospect of self-aggrandizement, to take the imperial side, and the elector of Brandenburg took no active part in the struggle, so that Electoral Saxony, Hesse, Würtemberg, and the imperial cities alone were to be reckoned with. The counsel of the great general Schärtlin, who commanded the troops of the cities to fall upon Charles at Ratisbon before his forces were assembled, and then to seize the passes of Tyrol, so as to break the communication between Italy and the imperial camp, was set aside by the hesitating and over-scrupulous leaders of the Protestant party. Accordingly, Charles was allowed to concentrate his troops and take the offensive. Maurice thereupon declared himself, and, invading the territories of Electoral Saxony, compelled the elector to withdraw from the Protestant camp, which consequently soon broke up, leaving the emperor to have his own way in South Germany, and to suppress the Reformation in the province of Cologne. Thus, disastrously for the Protestants, ended the campaign of 1546, the result of their own indecision, as their forces were superior to those of the emperor.

In the meantime, the Saxon elector had been chastising Maurice for his treacherous invasion of the electorate. In the spring of 1547 the emperor, hastening to assist his ally, concentrated his forces at Eger on the Bohemian frontier, overtook the electoral forces at Mühlberg on the Elbe, defeated them easily, and took the elector prisoner. He was obliged to submit to a humiliating arrangement, by which he resigned his territory and the electoral hat to his enemy Maurice. Shortly after, Philip of Hesse was likewise compelled to yield, and was detained a prisoner by the emperor, whose dishonorable conduct on this occasion excited the indignation of his Protestant allies, especially of Maurice, who was son-in-law to the landgrave. In a little time Protestantism seemed to be at the feet of the emperor. The city of Magdeburg was the only important seat of resistance remaining. But while the emperor had been beating down the enemies of the church on the field of battle, her representatives at Trent were proceeding in

sueh a way as to render a permanent settlement of the question impossible. The politic Charles was anxious to concede certain points to the Protestants, so as to secure peace while still maintaining the rights of the chureh. The conclusions arrived at by the council did not admit of compromise; and to make matters worse, the Pope, alarmed at the victorious attitude of Charles, removed it from Trent to Bologna. Elated by his victories to an extent that was not to be expected of an old and experienced statesman, the emperor now adopted some very doubtful measures. Under his auspices, the Augsburg Interim was framed—an attempt to supply a common religious platform for all parties in the empire, and thus by his own imperial authority put an end to the sehism. But it pleased neither party, for the Catholies rejeeted it, and the Protestants aecorded it only a limited and enforced obedience. Another plan of the emperor, to induce the German eleetors to eancel the eleetion of his brother Ferdinand as king of the Romans and to ehoose his own son Philip instead, also failed. Thus the ambitious dream of Charles to transmit all his own power to his son, and if possible make it hereditary in his family, could not be realized. Meanwhile, all unknown to himself, a plot was maturing by whieh he was to be hurled from a position of splendid triumph into the bitterest reverses of his life. The profound and skilful Maurice of Saxony, finding that he had got from the emperor all that was to be expected, and perceiving how deeply he had outraged the national and religious sentiment of Germany, resolved to seize the advantage given him by the high-handed and oppressive measures of his ally in order to retrieve his own lost credit. Accordingly a combination of princes was formed with the greatest seerecy, and an alliance concluded with Henry II. of France. While the French king, marching eastward as the "Protector of the Liberties of Germany," seized Toul, Verdun, and Metz, and threatened Strasburg, and the Turks renewed the war on the Austrian frontiers, Maurice and his confederates advanced suddenly into South Germany, and surprised the emperor at Innsbruck, whence, saved from capture by a mutiny among the German landskneehts, he fled, sick of gout, over the Tyrolese Alps into Carinthia. Weary of the religious divisions of Germany, Charles left to his brother Ferdinand the task of arranging a peaee, first at Passau (1552), and finally at Augsburg (1555). But he was doomed ere long to sustain another severe reverse. While renouneing the task of arranging the internal affairs of Germany, he had chosen for himself the duty of chastising her foreign enemies, and winning baek an important possession. At the head of a splendid army of 60,000 men, he besieged Metz from the end of Oetober, 1552, to the beginning of January; but all his efforts to retake the eity availed nothing against the skill of Guise, and the bravery of the French nobles who had thrown themselves into the city in great numbers. After suffering great losses he was obliged to retreat, and Metz was for three centuries lost to the German empire. Soon after, in a very different quarter, the poliey of Charles gained a great triumph, which likewise proved illusory. The frequent changes in the direction of English politics had always been a subjeet of deep interest to him, and had to some extent affected his own course, though only in a secondary way. Now, however, on the accession of Mary, there was real ground for the hope that England might be drawn into the closest connection with his policy, and most intimately interested in the great struggle against the new movement, which had gradually become the supreme question in European politics. Mary had already been betrothed to Charles, and expressed her willingness to become his second empress; but he transferred the state duty of marrying Mary to his son Philip, who aecordingly did so in 1554. The presence of Philip in England contributed greatly to the restoration of Catholicism in the country, and Mary was very glad to fall in with the general policy of Charles. An heir only was wanting to the stability of the union, an heir, too, who was destined by the marriage-treaty to rule over England and the possessions of the house of Burgundy, and his birth was expected with many prayers in the Catholic world, and with great anxiety on the part of Charles. Happily for England, the hopes of Mary were not realized. The English allianee continued, but its insecurity was only too apparent.

Long before the period at which we have arrived, Charles had entertained the idea of relinquishing the throne in order to devote the remainder of his life to quiet retirement and preparation for another world. With a feeling of this kind it had been purposed by him and his wife Isabella, who died in 1539, to withdraw, he into a monastery, she into some neighboring nunnery, and there spend the evening of their days in religious exereises. On his return from the unhappy expedition against Algiers his suite remarked the impression made on him by the quiet simplicity of the monastic life. In 1542, the seeret had been eonfided to Franeiseo Borja, afterwards famous in the Soeiety of Jesus. Now when he had been thwarted in his dearest sehemes, obliged to renounce all pretension to eontrol the religious movement in Germany, and foiled in a great attempt to recover an imperial eity treaeherously seized by his bitterest foes, and when the last great effort of his statesmanship depended on the life of a sickly woman, it is no wonder that he proceeded to carry his plan into exeeution. But beyond a doubt the great reason for finally adopting the resolution to abdieate was his feeble health. The vigor whieh in his younger days had fitted him so well for the ehase, the tournament, and the battle-field, was already completely undermined by incessant labor and anxiety, by repeated attaeks of gout, and, it must be added, by the most extraordinary excess at table. In 1554 he transferred the erown of Naples to his son Philip, in order that Philip might marry Mary of England on equal terms. Next year, on the 25th of October, the States of the Netherlands were assembled at Brussels to receive a formal abdication of those provinees. Supported by a crutch on the right hand, the left leaning on the shoulder of the young prinee of Orange, afterwards renowned as the liberator of Holland, Charles reeounted the many journeys he had made and the long and arduous labors he had undergone in the service of his people; he intimated that the state of his health now required that he should transfer the cares of government to his young son, whom he introduced to the assembly; and exhorting them to adhere steadfastly to the Catholie faith, requested their forgiveness of all the errors committed during his reign. The assembly, full of the aneient spirit of reverent loyalty, and struek by the marvellous spectacle of the highest earthly power voluntarily divesting itself of its majesty and deseending into obseurity before the natural time, burst into tears and sobs. The emperor himself, as he sank exhausted in his chair, wept like a child. The same year Charles intimated to his brother Ferdinand his determination to resign the imperial dignity; but owing to the tedious formalities of the empire, and the objeetions of Ferdinand, it was not till 1558 that the proeess of abdieation was completed. In the beginning of 1556 he formally laid down the crown of Spain.

After he had thus relieved himself of the responsibilities of government, Charles sailed from Flushing on the 17th September for a climate better suited to his broken health. He landed at Laredo in Spain on the 28th, and in the beginning of February of next year finally settled at Yuste, a Hieronymite monastery in the north of Estremadura. It stood in a pleasant and genial valley, proteeted from the north wind by a range of mountains. He had selected the spot some time before, and had eaused a house to be built for his reception adjoining the monastery. Here he stayed till his death, a period of one year and eight months nearly. His life in retirement, so erroneously painted by Robertson, has been described with great minuteness by many reeent historians of great ability. The romanee in whieh it has been enveloped has been done away, and his charaeter appears in unborrowed and somewhat prosaie reality. It is true that he devoted much of his time to religious exercises; for it was not to be expeeted that a prinee, who had not allowed a single day to pass since the age of twenty-one without spending a portion of it in inward prayer, would intermit the praetiee in his deelining years, and during a retreat chosen for the purpose. He spent mueh of his leisure in gratifying his mechanical tastes, but so far was he from learning the principle of toleration from the impossibility of making two watehes go exactly alike, that he exhorted his children, in the most urgent manner, to destroy heresy with fire and sword. He still delighted in the eonverse of learned and experieneed men, but instead of entertaining them familiarly at table he maintained the stately Castilian etiquette of dining alone, only once deigning to partake of the meal of the friars, whom he eontinued to respect as mueh as ever. The simplicity of his table

especially is a mere imagination. So long as he was tolerably well he kept his dependents in continual anxiety to have it well furnished with those pernicious dainties which had contributed to ruin his health, and this was only equalled by the anxiety of his medical and other advisers, when excess had brought about its natural consequences. His retirement certainly delivered him from the necessity of moving in a prescribed line of anxious duty and responsibility, but his own sympathy with public affairs, and the emergencies in which Philip found himself in consequence of a new combination of the French, the Turks, and the Pope, obliged him to come forward with his advice, which was always attended to with the utmost deference, and in financial matters, with his active help. The couriers despatched to Yuste found him keenly alive to all the vicissitudes of good and evil fortune which his empire was still destined to experience. The brilliant, but somewhat barren victories of St. Quentin and Gravelines, the extraordinary peace concluded by Philip with the Pope, the loss of Calais and Thionville, the advance of the Turkish fleet to the coast of Spain, and the much-desired but never-to-be-fulfilled hope of Mary of England, that God might give her a child for the good of the church—all these matters interested him as much as when he was the moving spirit of European politics. The soft air of Yuste and the easy way of life he led had for some time a most beneficial effect on his health. He became stronger than he had been. But his gout, and above all his injudicious diet, still rendered him an invalid. He could not ride, nor could he walk much, but was usually carried about in a chair, and delighted to enjoy the warm air under the shade of the trees of the monastery. At length, during the month of August, 1558, serious symptoms began to show themselves, and it was remarked that his mind dwelt more than ever on the religious ceremonies prescribed by the church for the souls of the dead. The Hieronymite chroniclers relate that he even caused his own obsequies to be performed before his death. There are a good many difficulties in the way of accepting their narrative; but Sir W. Stirling Maxwell and Prescott are both disposed to believe that his funeral service was in some form celebrated during his life. The same day, the 30th August, he felt considerably worse. In a little time his ailment took the form of fever, of which he expired at two o'clock in the morning of the 21st September (1558). He died the death of a good Catholic, earnestly commending his soul to God according to all the forms observed by the church. He was interred in the monastery; but after the completion of the Escorial by Philip, his remains were removed thither, where they were again laid to rest by the side of his dearly beloved and much regretted Isabella.

An important point in the codicil to his will, executed some days before his decease, must be mentioned for the light it throws on the character of Charles and on the subsequent history of Europe. In the very year of his death the most conclusive proof had been given of the influence of Luther's teaching even at the court and round the throne of Spain. At the time of this alarming disclosure Charles had urged the severest measures for the extinction of heresy, and now in this codicil he enjoined his son in the solemnest manner to root it out. Thus the last energies of the emperor were spent in consecrating that terrible system of religious policy which led the different branches of his house into the fatal crusade against the Reformation, set one-half of Christendom in arms against the other, and permanently arrested the development of Southern Europe. As to Luther and the Diet of Worms he regretted that respect for human engagements had led him to forget his duty to God in permitting the arch-heretic to escape, but congratulated himself that he had never exposed his soul to contamination by hearing the new doctrines defended in his presence, as if ignorance were the only sure safeguard of truth. At the same time, those who would see in this proof of a blood-thirsty disposition entirely mistake the character of Charles or the state of the Spanish conscience. Charles was neither cruel nor cold by nature; he was popular among all classes and nationalities of his subjects, clement to rebels, revered by his immediate attendants, loved by the members of his own family, and deeply attached to his wife. Conscious that he was by divine right the political head of Christendom, he did not evade or depreciate the duties such a position imposed, but exerted himself to the utmost and in a religious spirit to fulfil them, though by no means unwilling to employ all the arts permitted by the statesmanship of the time. In fact he fulfilled better than most men the mission which his experience and position imposed and his education enabled him to comprehend, and of this he considered the suppression of opinion destructive of the church the most indispensable part, quite as obligatory as the defence of Christendom against the Turks and the corsairs, more so than the assertion of his imperial dignity against the Pope, or of the rights of the house of Austria against the French. But his conscientious conviction of the necessity of suppressing heresy neutralized all the excellences of his character. It was not so much in what he did, as in what he was not permitted to do, that his reign was helpful to the civilization of modern Europe.

The memoirs of Charles, dictated by him in leisure hours while sailing up the Rhine in 1550, were discovered in 1861 by Baron Kervyn de Lettenhove, while making some searches in the Imperial Library at Paris. The manuscript was in Portuguese, and professed to be a translation made from the original at Madrid in 1620. That such memoirs had existed was well known from the testimony of Van Male, literary secretary to Charles, and from other contemporary notices; and their existence was affirmed in 1623 by Gonzalez d'Avila, historiographer of Philip III. They were written in French in a concise and dignified style, and give a brief summary of his life from 1515 to 1548,—very brief at first, somewhat in detail from 1545 to 1548. English translation by L. F. Simpson (Longmans, 1862).

Other authorities:—Robertson's *Charles V.*; Ranke's *Deutsche Geschichte im Zeitalter der Reformation*, which is almost coextensive with Charles's life. For life during his retirement consult Sir W. Stirling Maxwell's *Cloister Life of Charles V.*; Prescott's Appendix to Robertson; Pichot's *Chronique de Charles-Quint*; Gachard's *Retraite et mort de Charles-Quint*, and Mignet's *Charles Quint*, all which works are based on researches into the archives of Simancas, especially on those of Gonzalez. (T. K.)

CHARLES VI. (1685–1740), emperor, was the second son of Leopold I. As the only male representative of the house of Hapsburg, he claimed the throne of Spain, which was left by Charles II. to Philip, duke of Anjou, grandson of Louis XIV.; and in order to prevent the predominance of the house of Bourbon, England, Holland, Prussia, Germany, and Portugal gave him their support. In 1703 he was proclaimed at Vienna; and having, after a visit to England, invaded Spain, with the assistance of an English fleet under Peterborough and an English land-force under the earl of Galway, he was proclaimed king in Madrid in 1706. He himself remained at Barcelona; and the war continued with varying success, till the death of his brother, the Emperor Joseph I., in 1711, produced the most important changes in the policy of the allied European powers. They became as much afraid of the supremacy of the house of Hapsburg as they had formerly been of that of Bourbon; and in 1713, by the treaty of Utrecht, they made peace with France. In the next year Charles was obliged to follow their example, and by the treaty of Rastadt he gave up all to Philip except the Spanish possessions in the Netherlands and Italy. In 1715 Charles undertook the defence of Venice against the Turks; his general, Prince Eugene, gained some considerable successes, including the victory of Belgrade; and, at the conclusion of peace in 1718, he added Belgrade, and parts of Servia, Slavonia, Bosnia, and Wallachia to the empire. He was next engaged in meeting an attack on his Italian territory made by Spain, whose policy was then directed by Alberoni; and, with the assistance of England, France, and Holland, he was speedily successful. After this for several years all his efforts were spent in endeavoring to obtain the recognition by the European powers of his Pragmatic Sanction of 1713, which settled the succession on his daughter, Maria Theresa, and her heirs. By ceding Parma and Piacenza, Charles purchased the favor of Spain, and he afterwards in a similar manner acquired the alliance of Russia and Prussia. But England, France, Denmark, and Holland united to oppose him; and it was only at the cost of considerable sacrifices that he at length, in a conference held at Vienna in 1731, obtained their recognition of his scheme. One of the promises which he then made was to secure the succession to the crown of Poland to the son of the reigning king; and on the death of the latter he was consequently involved in a war with France, Spain, and Sardinia, which supported a rival claimant. In this struggle he lost Milan, Lorraine, and most of Lombardy,

which were seized by the French, together with the two Sicilies, which were conquered by the Spaniards. His last war, against the Turks, was equally unfortunate. He died in 1740, leaving the empire considerably weakened by his reign.

CHARLES VII. (1697–1745), emperor, also known by the name of Charles Albert, was the son of Maximilian Emmanuel, elector of Bavaria. He was taken from home while a child by the Emperor Joseph I., who had outlawed his father, and seized Bavaria; and he was not liberated till the conclusion of the treaty of Rastadt in 1714. He commanded against the Turks in the war which the Emperor Charles VI. undertook in order to protect the Venetians. In 1722 he obtained in marriage the second daughter of the late Emperor Joseph, after renouncing all claims to the imperial crown. But when he succeeded to the electorate of Bavaria (1726), he refused to recognize the Pragmatic Sanction; and on the death of Charles VI. he gained the alliance of France and Spain, proclaimed himself king of Bohemia, and, having obtained his own unanimous election, was crowned as emperor at Frankfort in 1742. The Hungarians, however, having espoused the cause of Maria Theresa, she was enabled to occupy Upper Austria and Bohemia, and Charles was forced to retire. In the next year his general, Seckendorf, met with some success, and in 1744 Frederick of Prussia invaded Bohemia in his interest. Charles died at Munich in 1745.

CHARLES I. of Spain. See CHARLES V., emperor.

CHARLES II. (1661–1700), king of Spain, son of Philip IV., was only four years old at the death of his father. The regency was left in the hands of the queen, Anna Maria of Austria. She appointed a council, at the head of which she placed Neidhard, her confessor, whom she also made grand inquisitor. But Don John, the illegitimate son of the late king, having gained great popularity by his military successes, marched on Madrid, and forced her to dismiss Neidhard, and give to himself the vice-royalty of Aragon. An unsuccessful war with France, and the loss of Sicily further weakened her power; and in 1675 Charles assumed the government, and took Don John as his chief adviser. Still Spain continued to suffer in the great European contest; and in 1678 she was forced, in the treaty of Nimeguen, to cede Franche-Comté and several considerable towns in the Low Countries to France. In the next year she sustained another serious loss in the death of her ablest minister, Don John. Immediately after the treaty of Nimeguen, Charles espoused Louisa of Orleans, a niece of Louis XIV., who for the next eleven years maintained harmony between Spain and France. The queen-mother now left the retirement of the convent in which she had been placed, and once more, amid the empty folly of the king and the court, assumed considerable authority. After the death of Louisa, Charles married Anne, a sister of the Emperor Leopold I., and in 1694 he joined the country of his wife and of his mother in declaring war against France. But he effected nothing, and the French troops had reached Barcelona, when Spain was saved by the treaty of Ryswick (1697). As the king was childless, negotiations concerning the succession occupied the last years of his life, and after leaning for a long time to the side of Austria, at last, a month before his death in 1700, greatly through the influence of the Pope, he left the crown to Philip Bourbon, grandson of Louis XIV., who succeeded as Philip V.

See *Spain under Charles II.; extracts from the correspondence of Alexander Stanhope, British ambassador at Madrid from* 1690 *to* 1700, edited by Mahon (Lond., 1840), and Mignet's *Négociations relatives à la succession d'Espagne.*

CHARLES III. (1716–1788), king of Spain, was the second son of Philip V. Parma, Piacenza, and Tuscany, having fallen into the hands of Spain, were bestowed upon Charles, who at the age of fifteen was furnished with an army, and sent to take possession of his principality. At eighteen he conquered the two Sicilies, and the emperor was obliged to recognize him as king. In 1759, by the death of his brother, Charles succeeded to the throne of his native country. His reign was a useful one; for he was a man of ability and of liberal temper, and he was served by such ministers as Aranda, Grimaldi, and Florida Blanca. The administration of the finances was reformed, and a bank was instituted at the capital. The Jesuits were banished, and an attempt, which was not, however, successful, was made to bring the Inquisition under the power of the civil government. Something was done to abolish brigandage; and on two occasions Charles endeavored to repress the piracy of the Algerines; he interested himself greatly in the development of commerce, science, and art; and, lastly, he did much to strengthen the army and navy. The wars, however, which he carried on with England, in alliance with the French, brought him little success. In 1763 he ceded Florida to the English in exchange for Cuba. He joined France in sending assistance to the United States during the War of Independence; and in the peace which was concluded after that war, he recovered Florida, and also gained Minorca. But his attack on Gibraltar was unsuccessful, and the English refused to treat for its restoration. Charles died at Madrid in 1788, after a reign of twenty-nine years. See the *Elogio* of Cabarrus, and the accounts of the reign by Beccatini and Roy.

CHARLES IV. (1748–1819), king of Spain, was the son of Charles III., whom he succeeded in 1788. He was married while very young to his cousin, Maria Louisa of Parma, who soon acquired the greatest influence over him. His most remarkable minister was Manuel Godoy, a good-looking guardsman, who gained the friendship of both the queen and her husband, rose from the ranks to the position of lieutenant-general, and was made duke of Alcudia, and minister of foreign affairs. In 1795 Godoy concluded a treaty of peace with the French Republic at Basel, after an unsuccessful attempt by the king to aid his relative, Louis XVI. Soon after the peace an offensive and defensive alliance was entered into with France; and Spain was thus involved in a short war with Portugal and a longer struggle with England, during which Nelson shattered the Spanish fleet at the battle of Trafalgar (1805). In 1807 Charles made a secret treaty with Napoleon, according to which Portugal was to be seized by the French and Spaniards, and the greater part divided between Godoy and the queen of Etruria, and Charles was to assume the title of emperor of America. At the same time 16,000 Spanish troops were sent to assist the French in Denmark. Meanwhile Napoleon also carried on intrigues with Don Ferdinand, the heir to the throne, who was soon after discovered in a plot to assassinate his father. Though pardoned, Ferdinand continued to do all that he could to arouse ill feeling against the court; and in 1808 Charles was so alarmed by disturbances in Madrid, that he abdicated in his favor. He declared almost immediately that the act was not voluntary, but the matter was decided by a meeting with Napoleon at Bayonne. Urged by Godoy, who was moved by his fear of Ferdinand, and also by the queen, Charles surrendered the crown to Napoleon, who gave him a pension of 6,000,000 francs with the castle and grounds of Chambord; and from that time he lived in retirement with his wife and the favorite, refusing to return to the throne, even when he might have done so with safety on account of the great unpopularity of his son. He died at Rome, soon after the decease of his wife, in 1819.

CHARLES IX. (1550–1611), king of Sweden, was the fourth son of Gustavus Vasa. His nephew, Sigismund, king of Poland, who inherited the crown in 1592, being a Roman Catholic, Charles was appointed to direct the government, till Sigismund signed a decree establishing Lutheranism as the religion of Sweden. There was also a general feeling against the occupation of the throne of Sweden by a Polish king, and, after several fruitless attempts at accommodation, Sigismund was deposed and Charles elected king in 1604. He carried on a vigorous war with Poland, Russia, and Denmark with varying success; and at the age of sixty he challenged (though without result) Christian IV., the king of the last-named country, to single combat. Many of his domestic measures were very beneficial. He founded the university of Gothenburg, and otherwise furthered the spread of education; and he drew up a new code of laws. He left a rhymed chronicle, and a number of letters addressed to Henry IV. of France and others, on the subject of the war with Poland, which were printed in German at Amsterdam in 1608. He died in 1611.

CHARLES GUSTAVUS X. (1622–1660), king of Sweden, was the son of John Casimir, Elector Palatine of the Rhine, and of Catherine, daughter of Charles IX. of Sweden. He studied at Upsala, and travelled in France and Germany, took part in the Thirty Years' War, and fought at Leipsic and elsewhere. On his return to Sweden

he sought the hand of his eccentric cousin, Queen Christina, whom he professed to love sincerely. He was rejected; but in 1654 she voluntarily abdicated the throne, and was succeeded by him. He had now an opportunity of gratifying his passion for war. In 1655 he overran Poland, on the pretext that the king had protested against his accession and desired to supplant him. The kingdom of Poland, and after that the dukedom of Prussia, were compelled to swear allegiance to him, and Charles next seized the continental territory of Denmark. He proposed to Holland and England a plan for dividing Denmark among the three nations, but Cromwell scornfully refused to share in the robbery. Charles was still fighting against Denmark when he died at Gothenburg (1660) in his 38th year.

CHARLES XI. (1655–1697), king of Sweden, was five years old at the death of his father, Charles X., and was left under the regency of his mother and of a council. Brought up without care, he arrived at manhood unable even to read. In 1672 he assumed the government, and, under the influence of France, was speedily engaged in the invasion of the electorate of Brandenburg. The elector was assisted by Denmark and Holland; and Charles's army at first met with serious reverses; but afterwards, taking the command in person, he won several battles, including those of Lund and Landskrona; and in 1679 peace was signed. Charles now devoted his energy to establish the absolute independence of the kingly authority. He diminished the number of senators, and made them mere royal councillors; he reunited to the Crown all the lands which had been divorced from it since 1609; and in December, 1682, the States were induced to declare that the king was responsible for the use of his authority to none but God, that he was not bound by forms of government, and that he need only seek the consent of the senate at his own pleasure. The power thus gained was creditably used for purposes of government. Charles paid the public debts, published annual accounts of the finances, travelled through the country that he might be personally acquainted with the needs and circumstances of the people, defended them from the tyranny of the nobles, established a strong and just legal administration, and commenced the drawing up of a general code. He also added largely to the territory of the kingdom. Under his reign no religion was tolerated but Lutheranism; and the king often showed himself stern and rough. He died at Stockholm in 1697.

CHARLES XII., king of Sweden, was born at Stockholm on June 27, 1682. He received an excellent education, and was able to speak German, French, and Latin fluently. In the spring of 1697 his father, Charles XI., died, and the prince, then only in his fifteenth year, was declared of age by the States-General and invested with the royal authority. As might have been expected, the boy-king showed himself but little disposed for state affairs. His time was divided between study and amusement; now he was poring over the exploits of Alexander in the pages of Quintus Curtius, now spending whole hours in gymnastic exercises, or joining a hunting party in the pursuit of the bear; and thus he was rapidly developing the iron strength of constitution which he displayed in his subsequent campaigns. At this juncture Frederick IV., king of Denmark, conceived the idea of wresting the crown from the young king, and adding Sweden to his possessions in the Scandinavian peninsula, and Augustus II., king of Poland and elector of Saxony, and the czar, Peter the Great, agreed to second his enterprise by seizing the continental provinces of Sweden. The Danes struck the first blow by invading the territories of Holstein Gottorp, and the duke, who had married the sister of Charles, fled to Stockholm and begged for assistance to recover his states. Charles proposed immediate operations against Denmark, confident in his own prowess and in promises of substantial aid received from the court of St. James's, for William of Orange saw in Sweden a valuable ally for his Continental policy, and was resolved not to allow the balance of power in the north to be destroyed by the triple alliance. Sir George Rooke, with an Anglo-Dutch squadron, formed a junction with the Swedish fleet, and at the head of fifty-four sail of the line swept the Baltic, drove the Danish fleet into Copenhagen, and bombarded the city, doing, however, little damage. Meanwhile Charles had landed in Zealand with a Swedish army, leading his troops to the shore in person, and wading through the water up to his chin in his eagerness to land. The Danes, inferior in numbers, retired before him, and Frederick, seeing his capital threatened with a siege by land and sea, abandoned the triple alliance, and sued for peace, leaving Charles free to turn his arms against Russia and Poland.

From this campaign we may date Charles's assumption of those Spartan manners which distinguished him for the rest of his life. He gave up the use of wine; at night he slept upon his cloak spread upon the floor of his room or on the ground in the open air. His dress was of the plainest, his whole wardrobe consisting of a suit of blue cloth with copper buttons. He seemed to care for no pleasure or amusement; he had an amount of endurance which defied fatigue, and he was alike insensible to the heat of summer and the almost arctic cold of a northern winter. Hardy, brave to the extent of recklessness, capable of inspiring in his followers personal devotion to himself, and with all that astute and sagacious in council, he was the very model of a soldier king. Yet in the end Sweden reaped no advantage even from his victories. He had left Stockholm to defend the country from a pressing danger, but once he had tasted the pleasures of military success, he allowed himself to be allured onward to a career of conquest, and he never saw his capital again.

When Frederick sued for peace, Peter the Great was threatening Narva and the Swedish province of Livonia on the Gulf of Finland, while Augustus II., elector of Saxony and king of Poland, was besieging Riga, then a Swedish town. Charles disembarked in Livonia with 20,000 men. The Russian army, said to have been 50,000 strong, lay before Narva in an entrenched camp. With 10,000 of the splendidly disciplined infantry of Sweden, Charles attacked them there on November 30, 1700. In a quarter of an hour the camp was stormed, and the Russian army, which must have been largely composed of raw troops, was completely routed and dispersed. Turning southward, Charles marched against the Saxons and Poles, defeated them on the banks of the Dwina, and raised the siege of Riga. He might now have dictated a peace which would have given Sweden an undisputed pre-eminence in Northern Europe. But his ambition was aroused; Augustus was by no means a popular king, and while continuing the war against him, Charles intrigued with the party adverse to him in Poland. The Saxon army of Augustus was defeated in the battle of Clissow (1703), and Poland was occupied by the victorious Swedes. Radziejowski, the cardinal primate, declared the throne vacant, and under the influence of Charles, the diet conferred the crown upon his friend Stanislas Leszczynski, the young palatine of Posnania. But even now Charles would not sheath the sword. He carried the war into Saxony, overran the hereditary states of Augustus, and in 1706 dictated to him the peace of Altranstadt, by which Augustus resigned all claim to the throne of Poland, and further agreed to give up to the conqueror John Reginald Patkul, the ambassador of the czar at Dresden. Patkul was by birth a Livonian, and therefore a subject of Sweden, but he had transferred his allegiance to Russia, and it was said that he was the real author of the league between Russia, Poland, and Denmark. It was very doubtful if he could have been adjudged guilty of treason, and in any case his position as ambassador ought to have protected him; but Charles thought only of vengeance, and after the form of a trial had been gone through, Patkul was condemned to be broken on the wheel, and the cruel sentence was executed, the king refusing to mitigate it in the least degree. The whole affair has left an indelible blot upon his memory, and it shows how much of vindictive passion was concealed under a perfectly passive exterior. Even had Charles been willing now to bring the war to a close, the execution of his ambassador would not have allowed the czar to accept a peace. Twice he invaded Poland, but each time he had to retire before the Swedes. By the autumn of 1707 Charles had collected 43,000 men in Saxony; a reserve of 20,000 under General Levenhaupt was in Poland, and a third army, 15,000 strong, was upon the frontier of Finland. In the following January, in the midst of the ice and snow, he suddenly broke up his camp, marched against the Russians, surprised and almost captured the czar at Grodno, and then continued his advance, driving the Russians before him, and defeating them in numerous encounters. He had forced the Beresina and won a battle near Smolensko, and the way to Moscow lay almost open before him, when, to the surprise of his army, he turned

southward to the district of the Ukraine. The fact was that he had a secret treaty of alliance with the hetmanu of the Cossacks of the Ukraine, Mazeppa, whose romantic story has been made so famous by the verse of Byron. The hetmann had promised to join the Swedes with 30,000 Cossacks and abundant supplies. But when, after a difficult march, Charles reached the Ukraine, he found that the Russians had discovered and frustrated Mazeppa's design, and the hetmann brought him only a handful of followers. Nor was this his only disappointment. A reinforcement of 15,000 men under Levenhaupt was intercepted and cut to pieces by the czar, and after wasting the summer in a desultory warfare, the Swedes found themselves overtaken by the severe winter of 1708–1709 in the midst of an enemy's country. Still Charles would not abandon the idea of reaching Moscow. Though his army was reduced by cold and privations to 23,000 men, he maintained himself till spring, and then besieged the fortress of Pultowa. The place held out until July, when the czar approached at the head of a large army. On the 7th Charles was wounded in reconnoitring the enemy. In the famous battle which took place next day he had to be carried in a litter amongst his staff. The battle ended in the complete defeat of the Swedes. Charles, leaving most of his officers prisoners in the hands of the enemy, fled with a few attendants across the Bug into the Turkish territories, and was hospitably received by the Turks at Bender on the Dniester.

Charles resided three years in Turkey, during all which time his expenses, and those of his numerous household, were paid by the Turkish Government, in accordance with a very liberal interpretation of the Eastern law of hospitality. From the day of his arrival at Bender his constant aim was to involve Russia and Turkey in war. He succeeded in producing an outbreak of hostilities; the Turks outmanœuvred and surrounded Peter and his army on the banks of the Pruth, and the czar would have been either killed or taken had not his wife Catherine, by her energy and courage, obtained an armistice for him on favorable terms from the grand vizier. Removing his residence to Vranitza, where his followers formed a little camp around the strongly-built house in which he lived, Charles continued his intrigues to produce another war with Russia, and though once on the point of success, he eventually failed, and the counter-intrigues of the czar began to produce an effect at Constantinople. At this time Charles occupied a very humiliating position, short of money, afraid to leave Turkey for fear of falling into an enemy's hands, dreading at any moment to be betrayed by the Turks, and knowing that all his conquests had been useless, and that the Swedish provinces were being invaded by Danes, Saxons, Poles, and Russians. The Porte displayed a singular amount of patience in treating with him, but at length it became evident that so long as Charles felt himself safe among his Polish and Swedish guards at Vranitza he would not leave Turkey. A fetva of the Sheikh-ul-Islam declared that the rights of hospitality would not now be violated by his forcible removal, and Ismaël Pacha, the governor of the district, received orders to seize him dead or alive.

Charles having persistently refused to come to terms, Ismaël, with several thousand janissaries and Tartars, surprised the little camp and took his 300 guards prisoners; he then attacked the house held by Charles and forty of his suite. The king defended himself desperately; the house was set on fire over his head, and he was retiring, driven out by the flames, when his spurs became entangled and he fell and was secured and disarmed by the janissaries. His eyebrows were singed and his clothes torn and stained with blood. For a while he was kept in honorable imprisonment, then he was allowed to reside with a few attendants at Demotica, where he still spoke of departing escorted by a Turkish army, and feigned illness in order to gain time for negotiations, which in the end led to nothing. The king of Prussia was desirous of forming a league with him against the czar, and would have secured for him an honorable return to his states, the one condition being that Stanislas should abdicate and Augustus II. be recognized as king of Poland. Stanislas was quite willing to abandon his doubtful claim to the throne, but Charles with characteristic obstinacy refused to listen to the proposal. "If," he said, "my friend Stanislas will not be king, I can find some one else to take his place." At length he saw that there was no chance of the Porte granting his demands, and sending his respectful adieux to Constantinople, he set out suddenly with only two attendants, and travelling unceasingly, riding by day and sleeping in a carriage or cart at night, he passed through the Austrian territories, Bavaria, Westphalia, and Mecklenburg, and thus avoiding the districts held by his enemies reached his own town of Stralsund, in Swedish Pomerania, late at night, on November 21, 1714, after a journey of sixteen days. He announced himself as a Swedish officer charged with important despatches from Bender. The governor received him at once in his bedroom, and asking for news of the king, recognized Charles by the sound of his voice when he replied, and the tidings of his arrival soon spread through the city, which was illuminated for the rest of the night. The return of Charles only drew more closely the alliance between the powers which had been plotting in his absence the dismemberment of Sweden. Stralsund was besieged by a combined army of Saxons, Danes, Prussians, and Russians. Charles made a protracted defence, but on December 23, 1715, the place was forced to capitulate, the king embarking immediately before the surrender, and taking up his residence at Lund in Scania.

Arrived in Sweden, he took measures to protect the coasts of the kingdom against a descent of his enemies, and with a small army invaded Norway in March, 1716; he overran a large part of the country, but was forced to retire for want of supplies. About this time the Baron von Görtz, a German officer, who had during his stay in Turkey become his principal adviser, proposed to him a complete change of policy, and Charles immediately accepted the scheme which Görtz had elaborated, and of which he had already executed some of the preliminaries. He proposed that Charles should make peace with the czar, cede to him the Baltic provinces of Sweden, and gain his alliance. The allies were to replace Stanislas on the throne of Poland and restore the duke of Holstein to his states which had been seized by Denmark. Charles was to invade and conquer Norway, and then land a small army in Scotland, and with the help of the Jacobites, restore the house of Stuart in England, Cardinal Alberoni, then all-powerful in Spain, promising to assist in the accomplishment of this part of the project. The other allies had lately been showing a marked jealousy of the growing power of the czar, and it was no difficult matter for Görtz to detach him from the alliance and negotiate a peace on the part of Sweden. This first step being successfully accomplished, Charles burst into Norway, speedily occupied several provinces, and in the early winter of 1718 besieged Fredrikshall, a strong fortress, which was regarded as the key of Norway. On Sunday, November 30, accompanied by his staff, and by Siguier and Maigret, two French officers in his service, he visited the trenches in the afternoon. Arrived in the foremost trench he found fault with the progress of the work, sent for some more sappers, and leaning on the gabions in front of the trench, himself directed their operations. Night came on rapidly, but still he remained there exposed to the shot of the fortress, for the Danes threw up light-balls, and kept up a continual fire from their batteries. His officers in vain endeavored to persuade him to retire from his dangerous post, he obstinately refused even to shelter himself behind the gabions, though several of those around him had been struck, and about nine o'clock, when the moon had risen and shining on the snow made the night almost as bright as day, a well-aimed shot struck him on the temple, his head fell forward, his hand instinctively grasped his sword hilt, and his officers running up, found him leaning over the gabions dead. A musket ball had passed through his head, destroying his left eye and driving the right out of its orbit. The shot put an end at once to the invasion of Norway, the projects of Görtz, and the power of Sweden in the north of Europe.

Before the end of the following year it began to be whispered that the shot which killed Charles came not from the ramparts of Fredrikshall, but from the Swedish trenches. The two French officers were in turn pointed out as the probable assassins, and Siguier in the ravings of fever actually charged himself with the murder. On his recovery he denied it, but his involuntary self-accusation was generally believed in preference to his denial. Others laid the alleged crime upon the Swedish generals Cronstadt and Stiernross, and it was said that they had been bribed

to break up the project of Görtz by a successful pistol-shot before Fredrikshall. In 1746 the tomb of Charles XII. was opened and the remains were examined in order to see if in this way the question could be settled. The officials charged with the examination seem to have known very little about surgery. They at first suggested that the hole through the skull was made by a dagger; then apparently misled by their ignorance of the well-known fact that the wound at the point of exit is almost invariably larger than that at the point where the bullet enters, they alleged that the ball had struck the right side of the king's head, which was turned away from the fortress. This naturally confirmed the belief that he had been assassinated, although a great mass of concurrent testimony tended to exculpate every one who had been charged with the crime. To solve the mystery of his death, the body was again exhumed by Charles XV., so recently as 1859, when a careful examination of the skull by three eminent medical professors led to the conclusion that the fatal shot had been fired from a distance on the king's left, and from a higher level than that on which he stood. Thus it was finally proved that Charles fell, not by the hand of a traitor, but from his recklessly exposing himself to the fire of the fortress.

The character of Charles was a strange mixture of good and evil. In him almost everything was vitiated by a kind of exaggeration. Thus his courage at times degenerated into rashness, his determination into mere obstinacy. While we praise his temperate and simple habits, we cannot be sure that, in despising the ostentation and luxury of his brother kings, he was not actuated by a subtle vanity that made him more proud of the blue coat with copper buttons than another would have been of a richly embroidered uniform. His victories and conquests are all the more wonderful when we consider how young he was at the time of his greatest achievements. He was only eighteen when he extorted a peace from Frederick of Denmark and defeated the Russians at Narva, and he was only twenty-one when the victory of Clissow made him master of the destinies of Poland. War had not in those days the lightning rapidity of modern times, or Charles might have more than rivalled the victories of the first Napoleon. But he was really little more than a soldier; as a statesman he must be placed below the second rank, and the only result of his reign was the weakening and impoverishment of his kingdom. He found Sweden one of the first powers of Europe, he left her fallen to a secondary place, and she has never recovered her former position.

See the histories written by his chaplain Norberg and by Alderfield, one of his officers. Voltaire's well-known memoir is useful, but contains several inaccuracies. There are also very full biographies by Fryxell and Lundblad. Among contemporary publications there is a curious account of his wars "by a Scots gentleman in the Swedish service," the first edition of which appeared in London in 1715, before the death of Charles, the second in 1718. The real author was Daniel Defoe. (A. H. A.)

CHARLES XIII. (1748–1818), king of Sweden, was the second son of Adolphus Frederick and of Louisa Ulrica, sister of Frederick the Great. He was educated for the office of high-admiral, and commanded with credit against the Russians. On the accession of his brother Gustavus III., in support of whom he exerted all his influence, he was appointed governor of Stockholm and created duke of Sudermania; and he became regent when Gustavus was assassinated in 1792. In 1796 Gustavus IV. came to his majority, and Charles retired from political life. But when Sweden was threatened by the arms of Napoleon, Gustavus directed his forces with an incapacity so remarkable that the people refused any longer to bear his government. In March, 1809, he was obliged to abdicate; and in May the crown was offered to Charles. A year after, Prince Christian, the heir appointed by the States, having died, Charles, yielding to the wish of the nation, nominated Charles Bernadotte prince royal, and gave the government into his hands, though still retaining the title and some of the dignity of king. After occupying this position for eight years, Charles died in February, 1818.

CHARLES XIV., king of Sweden. See BERNADOTTE.

CHARLES XV. (1826–1872), king of Sweden and Norway, succeeded to the throne in 1859, on the death of his father, Oscar I., son of Charles XIV. His rule was popular and liberal. The most important event in his reign was the change which was effected in 1866 in the constitution of the Storthing, or parliament, which from that time has consisted not of four but of two chambers—the first being elected by the provincial representatives, the second by the people. In character Charles was generous and kindly, and his disposition is shown in his refusal to sanction capital punishment. He possessed considerable taste for literature and art, and published a volume of poems, which were translated into German by A. Van Winderfeld (Berlin, 1866). In 1850 he married Louisa, daughter of the king of the Netherlands, by whom he had one daughter, Louisa, who became the wife of Prince Frederick of Denmark. His relations with Denmark were of the most intimate kind, owing to his personal friendship with the king; but during the struggle of that country against the aggressions of Prussia he was obliged to remain neutral, since neither Sweden nor Norway would take up arms. Charles died September 18, 1872.

CHARLES, count of Anjou and Provence, king of Naples and Sicily, born between the years 1220 and 1226, was the ninth son of Louis VIII. of France. He married Beatrice, heiress of Provence, after scattering his rivals by the aid of an army furnished by his brother, Louis IX. Soon after he accompanied the king on a crusade, during which he fought with bravery, but achieved no permanent success, and he was at last taken prisoner with his brother. During his absence most of the towns of Provence formed themselves into republics; but on his return they were quickly subdued, and among others, Marseilles lost the independence she had before enjoyed. Charles's power was now very considerable; but his ambition was far from being satisfied. He therefore unscrupulously lent his arms to Margaret of Flanders, who offered him the province of Hainault in return for his assistance in setting aside her husband's children by a former wife in favor of her own; but this scheme was crushed by Louis, who caused him to give up Hainault for a sum of money. Charles had now, besides, conceived a loftier ambition. He had been requested to assume the crown of the two Sicilies by Pope Urban IV., who desired to overthrow the bastard Manfred, the Ghibelline king; and in 1265 he was crowned at Rome. A crusade was preached against Manfred, who was defeated and slain. The legitimate heir, Conradin, was also routed (1268), and being betrayed, was meanly tried and executed; a similar fate befell a large number of Italian nobles; many fiefs were confiscated to reward the French followers of the new king; and the rule of the Provençals was often arbitrary and brutal. Charles's ambition continued to widen. He now designed to make himself the head of the Eastern empire. With this end in view, he again accompanied his brother on a crusade; but the accomplishment of his ultimate design was prevented by a terrible storm, and by the outbreak of the plague. He also incurred the enmity of the Pope, Nicholas III., by haughtily refusing to accept the hand of his niece for his own grandson. Nicholas joined the Ghibellines, and took from Charles, who offered no resistance, his titles of senator of Rome and vicar-general of Italy. But in 1280 Nicholas died, and Charles, by means of many intrigues, and after imprisoning two of the cardinals, effected the election of a Frenchman, Martin IV. In return, he was made senator of Rome, and his rival, the Emperor Michael Palæologus, was excommunicated. Another expedition was already fitted out against the East, when news was brought of the rebellion known as the Sicilian Vespers. Aroused by the rough rule of the French, the people were also stirred by the burning exhortations of John of Procida, a Calabrian doctor, formerly friend of Frederick and of Manfred, who had been travelling in disguise through Italy, Greece, and Spain, seeking assistance against the usurpation of Charles. On Easter Monday, 1282, he collected a large assembly of the Sicilian nobles at Palermo. An opportune pretext for a rising soon occurred. The viceroy had forbidden the bearing of arms; and, on the pretext that weapons were concealed under her dress, a Frenchman insulted a girl of noble family on her very passage to the church where she was about to be married. He was killed on the spot, and every Frenchman in the city soon shared his fate. Some of the other Sicilian towns followed this example; others expelled the French more mildly. Charles at once directed his fleet against Messina. He refused all offers of capitulation,

and Messina held out till aid was brought it by Don Pedro of Aragon, and Charles's fleet was burned by the famous sailor, Roger de Loria. Charles, despairing of other means of success, now challenged Pedro to single combat. Pedro accepted the challenge, but Charles alone entered the lists. It is said that the former was dissatisfied with the arrangements, though others regard his acceptance as a mere ruse. Soon after Charles's son was defeated and taken prisoner, and in 1285 Charles himself fell ill, and died at Foggia.

CHARLES II. (1332–1387), king of Navarre and count of Evreux, was a grandson of Louis Hutin, and possessed a title to the French throne inferior to that of John II. only on account of the Salic law, and superior to that of Edward III. of England. Handsome, clever, eloquent, and bold, he yet thoroughly deserved the title of "the Bad" with which he mounted the throne in 1349, at the age of sixteen. The commencement of his notorious career was the assassination of Le Cerda, the favorite of John, who had been appointed to the duchy of Angoulême, which the king had bought from Charles's mother, but of which the price was not yet paid. For this deed,—which Charles openly avowed, declaring it to be a punishment richly deserved,—John was at first unable to retaliate, being indeed obliged to make good his debts; but not long after (1356) Charles was seized and thrown into prison. During the king's exile in England, Charles, aided by the States-General, obtained his release, and by his eloquence and the suavity of his manners gained the hearts of the Parisians, who made him their captain-general. Suspecting him, however, of too great favor for the aristocracy, they deprived him of the office; but he maintained his alliance with Stephen Marcel, and, at the head of companies of banditti, he continued to lay waste the country till 1360, when he made peace with the king. This peace was not final, for Charles V. was resolved to crush him. He was accused of various unscrupulous plots, and extravagant stories were circulated against him, as, for example, that the king's weakness was due to poison administered by his contrivance. On the charge of being concerned in these intrigues, two of his ministers were executed, and his two sons were seized as hostages. The duke of Anjou was persuaded to attack Montpellier, the king of Castile to invade Navarre, and Duguesclin was sent to seize his fiefs in Normandy, and Charles was obliged to yield twenty places as security before he regained his territory. According to the popular story, he expired by a divine judgment, through the burning of the clothes steeped in sulphur and spirits in which he had been wrapped as a cure for a loathsome disease caused by his debauchery; but the bishop who attended him affirms that he died placidly and in the odor of sanctity (1387). See Secousse, *Histoire de Charles le Mauvais*.

CHARLES IV. (1421–1461), king of Navarre, was the son of John of Aragon, and of Blanche, daughter and heiress of Charles III., king of Navarre. On her death the throne belonged to Charles, but his father retained it, and took as second wife the ambitious and unscrupulous Jeanne of Castile. Charles did not press his claim, but devoted himself to literature, until his step-mother roused him by repeated indignities. He succeeded in having himself crowned, but soon after was defeated and imprisoned (1652). Next year he was released; the struggle recommenced, and he gained possession of a considerable part of Navarre. He was reconciled to his father, and recognized as king of Barcelona; but Jeanne caused him to be arrested and poisoned. He was a man of gentle disposition, and of considerable learning. He left a Spanish translation of the *Ethics of Aristotle*, a chronicle of the kings of Navarre, and several poems.

CHARLES, or Charles Louis (1771–1847), archduke of Austria, was the third son of the Emperor Leopold II. He commenced active service against the French at the age of twenty-two, and so distinguished himself that at twenty-five he was intrusted with the supreme command of the army of the Rhine. He defeated Jourdan at Teiningen, Amberg, and Würzburg, and Moreau at Rastadt; and the year after (1797) he was honored with the command against Napoleon in Italy. In a month, however, peace was concluded; but the war soon recommenced, and in 1799 Charles defeated Jourdan once more in Swabia, and then checked Masséna in Switzerland. After this he was forced by ill-health to retire from service. He was appointed governor of Bohemia; but it was not long before he had again to oppose his old enemy Moreau, with whom he made terms which were afterwards taken as the basis of the peace of Lunéville. His popularity was now such that the Diet of Ratisbon, which met in 1802, resolved to erect a statue in his honor, and to give him the title of Saviour of his country; but Charles refused both distinctions. He was for some time president of the council of war, but in 1805 he was once more in Italy, where he won the victory of Caldiero[1] over Masséna. On his return to Austria he became commander-in-chief and again president of the aulic council of war. He employed his time in organizing the army and establishing a strong reserve force, till in 1809 he took the field against the French army commanded by Napoleon in person. He carried on the conflict for five days, and fought with great gallantry; but at last, being wounded and overpowered, he retreated in good order. At the end of the campaign he gave up all his military offices, and spent the rest of his life in retirement, with the exception of a short time, when on the return of Napoleon from Elba, he became governor of Mayence. He published *Grundsätze der Strategie* (1814), and *Geschichte des Feldzugs von* 1799 *in Deutschland und der Schweiz* (1819).

CHARLES, the Bold (1433–1477), duke of Burgundy, born in 1433, was the son of Philip the Good of Burgundy and Isabella of Portugal. Remarkable both for his personal qualities and also for his position as the leader of the last great struggle of the feudal lords against royalty in France, and as the life-long enemy of crafty Louis XI., Charles was the last great figure of the Middle Ages. His physical strength and energy were extraordinary. He was full of the most lofty ambition, and capable of the most obstinate determination. He never forgot an injury. His passion was terrible and frequent. His boldness amounted to the rashness of fury. He was careless of luxury, though, in imitation of the ancient conquerors about whom he loved to read, he delighted to surround himself with magnificent display; and he presented an example of conjugal fidelity most remarkable in the society in which he lived.

As Charles rose to manhood, he found his father under the control of the Croys, whose usurpation of what he regarded as his own rightful function he deeply resented; and he allowed himself to be banished rather than take one of the family into his household. Soon after—he was at this time count of Charolais—he joined the duke of Brittany in forming a great confederation of the French nobles against King Louis. The confederates, calling themselves the League of the Public Weal, declared that their object was to get rid of bad ministers, to abolish taxes, and to relieve the people from oppression. They maintained good discipline, paid for all they consumed, and consequently were opposed neither by the townsmen nor by the country-folk, while the gentry with their dependants flocked to their standard. In 1465 Charles met the royal army in the battle of Montlhéry, which was decided by the retreat of the latter during the following night. Paris was besieged; and Louis was forced to surrender Normandy to the duke of Berry, the towns on the Somme and the counties of Boulogne and Guienne to the count of Charolais, and other territory to other of the nobles. Charles's next exploit was the conquest of Liége, which, hitherto ruled democratically under the constitutional control of its bishop, was now struggling against the encroachments of Burgundy. The town of Dinant alone he excepted from the peace which he granted to the rest of the principality; and a year later he returned to take vengeance upon it. Its crime was that some of its apprentices had insulted himself and his mother by burning him in effigy as a bastard, and its punishment was an extravagant revenge. It was burned to the ground; of its men numbers were butchered, and the rest remained the unfortunate prisoners of the rude soldiery. The women were spared to be exposed to the extremes of cold and hunger, but were saved from worse treatment by the stern regard for female honor, which was Charles's most admirable characteristic.

At the age of thirty-four (1467) Charles became duke of Burgundy. Immense changes were at once effected. He permitted none of the gay festivity and wasteful profusion which had been common in his father's time, but the court was directed with a stately and splendid cere-

[1] [But Mack's capitulation at Ulm forced him to an immediate though skillful retreat.—Am. Ed.]

mony, in which the duke took his full share. Everything was arranged, though liberally, yet with strict order and economy; the state of the finances was carefully examined, and the amount in the treasury was largely increased by unusual demands from the Estates. Every petitioner, however humble, was heard; the duke shirked no details of business, was present at every council, and sharply rebuked or punished with a fine any absence or inattention on the part of the courtiers. A strict system of administering justice was instituted, and the law was carried out impartially even in the case of the most popular of the nobles.

Soon after his accession Charles increased his political influence by taking as his second wife Margaret the sister of Edward IV. of England. It was not long before he required all his power; for soon Louis again took possession of Normandy, and contrived to detach the duke of Brittany from his alliance with Burgundy. But Charles at once made ready for war, and the king in alarm took the daring step of requesting a meeting, and placing himself in the duke's hands at Peronne. Unfortunately for Louis, he had been for some time inciting the people of Liége to rebellion, and they chose this moment for an outbreak. Charles was mad with indignation, and with great difficulty restrained himself from taking vengeance upon the person of the king. After three days of irrepressible passion his wrath was so far spent that he contented himself with requiring Louis to undergo the ignominy of witnessing the punishment of the revolt which he had himself instigated, and with extracting from him a treaty, which, among other most important concessions, confirmed to the duke the possession of the territory which he then held, sanctioned the alliance with England, and took away the right of appeal from the courts of Flanders to the Parliament of Paris. In case of violation of this compact, the king invoked upon himself the curse of excommunication and the loss of the fealty of Burgundy; and a letter, signed by Louis, was despatched to each of the princes of the blood, requiring them in that event to take up arms against him.

Soon after this Liége was burned, like Dinant, and its inhabitants nearly exterminated, the fighting-men being mostly butchered, and the aged, the women, and the children exposed to the terrible cold; and the powerful city of Ghent, whose mob had forced from the duke the abolition of the hated cueillote and certain other concessions during his passage through the city before his coronation, was fain to avert his anger by giving up all, and allowing its charter to be annulled.

Charles had now reached the height of his power, but his greatness was unsubstantial. His subjects were becoming much estranged from him. The placid trade-loving Netherlanders found it hard to bear his arbitrary and haughty passion. The courtiers became weary of the stiff ceremonial of the court and the constant toil they were obliged to undergo. Comines (seeing, as he tells us, that his master was madly rushing to destruction, but, as we can perceive, also affected by the promises of Louis) went over to the court of France. The king was now bold enough to reverse his hypocritical policy, and deny the validity of the treaty which he had signed under constraint at Peronne; and the towns on the Somme, never loyal to Burgundy, were reattached to France. The consequent war was, however, carried on by Charles with his usual success and his usual extravagance of severity.

His ambition and his policy were now changed. He cared no longer to make the lords independent of the king, but aimed at erecting a kingdom with himself as independent sovereign. Circumstances enabled him to obtain the reversion of Gueldres; and he entered into negotiations with the Emperor Frederick, to whose son he agreed to marry his daughter on condition that he should himself be elected king of the Romans. The emperor proposed instead to crown him king of Burgundy. A meeting, enlivened by a protracted round of gorgeous jousts and feasts, was held at Trèves (1473), in order to carry out the latter proposal; but the electors made a protest to Frederick, who was not remarkable for decision, and persuaded him to flee secretly by night.

In 1469 Sigismund, duke of Austria, being in great financial difficulty, had sold Alsace to Charles. The governor appointed by the latter was Peter von Hagenbach. His boldness as a soldier, his rough shrewdness, and his capacity for strong government had recommended him; but horrible stories were told of his brutality, his license, and his blasphemies. He did indeed terrify the country into order, but his severity at length excited people and nobles alike against him, and he was tortured and condemned to death by a court of deputies, representing the Alsatian towns, with Bern, and one or two others. Charles did not fail to take signal vengeance, and the country was given up to indiscriminate slaughter and devastation. But he was now surrounded by powerful and determined enemies. He had himself refused to renew the treaty with Louis, who had on his part purchased the alliance of the Swiss. Sigismund of Austria, now desirous of redeeming Alsace but having no objection to save his money, had been concerned in the rebellion of that province, and afterwards openly joined the French. But, notwithstanding all this, and in spite of the prohibitions and threats of the emperor, Charles prepared for the invasion of Cologne, in support of its bishop-ruler, by whose means he expected to bring the city under his own control. As a preliminary he attacked the strong town of Neuss. For eleven months it appeared that nothing could tear him from the siege. The Swiss routed his army, and ravaged Franche-Comté; the French army laid waste his territory and pillaged his towns; the emperor opposed him with a large force; the Pope commanded him to desist. At length he came to an understanding with the emperor. Neuss was put under a papal legate, and the fate of Cologne was left in the hands of the Holy Father (June, 1475).

Immediately after this the English landed at Calais, but only to sign a treaty of peace with Louis at Picquigny. Yet Charles did not give up heart; and an important acquisition was made in the conquest of Lorraine. Again the Swiss took the aggressive, and possessed themselves of the Pays de Vaud. Notwithstanding his capture of Grandson, Charles was plainly overmatched; and, in 1476, he was utterly routed by them at Morat with immense slaughter. Still with no thought of yielding, he devoted himself with all his energy to raise and organize a fresh army. In a few months he was once more ready for war. René had meanwhile recovered Nancy; but soon, through the cowardice of the Alsatians, he was deserted, and his capital was invested by Charles. But René's triumph was at hand. The assistance of the Swiss was gained, and the Burgundians were attacked by an enemy they could not resist. On the 5th of January, 1477, the battle took place. The Burgundians were scattered, and next day the massive body of Charles the Bold was found in a ditch, mutilated by several deadly wounds. It was buried at Nancy, but in 1550 his remains were removed to Bruges by Charles V.

See Comines, *Mémoires;* De Barante, *Histoire des ducs de Bourgogne;* J. Foster Kirk, *Charles the Bold.* (T. M. W.)

CHARLES ALBERT (1798–1849), king of Sardinia, was the son of Charles Emmanuel of Savoy Carignano. In his youth Charles became attached to the national party in Italy, and even formed a connection with the Carbonari. In 1821 Victor Emmanuel, on his abdication, appointed him regent; and he now availed himself of the opportunity for carrying out a liberal policy. He confirmed the constitution which had lately been established on the model of the new Spanish constitution, and which consisted of an assembly of one chamber, with a king deprived of the right of veto and of almost all real power. The approach of the Austrians, however, and the declaration of the new king, Charles Felix, refusing to recognize his acts, caused him to flee secretly from Turin after holding the regency little more than a week, and he was afterwards forbidden to enter the Sardinian court. In 1823 he served as a volunteer in the French army which invaded Spain in order to overthrow its new constitution; and by thus deserting his principles he obtained permission to return to Turin. He was for a few months, in 1829, viceroy of Sardinia; and in 1831 he succeeded Charles Felix on the throne. He felt obliged to resort to severe measures in order to secure his throne against the secret societies, of which the chief at that time was the society of "Young Italy," which had been founded by Mazzini. In 1847 risings took place in Sicily, Rome, Tuscany, and Naples; the Austrians were expelled from Milan, and the people of Piedmont gained the re-establishment of the constitution which Charles had advocated in his youth. At the same time Charles greatly increased the freedom of the press. During the next yea-

he marched against the Austrians, who had already been broken by defeat, and who at once retreated. On the last day of April, 1848, he won the victory of Pastrengo, and in the end of May, that of Goito. But two months after he was defeated at Custozza by Marshal Radetsky, and forced to retire to Milan, where he made an armistice with the Austrians, and, contrary to his promise, surrendered the city. On the expiration of the truce Charles again took up arms. A battle ensued with Radetsky at Novara, in which the Piedmontese army was rapidly and completely routed, though the king risked his life bravely, and some thought even desperately. An armistice was again sought, but the terms offered by Austria were such that Charles abdicated in favor of his son Victor Emmanuel II. He died four months later, on 28th July, 1849. Charles did what he could to further commerce and to popularize art and science, and appears, notwithstanding apparent inconsistencies, to have sincerely desired the good of his people.

CHARLES AUGUSTUS (1757–1828), grand-duke of Saxe-Weimar, having been early deprived of his father, was educated under the governorship of Count Görtz, and among his tutors were Wieland, Knebel, Seidler, and Hermann. At seventeen he commenced his friendship with Goethe, who afterwards joined Schiller, Wieland, and Herder in forming the company of men of genius that distinguished his court. Charles assumed the direction of the government at the age of eighteen; and in the next year entered the Prussian army, in which he remained till after the defeat at Jena (1806), when he became a member of the Rhenish confederacy, and furnished aid to the French. In 1813, he joined the coalition against Napoleon, and took the command of an army of Saxons, Hessians, and Russians. He fought among the Allies in 1815; and at the Congress of Vienna he received as reward for his services the enlargement of his principality, and its erection into a grand-duchy. Charles died in 1828. His correspondence with Goethe was published in 1863 at Leipsic.

CHARLES EDWARD, or, in full, Charles Edward Louis Philip Casimir (1720–1788), was born on the 31st December, 1720. He was the elder son of James, known as the Pretender and the Chevalier St. George. Grandson of James II. and nephew of Anne, he was heir of line of both these sovereigns; but the hereditary rights of his father and himself had been declared null under the Proclamation of Rights and other parliamentary enactments which followed and completed the Revolution of 1688.

The young prince was educated at Rome, his mother, by blood a Sobieski, superintending his studies for some years. On the whole his education was good; he became conversant with the French, Italian, and Latin languages, and his religious training was watched with interest by the Pope. His father's miniature court was frequented by English and Scottish noblemen of Jacobite sympathies, by foreign enemies of the house of Hanover, and by bigoted supporters of the Romish faith; and the influence of this society is distinctly evident upon his after life. In 1734, the duke of Livia, afterwards duke of Berwick, who was proceeding to join Don Carlos in his struggle for the crown of Naples, passed through Rome. He offered to the Pretender to take charge of his son, should Charles be willing to accompany him in his expedition. This offer was accepted, and the youth of fourteen, having been appointed general of artillery by Don Carlos, shared with credit the dangers of the successful siege of Gaeta.

The handsome and accomplished youth, whose doings were eagerly reported by the English ambassador, was now introduced by his father and the Pope to the highest Italian society, which he fascinated by the frankness of his manner and the grace and dignity of his bearing. To these, more than to any power of his mind or heroism of his career, are to be attributed the successes of his early life. James despatched his son on a tour through the chief Italian cities, that his education as a prince and man of the world might be completed. The distinction with which he was received on his journey, the royal honors paid to him in Venice, and the jealous interference of the English ambassador in regard to his reception by the Grand Duke of Tuscany, show how great was the respect in which the exiled house was held by foreign Catholic powers, as well as the watchful policy of England in regard to its fortunes.

The Pretender himself calculated upon foreign aid in his attempts to restore the monarchy of the Stuarts; and the idea of rebellion unassisted by invasion or by support of any kind from abroad was one which it was left for Charles Edward to endeavor to realize. Of all the European nations France was the one on which Jacobite hopes mainly rested, and the keen sympathies which Cardinal Tenein, who had succeeded Fleury as French minister of war, felt for the Pretender resulted in a definite arrangement for an invasion of England to be timed simultaneously with a pre-arranged Scottish rebellion. Charles was secretly despatched to Paris. A squadron under Admiral Roquefeuille sailed from the coast of France. Transports containing 7000 troops, to be led by Marshal Saxe, accompanied by the young prince, set sail for England. The sight of the English fleet and a severe storm effected, however, a complete disaster without any actual engagement having taken place. The loss in ships of the line, in transports, and in lives was a crushing blow to the hopes of Charles, who remained in France in a retirement which he keenly felt, and which he resolved to quit by a personal visit to Scotland.

He had at Rome made the acquaintance of Lord Elcho and of Murray of Broughton; at Paris he had seen many supporters of the Stuart cause; he was aware that in every European court the Jacobites were represented in earnest intrigue; and he had now taken a considerable share in correspondence and other actual work connected with the promotion of his own and his father's interests. Although dissuaded by every friend he had, he, on the 13th July, 1745, sailed for Scotland on board the small brig "La Doutelle," which was accompanied by a French man-of-war, "The Elizabeth," laden with arms and ammunition. "The Elizabeth" fell in with an English man-of-war and had to return to France, while Charles escaped during the engagement, and at length arrived on the 2d of August off Erisca, a little island of the Hebrides. Receiving, however, but a cool reception from Macdonald of Boisdale, he set sail again and arrived at the bay of Lochnahuagh, on the west coast of Inverness-shire.

The Macdonalds of Clanranald and Kinloch Moidart, along with other chieftains, again attempted to dissuade him from the rashness of an unaided rising, but they yielded at last to the enthusiasm of his manner, and Charles landed on Scottish soil in the company of the "Seven Men of Moidart," who had come with him from France. Everywhere, however, he met with discouragement among the chiefs, whose adherence he wished to secure; but at last, by enlisting the support of Cameron of Lochiel, he gained a footing for more than a miniature rebellion. With secrecy and speed communications were entered into with the known leaders of the Highland tribes, and on the 19th of August, in the valley of Glenfinnan, the standard of James III. and VIII. was raised in the midst of a motley but increasing crowd.

On the same day Sir John Cope, at the head of 1500 men, left Edinburgh in search of Charles; but fearing an attack in the Pass of the Corryarrick, he changed his proposed route to Inverness, and Charles thus had the undefended south country before him. In the beginning of September he entered Perth, having gained numerous accessions to his forces on his march. Passing through Dunblane, Stirling, Falkirk, and Linlithgow he arrived within a few miles of the astonished metropolis, and on the 16th of September a body of his skirmishers defeated the dragoons of Colonel Gardiner in what was known as the "Canter of Coltbrig." His success was still further augmented by his being enabled to enter the city, a few of Cameron's Highlanders having on the following morning, by a happy ruse, secured the Netherbow Port. On the 18th he occupied Holyrood.

Cope had by this time brought his disappointed forces by sea to Dunbar. On the 20th Charles met and defeated him at Prestonpans, and returned to prosecute the siege of Edinburgh Castle, which, however, he raised on General Guest's threatening to lay the city in ruins. In the beginning of November Charles left Edinburgh never to return. He was at the head of at least 6000 men; but the ranks were speedily thinned by the desertion of Highlanders, whose experience had led them to consider war merely as a raid and an immediate return with plunder. Having passed through Kelso, he, on the 9th November, laid siege to Carlisle, which capitulated in a week. On the 4th of December he had reached Derby and was within two days' march of London, whose inhabitants were terror-struck, and where a commercial panic immediately ensued. Two armies under English leadership were now in the field

against him,—the one under Marshal Wade, whom he had evaded by entering England from the west, and the other under the duke of Cumberland, who had returned from the Continent. London was not to be supposed helpless in such an emergency; Manchester, Glasgow, and Dumfries, rid of his presence, had risen against him, and Charles paused. There was division among his advisers and desertion among his men, and on the 6th of December he commenced his retreat.

Closely pursued by Cumberland, he marched across the border, and at last stopped to lay siege to Stirling. At Falkirk, on the 17th of January, 1746, he defeated General Hawley, who had marched from Edinburgh to intercept his retreat. A fortnight later, however, Charles raised the siege of Stirling, and after a weary though successful march, rested his troops at Inverness. Having taken Forts George and Augustus, and had varying success against the supporters of the Government in the north, he at last prepared to face the duke of Cumberland, who had passed the early spring at Aberdeen. On the 8th of April the duke marched thence to meet Charles, whose little army, exhausted with a futile night march, half-starving, and broken by desertion, he engaged at Culloden on 16th April, 1746. The decisive and cruel defeat sealed the fate of Charles Edward and the house of Stuart.

Charles fled. Accompanied by the faithful Ned Burke, and a few other followers, he gained the western coast. Hunted hither and thither, the prince wandered on foot or cruised restlessly in open boats among the many islands of the west. The barren Benbecula sheltered him for a month. In lack of food, unsightly in appearance, having a strange contentment under his misfortunes, and already betraying his weakness for liquor, Charles, upon whose head a price of £30,000 had a year before been set, was relentlessly pursued by the spies of the Government. Disguised in women's clothes, and aided by a passport obtained by the devoted Flora MacDonald, he passed through Skye, and parted from his conductress at Portree. Shortly afterwards he was again on the mainland, and in the end of July he took refuge with the "Seven men of Glenmoriston," a body of outlawed Jacobite freebooters, with whom for a time he was safe. Having joined Lochiel and Cluny Macpherson, he at last heard that two French ships were in waiting for him at the place of his first arrival in Scotland—Locknahuagh.

He embarked with speed, and sailed for France. Erelong he was again intriguing in Paris, and even in Madrid. So far as political assistance went his efforts were in vain; and he plunged eagerly into the gayeties of Parisian society, of which he was the hero for some years.

The enmity of the English Government to Charles Edward made peace with France an impossibility, so long as she continued to harbor the young prince. A condition of the treaty of Aix-la-Chapelle, concluded in October, 1748, was that every member of the house of Stuart should be expelled the French dominions. Charles had forestalled the proclamation of the treaty by an indignant protest against its injustice, and a declaration that he would not be bound by its provisions. But his indignation and persistent refusal to comply with the request that he should voluntarily leave France had to be met at last with force; he was apprehended, imprisoned for a week at Vincennes, and on the 17th December conducted to the French border. He lingered at Avignon; but the French, compelled to hard measures by the English, refused to be satisfied; and the Pope, under threat of a bombardment of Civita Vecchia, advised the prince to withdraw. Charles simply and quietly disappeared; and for years Europe watched for him in vain. It is now established, almost with certainty, that he returned to the neighborhood of Paris; and it is supposed that his residence was known to the French ministers, who, however, firmly proclaimed their ignorance. In 1750, in 1752, and again, it is thought, in 1754, he was even in London, hatching futile plots and risking his safety for his hopeless cause.

During the next ten years of his life Charles Edward had become a confirmed profligate. His illicit connection with a Miss Walkenshaw, whom he had first met at Bannockburn House while conducting the siege of Stirling, his imperious fretful temper, his drunken habits and debauched life, could no longer be concealed. He wandered over Europe in disguise, alienating the friends and crushing the hopes of his party; and in 1766, on the death of his father, he was treated even by the Pope with contempt, and his title as heir to the British throne was openly repudiated by the great powers.

It was in 1772 that France, still intriguing against England, arranged that Louise, Princess of Stolberg, should marry the besotted prince (now passing under the title of Count Albany) who twelve years before had so cruelly maltreated his paramour that she had left him for ever. Six years afterwards, however, the countess had to take refuge in a convent. Her husband's conduct was brutal, and her own life was in danger at his hands. Her suspected attachment to Alfieri the poet and the persistent complaints of the prince at last brought about a formal separation, and Charles Edward, lonely, ill, and evidently near death, remained at Florence. In remorse he wrote for his daughter, the child of Miss Walkenshaw, and she remained with him, under the name of duchess of Albany, during the last two years of his life. He died at Rome on the 31st of January, 1788, and was buried in the *Grotte Vaticane* of St. Peter's.

See Earl Stanhope's *The Forty-Five*, Chambers's *History of the Rebellion of* 1745–6, Burton's *History of Scotland*, Hayward's *Essays*, vol. ii., Hale's *Fall of the Stuarts*, Ewald's *Life and Times of Charles Stuart*, The *Autobiography of Flora Macdonald*, &c.

CHARLES EMMANUEL I., The Great (1562–1630), duke of Savoy, succeeded his father Philibert Emmanuel in 1580. After having fought in alliance with Spain, France, and Germany, he laid claim to the throne of France on the death of Henry III. He became involved in war with Henry IV. and also with the Swiss, and was defeated at St. Joire in 1589. But the peace to which his defeat compelled him was soon broken, and he joined the Catholic league. He gained several successes, and obtained possession of Saluzzo, for which he had fought both with Henry III. and Henry IV. He next attacked Geneva, but without success; and his alliance with France against Spain was equally unfortunate, for Henry IV. dying, the regent made peace with Spain, and Charles was compelled to follow her example. After this he conquered Montferrat, which, however, he was unable to retain; and in 1619 he laid claim to the imperial crown without success. New leagues against Spain and against the Genoese followed. But finally the French conquered Savoy and part of Piedmont, and Charles died overwhelmed with misfortune.

CHARLES MARTEL (about 689–741) was an illegitimate son of Pepin d'Heristal, duke of Austrasia and mayor of the palace of the Merovingian kings of France. The wildness of Charles's youth, and most of all the suspicion that he was concerned in the murder of his brother, totally estranged the affection of his father, who left the mayoralty to one of his grandsons, and the regency to his wife. The Austrasians, however, unwilling to be ruled by an infant and a woman, made Charles their duke. His life was from that time one continual battle, of which the result was to lay the foundation of the modern French kingdom. He subdued the Neustrians, and made himself mayor of the palace; he forced the duke of Aquitaine to do homage to the French crown; he drove back the Saxons, Bavarians, and other German tribes, who ravaged the frontier; and he compelled the Frisians to embrace Christianity. But by far his most important achievement was the victory which he won between Tours and Poitiers in 732, when he finally stayed the northward advance of the Saracens, and thus materially affected the subsequent course of European history. It is a commonly accepted tradition that it was his valor in this battle which gained him the title of Martel, or "the Hammer." In 737, on the death of Thierry IV., Charles did not go through the form of appointing another nominal king, though he never altered his own title. He divided his territory between his two sons, Pepin and Carloman, the former receiving Neustria, the latter Austrasia; and on the death of Carloman, Pepin gained possession of the whole kingdom, and assumed the title of king. Of the favor of the church Charles Martel was careless; he seized her lands to reward his warriors; and though he more than once defended the Pope, his name was execrated by the clergy, who were fond of painting him amid the torments of hell.

CHARLESTON, a city, a seaport, and the capital of Charleston county, South Carolina, United States, is situ-

ated in 32° 47′ N. lat. and 79° 57′ W. long. It stands upon a flat tongue of land pointing south-eastward between the Ashley and Cooper rivers, which here debouche into a spacious harbor extending about 7 miles south-east to the Atlantic, with an average width of two miles. The harbor is surrounded by land on all sides except the entrance, which is about one mile wide and 18 feet deep. The water in the harbor, however, is very much deeper, and the work of increasing the depth of the entrance is in progress. Fronting the Atlantic, and extending northwards, is Sullivan's Island, about six miles long; and on the other side of the entrance is Morris Island which stretches to the southward. Both islands are penetrated by channels. The harbor is well defended—at its entrance by Forts Sumter and Moultrie, and inside by Castle Pinckney and Fort Ripley.

Owing to the lowness of the ground on which it is built, Charleston presents a peculiarly picturesque appearance from the harbor. Its spires and public buildings seem to rise out of the sea, while the richness of the surrounding foliage gives the place a particularly engaging aspect. Its proximity to the ocean tends materially to the equalization of the climate. In 1874 the mean temperature in January was 52° 1′, in June 81°, in July 79° 3′, and in August 79° 1′. The maximum temperature (96°) occurred in June, and the minimum (27°) in January. The city covers an area of about five square miles, and has a water front of about nine miles. The streets are regularly laid out, and are generally well paved and lighted with gas. King Street and Meeting Street, the two chief avenues of the city, extend in nearly parallel lines, and are intersected by the shorter cross streets, which run between Ashley and Cooper rivers. There is little uniformity in the buildings, and there is a want of public squares and places; but many of the residences are surrounded with spacious ornamental grounds, which, with the numerous shade trees of all kinds, give the city a picturesque appearance. The most noted public buildings are the city orphan house which has extensive grounds, the city hall, the custom-house, the arsenal, the court-house, and the Academy of Music, a theatre, which is esteemed one of the best in the southern States. The population of Charleston has increased from 18,711 in 1800 to 42,985 in 1850, to 40,519 in 1860, to 48,956 in 1870 (of whom 22,749 were colored and 4892 foreigners), and to 56,540 in 1875 (of whom 32,012 were colored).

Charleston is one of the leading commercial cities of the South, being the outlet for a very rich rice and cotton producing country, and a point of supply for an extensive territory embracing South Carolina and parts of North Carolina, Georgia, Alabama, Florida, Tennessee, and Mississippi. The commerce consists chiefly of exports. During the year ending June 30, 1875, the foreign commerce comprised exports to the value of $19,655,966, and imports valued at $680,343. Included in the exports there were 265,410 bales of cotton, valued at $18,709,949. Besides this foreign commerce there is an extensive trade in cotton, rice, naval stores, phosphate, and lumber, which are shipped in large quantities to ports of the United States. The extent of the commerce in these articles will be indicated by the following statement of the quantities received in Charleston from the interior for shipment for a series of years ending August 31:—

	1873.	1874.	1875.
Cotton, Upland..... bales	368,710	425,394	409,724
" Sea Island..... "	17,418	11,362	10,223
Rice .....tierces	48,943	43,667	46,796
Naval stores, spirits.....casks	40,000	41,000	50,265
" rosin.....lb	185,683	180,000	225,957
Phosphate, raw.....tons	49,838	56,413	51,546
" manufactured.. "	56,298	46,302	49,500
Timber .....feet	21,000,000	21,000,000	5,242,238

Of the total shipments of cotton during the year ending August 31, 1875, 264,305 bales were sent to foreign, and 154,869 to home ports. The large quantities of bone phosphate annually shipped are obtained in the vicinity of the city, where the richest deposits of this material in the United States have been discovered. A valuable fertilizer is manufactured from the phosphate. During the year ending June 30, 1875, 236 vessels, of 102,023 tons, entered in the foreign trade, and 268, of 119,274 tons, cleared; 504 vessels, of 382,018 tons, entered, and 461, of 328,266 tons, cleared in the coastwise trade. The number of vessels registered, enrolled, and licensed was 185, of 12,051 tons. The manufactures of Charleston are of inferior importance compared with its commerce. Among the most important industries are the manufacture of fertilizers from phosphate, in which more than $2,000,000 is invested, and the preparation of rice for market by removing the husk, cleaning, &c. There are three rice mills in the city, where a large part of the rice crop of South Carolina and Georgia is cleaned. The manufacture of sulphuric acid is extensively carried on in connection with the phosphate industry. Charleston has an extensive wholesale trade in dry goods, boots and shoes, clothing, hats and caps, drugs and medicines, &c. The city has three national, four State, and five savings banks. Three railroads have their termini here,—the North-Eastern, extending to Florence; the South Carolina, to Augusta, Ga.; and the Savannah and Charleston. The Santee canal, 22 miles long, connects Charleston with the Santee River. The city is divided into eight wards, and is governed by a mayor and eighteen aldermen. It has an excellent fire department and an efficient police system. Among the public charitable institutions are the city orphan house, the catholic orphan asylum, the almshouse, the asylum for the aged and infirm, the city hospital, and the asylum for colored orphans. In 1874 the school population was 12,727, of whom 3291 white and 2221 colored children were attending the public schools. There were 75 teachers employed, of whom all were white, and all, except four, were females. The public schools are graded as primary, grammar, and high. There is also a normal school for girls. The higher institutions of learning are the College of Charleston, founded in 1785, which has a faculty of five and an excellent museum; and the Medical College of the State of South Carolina, opened in 1832, which has a faculty of eight and a valuable pathological and anatomical museum. The Charleston library was founded in 1748, and has about 15,000 volumes. There are published in the city fifteen newspapers and periodicals—four daily, two thrice a week, four weekly, two fortnightly, two monthly, and one quarterly. The city contains 39 churches, the most noted edifices being St. Michael's, built in 1752, and St. Philip's, both Episcopal.

Charleston was founded about 1680 by English colonists who had come over with William Sayle. As early as 1670 they had settled a few miles distant from the site of the present city at a place which they named Charleston. The new village soon began to flourish, while the original settlement dwindled away and disappeared. During the revolutionary war two unsuccessful attempts were made by the British forces to take Charleston,—the first by Sir Peter Parker and Sir Henry Clinton in 1776, and the second by General Prevost in 1779. After a siege of several weeks, the city was taken in May, 1780, by a force under Sir Henry Clinton, but it was evacuated by the British in December, 1782. In the recent civil war between the Northern and the Southern States Charleston was the scene of the first hostilities, which commenced April 12, 1861, with the bombardment of Fort Sumter by the Confederate General Beauregard. After the surrender of the fort the Confederates took possession of the city, and held it until February, 1865. In April, 1863, a naval attack was made upon the fortifications in the harbor by a Federal fleet of nine iron-clads commanded by Admiral Du Pont. This effort, however, proved unsuccessful, as was also a land attack made by General Gillmore in July ensuing. The advance of General Sherman's[1] army through South Carolina, and the fall of Columbia, the capital of the State, led to the evacuation of Charleston by the Confederates on the 17th of February, 1865. The public buildings, cotton warehouses, stores, shipping, &c., had previously been fired by order of the general in command. From this and other causes the city suffered much injury during the war; but since its close many new buildings have been erected, and there has been marked commercial and industrial progress. (E. S. D.)

CHARLESTOWN, formerly a separate city of the United States, in Middlesex county, Massachusetts, but since 1874 incorporated with the city of Boston, with which it had long before been in many respects practically one. It was founded in 1628 or 1629, and soon rose into importance. The most remarkable event in its history is its

[1] [Wm. Tecumseh (1820–91) of Ohio, adopted by Thos. Ewing, whose daughter he married, graduated at West Point 1840, lived in San Francisco and New Orleans, served under Grant in the West, commanded in two brilliant campaigns in Georgia and the Carolinas 1864–65, general in 1869, retired in 1883, died Feb. 14, 1891, in New York.—Am. Ed.]

almost complete destruction in 1775 during the revolutionary war. Its population in 1800 was 2751, which at the time of its incorporation with Boston had increased to 32,040. See BOSTON.

CHARLET, NICOLAS TOUSSAINT, a designer and painter, more especially of military subjects, was born in Paris on 20th December, 1792, and died there on 30th October, 1845. He was the son of a dragoon in the Republican army, whose death in the ranks left the widow and orphan in very poor circumstances. Madame Charlet, however, a woman of determined spirit and an extreme Napoleonist, managed to give her boy a moderate education at the Lycée Napoléon, and was repaid by his lifelong affection. His first employment was in a Parisian mairie, where he had to register recruits: he served in the National Guard in 1814, fought bravely at the Barrière de Clichy, and, being thus unacceptable to the Bourbon party, was dismissed from the mairie in 1816. He then, having from a very early age had a propensity for drawing, entered the atelier of the distinguished painter Baron Gros, and soon began issuing the first of those lithographed designs which eventually brought him renown. His Grenadier de Waterloo, with the motto "La Garde meurt et ne se rend pas" (a famous phrase which has got attributed to Cambronne, but which he never uttered, and which cannot, perhaps, be traced farther than to this lithograph by Charlet), was particularly popular. It was only towards 1822, however, that he began to be successful in a professional sense. Lithographs (about 2000 altogether), water-colors, sepia-drawings, numerous oil sketches, and a few etchings followed one another rapidly; there were also three exhibited oil-pictures, the first of which was especially admired—Episode in the Campaign of Russia (1836), the Passage of the Rhine by Moreau (1837), Wounded Soldiers Halting in a Ravine (1843). Besides the military subjects in which he peculiarly delighted, and which found an energetic response in the popular heart, and kept alive a feeling of regret for the recent past of the French nation and discontent with the present—a feeling which increased upon the artist himself towards the close of his career,—Charlet designed many subjects of town life and peasant life, the ways of children, &c., with much wit and whim in the descriptive mottoes. One of the most famous sets is the Vie Civile, Politique, et Militaire du Caporal Valentin, 50 lithographs, dating from 1838 to 1842. In 1838 his health began to fail, owing to an affection of the chest. Charlet was an uncommonly tall man, with an expressive face, bantering and good natured; his character corresponded, full of boyish fun and high spirits, with manly independence, and a vein of religious feeling, and he was a hearty favorite among his intimates, one of whom was the celebrated painter Géricault. Charlet married in 1824, and two sons survived him. A life of him was published in 1856 by a military friend, De la Combe.

CHARLEVILLE, a handsome and well-built town of France, on the left bank of the Meuse, in the department of Ardennes, about one mile north of Mézières, with which it is connected by a suspension bridge. Since the end of the 17th century it has become a thriving place, with manufactures of nails, hardware, and firearms, and an active export trade in wine, spirits, coal, iron, and slates. It has tribunals of primary instance and commerce, a commodious port, a theatre, a large public library, and a cabinet of natural history. The royal manufactory of arms formerly established here was transferred to Tulle and Chatellerault. Charleville was founded by Charles of Gonzagua, eighth duke of Mantua, in 1606, and continued in the possession of his family till 1708. Its fortifications were dismantled in 1687; and in 1815 it was plundered by the Prussians. Louis Dufour, the Abbé of Longuerue, was born in the town. Population in 1872, 12,059.

CHARLEVOIX, PIERRE FRANÇOIS XAVIER DE (1682–1761), a French Jesuit traveller and historian, was born at St. Quentin in 1682. At the age of sixteen he entered the society of the Jesuits; and, at the age of twenty-three, was sent to Canada, where he remained for four years. He afterwards became professor of belles lettres at home; and travelled on the errands of his society in various countries. In 1720 he visited America for two years, in order to collect material for his *Histoire de la Nouvelle-France*, which appeared in 1744. He also wrote *Histoire du Paraguay* (1756), *Histoire de Saint Domingue* (1730), *Histoire du Japon*, a compilation chiefly from Kämpfer (Rouen, 1715); and he was one of the directors of the *Journal de Trévoux*.

CHARLOTTENBURG, a town of Prussia, in the province of Brandenburg, district of Potsdam, and circle of Teltow, situated on the Spree, four miles west of Berlin, with which a fine promenade connects it. The town has well-built straight streets, two churches, and a free park; it has several spinning mills, oil and vitriol factories, a beer brewery, and distilleries. It is much frequented in summer by visitors from Berlin. The castle, built in 1696 for the queen of Frederick I., the electress Sophia Charlotte, after whom the town was named, contains a collection of antiquities and paintings. In the castle grounds there is an extensive orangery, as also a granite mausoleum, the work of Schenkel, with monuments of Frederick William III. and Queen Louise by Rauch. The population in 1871 was 19,518.

CHARLOTTESVILLE, a town of the United States, the capital of Albemarle county, Virginia, situated about 65 miles north-west of Richmond on Moore's Creek, a tributary of Rivanna River. It is a railway junction of some importance; but its celebrity is due to the university of Virginia and the residence of Thomas Jefferson, which are both in the neighborhood. The university was founded by Jefferson in 1819, and over $200,000 was spent on the buildings; it is endowed and controlled by the state, and was attended in 1875 by 330 students. Monticello, the founder's residence, is still standing, though in a somewhat dilapidated state, and his tomb is to be seen in the family burying-ground. The population of the town in 1870 was 2838, of whom 1473 were colored.

CHARLOTTE TOWN, a town of British America, in the Dominion of Canada, the capital of Prince Edward Island, is situated on gently rising ground on the north bank of Hillsborough River, at its junction with York River, not far from the south coast, in 14° 15′ N. lat. and 63° 7′ W. long. It has a good harbor in Hillsborough Bay, and the river is navigable by the largest vessels for several miles. Besides the government buildings and the court-house, the town possesses an Episcopal, a Roman Catholic, and a Scotch church, a fort and barracks, a convent, a lunatic asylum, an exchange, a jail, three banks, and an almshouse; its educational institutions include the Prince of Wales College, supported by the province, the Roman Catholic College of St. Dunstan's, the Wesleyan Methodist Academy, founded in 1871, and a normal school; and among its industrial establishments are an iron foundry, a woollen factory, and shipbuilding yards. Large quantities of grain are exported, as well as potatoes, fish, and pork. A steamer plies between the town and Southport every hour, and there is regular communication with several of the other continental ports. A railway, with a total length of 200 miles, runs east to Georgetown and Souris, and west to Somerside, Alberton, and Tignish. Population in 1871, 8807.

CHAROLLES, a town of France, the capital of an arrondissement in the department of Saône-et-Loire, 3 miles by rail W.N.W. of Mâcon. It has tribunals of primary instance and commerce, an agricultural society, a communal college, a public library, manufactories of potteryware, iron forges, and a considerable trade in corn, wine, cattle, and timber. It was the capital of Charolais, an old division of France, which from the 13th century gave the title of count to its possessors. In 1327 the countship passed by marriage to the house of Armagnac; and in 1390 it was sold to Philip of Burgundy. After the death of Charles the Bold, who in his youth had borne the title of count of Charolais, it was seized by Louis XI. of France; but in 1493 it was ceded by Charles VIII. to Maximilian of Austria, the representative of the Burgundian family. Ultimately passing to the Spanish kings, it became for a considerable period an object of dispute between France and Spain, until at length it was assigned to Condé the Great, in reward for the services he had rendered to the Spanish monarch. The ruins of the count's castle occupy the summit of a hill in the immediate vicinity of the town. Population in 1872, 3064.

CHARON, in Grecian mythology, the son of Erebus and Nox, whose office it was to ferry the souls of the deceased who had received the rite of sepulture over the waters of Acheron. For this service each soul was required to pay an obolus or danace, one of which coins was accordingly placed in the mouth of every corpse previous to burial.

CHARONDAS, a celebrated lawgiver, who legislated not

only for his native Catana, but likewise for various cities of Magna Græcia. By some he is said to have been a disciple of Pythagoras, who flourished 540–510 B.C.; and according to the common account (as given by Diodorus, XII.), he also drew up a code for the use of the Thurians; but this statement is scarcely admissible, since Thurii was not founded till the year 443, and it is known that the laws of Charondas were in use among the Rhegians till they were abolished by Anaxilaus, who reigned from 494–476 B.C. It is traditionally related that Charondas fell a sacrifice to one of his own laws, by which it was made a capital offence to appear armed in a public assembly. Hastening to quell a tumult on his return from a military expedition, his sword still hanging by his side, he was reminded by a citizen of his violation of the law, upon which Charondas exclaimed—"Then will I seal it with my blood!" and immediately plunged the weapon into his breast. Fragments of his laws are given in Heyne's *Opuscula*, vol. ii.

CHARPENTIER, FRANÇOIS (1620–1702), archæologist and man of letters, was born at Paris. Intended for the bar, he quitted law for literature at an early age, and was employed by the great minister Colbert, who had determined on the foundation of a French East India Company, to draw up an explanatory account of the project for the perusal of Louis XIV.; to the memoir he thus prepared he afterwards added a second part. Charpentier, who was an ardent admirer of his own tongue, was one of the first to demonstrate the absurdity of the use of Latin in monumental inscriptions, and to him was entrusted the task of supplying the paintings of Lebrun in the Versailles Gallery with appropriate legends. He acquitted himself so indifferently of the commission that his verses had to be replaced by others, the work of Racine and Boileau. With these poets Charpentier had already quarrelled, having espoused the cause of Perrault in the famous academical dispute (1687) concerning the relative merits of the ancients and moderns, and their notices of him are by no means calculated to place his abilities in the most favorable light. He is credited with an important share in the production of the magnificent series of medals that commemorate the principal event of the age of Louis Quatorze. Charpentier, who was long in receipt of a pension of 1200 livres from Colbert, was erudite and often ingenious, but he was always heavy and commonplace. His principal works are a *Vie de Socrate* (1650), a translation of the *Cyropædia* of Xenophon (1659), the *Traité de la Peinture Parlante* (1684), and the *Défense de l'Excellence de la Langue Française* (1695).

CHARRON, PIERRE (1541–1603), a French philosopher, born in Paris in 1541, was one of the twenty five children of a bookseller of that city. After studying law at Orleans and Bourges, and obtaining the degree of doctor from the latter university, he settled at Paris to practise as an advocate. But, having met with no great success during five or six years, he entered the church, and soon gained the highest popularity as a preacher, rising to the dignity of canon, and being appointed preacher in ordinary to Queen Margaret. At length, when about forty-seven years of age, he determined to fulfil a vow which he had once made to enter the cloister; but, being rejected by the Carthusians and by the Celestines, and having taken the advice of some professed casuists, he held himself absolved and continued to follow his old profession. He delivered a course of sermons at Angers, and in the next year passed to Bordeaux, where he formed his short but famous and important friendship with Montaigne. Its intimacy is shown by the fact that at the death of Montaigne, in 1592, Charron was requested in his will to bear the arms of his family.

In 1594 Charron published (at first anonymously, afterwards under the name of "Benedict Vaillant, Advocate of the Holy Faith," and also, in 1594, in his own name) *Les Trois Vérités*, in which, by methodical and orthodox argument, he seeks to prove that there is a God and a true religion, that the true religion is the Christian, and that the true church is the Roman Catholic. The last book (which is three-fourths of the whole work) is chiefly an answer to the famous Protestant work entitled *Le Traité de l'Église* by Du Plessis Mornay; and in the second edition (1595) there is an elaborate reply to an attack on the third *Vérité*, which had been published anonymously by a Protestant writer. *Les Trois Vérités* gained considerable popularity, ran through several editions, and obtained for its author the favor of the bishop of Cahors, who appointed him grand vicar and theological canon. It also led to his being chosen deputy to the general assembly of the clergy, of which body he became chief secretary. It was followed in 1600 by *Discours Chrestiens*, a book of sermons, similar in tone, half of which treat of the Eucharist.

In the following year (1601) Charron published at Bordeaux his third and most remarkable work—the famous *De la Sagesse*, a complete popular system of moral philosophy. Usually, and so far correctly, it is coupled with the Essays of Montaigne, to which the author is under very extensive obligations; but though it is avowedly composed in great part of the thoughts and even the words of others, there is distinct individuality in the book. It is specially interesting from the time when it appeared, and the man by whom it was written. Conspicuous as a champion of orthodoxy against atheists, Jews, and Protestants—without resigning this position, and still upholding practical orthodoxy—Charron suddenly stood forth as the representative of the most complete intellectual skepticism.

His psychology is sensationalist. With sense all our knowledge commences, and into sense all may be resolved. The soul, located in the ventricles of the brain, is affected by the temperament of the individual; the dry temperament produces acute intelligence; the moist, memory; the hot, imagination. Dividing the intelligent soul into these three faculties, he shows—after the manner which Bacon subsequently adopted—what branches of science correspond with each. With regard to the nature of the soul he merely quotes opinions. The belief in its immortality, he says, is the most universal of beliefs, but the most feebly supported by reason. As to man's power of attaining truth, his skepticism is decided; and he plainly declares that none of our faculties enable us to distinguish truth from error. In comparing man with the lower animals, Charron insists that there are no breaks in nature. "Those parts which approach and touch one another are more or less similar. So between man and the other animals there is much nearness and kindred." The latter have reason; nay, they have virtue; and, though inferior in some respects, in others they are superior. The estimate formed of man is not, indeed, flattering. His five most essential qualities are vanity, weakness, inconstancy, misery, presumption. Upon this view of human nature and the human lot Charron founds his moral system. Equally skeptical with Montaigne, and decidedly more cynical, he is distinguished by a deeper and sterner tone. Man comes into the world to endure; let him endure then, and that in silence. To be grieved by others' sorrows is a weakness; our compassion should be like that of God, who succors the suffering without sharing in their pain. Avoid vulgar errors; cherish universal sympathy. Let no passion or attachment become too powerful for restraint. Follow the customs and laws which surround you. Such are the maxims he lays down.

Special interest attaches to Charron's treatment of religion. He has been lauded for his piety, and condemned for his infidelity; but he is justly to be regarded as a skeptic of the school of Montaigne. He insists on the diversities in religions; he dwells also on what would indicate a common origin. All grow from small beginnings and increase by a sort of popular contagion; all teach that God is to be appeased by prayers, presents, vows, but especially, and most irrationally, by human suffering. Each is said by its devotees to have been given by inspiration. In fact, however, a man is a Christian, Jew, or Mahometan, before he knows he is a man. One religion is built upon another; the Jewish, for instance, on the Egyptian and other Gentile religions, the Christian on the Jewish, the Mahometan on the Jewish and Christian combined. But while he openly declares religion to be "strange to common sense," the practical result at which Charron arrives is that one is not to sit in judgment on his faith, but to be "simple and obedient," and to allow himself to be led by public authority. This is one rule of wisdom with regard to religion; and another equally important is to avoid superstition. What superstition is he boldly ventures to define. It is the belief that God is like a hard judge who, eager to find fault, narrowly examines our slightest act, that He is revengeful and hard to appease, and that therefore He must be flattered and importuned, and won over by pain and sacrifice. True piety, which is the first of duties, is, on the other hand, the knowledge of God and of one's self, the

latter knowledge being necessary to the former. It is the abasing of man, the exalting of God,—the belief that what He sends is all good, and that all the bad is from ourselves. It leads to spiritual worship; for external ceremony is merely for our advantage, not for His glory.

Charron's political views are neither original nor independent. He pours much hackneyed scorn on the common herd, declares the sovereign to be the source of law, and asserts that popular freedom is dangerous.

At once the *De la Sagesse* brought upon its author the most violent attacks, the chief being by the Jesuit Garasse. A second edition was nevertheless soon called for. In 1603, notwithstanding much opposition, it began to appear, but only a few pages had been printed when Charron died suddenly in the street. A summary and defence of the *Sagesse*, written shortly before his death, appeared in 1606. In 1604 his friend Michel de la Rochemaillet prefixed to an edition of the *Sagesse* a Life, which depicts Charron as a man of the most amiable disposition and purest character. His complete works, with this Life, were published in 1635. An excellent abridgment of the *Sagesse* is given in Tennemann's *Philosophie*, vol. ix.

CHARTER. The word charter, from χάρτης, thick paper or parchment, came to be applied, from the substance on which it was written, to a document granted by a prince conferring or acknowledging privileges to be enjoyed by either the whole or a portion of the people under his rule. In England, from the Conquest downwards, there was a struggle between those who sought to enforce the feudal exactions which the Normans had learned in France and those who attempted to resist the innovation and hold to the old Saxon customs. If at first it was a contest between the monarch with his Norman followers on the one side and the Saxon population on the other, the conditions had changed during the lapse of nearly a century and a half preceding the reign of John, and the barons were so frequently incensed by the oppressions and exactions of the ambitious kings, to whose power they had contributed so much, that they joined in the general demand for "the good old laws of Edward the Confessor." Even so early as the reign of the Conqueror himself, there was a royal acknowledgment of franchises or liberties, and the charters, renewals, or confirmations granted by subsequent kings are inextricably numerous. Coke, without exhausting them, counts thirty-two. The Great Charter of King John (1215) has so conspicuous a place in history, not only from its comparative completeness, but because it was exacted by men with arms in their hands from a resisting king, and was thus an enforced stipulation likely to be rigidly interpreted, instead of a concession carelessly conceded and readily forgotten. A great many of the stipulations of the Great Charter refer to feudal exactions now so long obsolete that the restraints on them cease to be intelligible; and those who have looked at the "palladium of our liberties," expecting to find in it high-sounding definitions of freedom like those in modern Continental declarations of right, have been much disappointed. Even in the comparatively popular language of Blackstone there is not much to convey a distinct expression to unprofessional modern readers.

"It fixed," he says, "the forfeiture of lands for felony in the same manner as it still remains, and prohibited for the future the grants of exclusive fisheries, and the erection of new bridges so as to oppress the neighborhood. With respect to private rights, it established the testamentary power of the subject over part of his personal estate, the rest being distributed among his wife and children; it laid down the law of dower as it has continued ever since; and it prohibited the appeals of women, unless for the death of their husbands. In matters of public police and national concern, it enjoined a uniformity of weights and measures, gave new encouragements to commerce by the protection of merchant strangers, and forbade the alienation of lands in mortmain. With regard to the administration of justice, besides prohibiting all denials or delays of it, it fixed the court of common pleas at Westminster, that the suitors might no longer be harassed with following the king's person in all his progresses; and at the same time brought the trial of issues home to the very doors of the freeholders, by directing assizes to be taken in the proper counties, and establishing annual circuits. It also corrected some abuses then incident to the trials by wager of law and of battle, directed the regular awarding of inquests for life or member, prohibited the king's inferior ministers from holding pleas of the Crown, or trying any criminal charge, whereby many forfeitures might otherwise have unjustly accrued to the exchequer, and regulated the time and place of holding the inferior tribunals of justice, the county court, sheriff's turn, and court-leet. It confirmed and established the liberties of the city of London, and all other cities, boroughs, towns, and ports of the kingdom. And, lastly, it protected every individual of the nation in the free enjoyment of his life, his liberty, and his property, unless declared to be forfeited by the judgment of his peers or the law of the land."

The material feature of the document is that, so slightly referred to in the above extract, which says, "No freeman shall be taken or imprisoned, or be disseised of his freehold or liberties, or free customs, or be outlawed or exiled, or any otherwise damaged, nor will we pass upon him, nor send upon him, but by lawful judgment of his peers, or by the law of the land." In this stipulation there is inferred that supremacy of the fixed principles of the law over the will and power of the monarch, which has rendered the fanatical devotion of the English lawyers to their common law so justifiable; and as a farther security, the right of trial by peers or jurymen appointed a perpetual popular tribunal to check the official judges, should they be tempted to sell the liberties and privileges of the subject. Hallam, a very competent judge, says, "The institutions of positive law, the far more important changes which time has wrought in the order of society during 600 years subsequent to the Great Charter, have undoubtedly lessened its direct application to our present circumstances. But it is still the keystone of English liberty. All that has since been obtained is little more than a confirmation or commentary; and if every subsequent law were to be swept away, there would still remain the bold features that distinguish a free from a despotic monarchy."—(*Middle Ages*, chap. viii.)

Exemplars of the Great Charter were preserved among the muniments of cathedrals, and in other places calculated to preserve public archives. The Record Commission, when they published their edition of the statutes of the realm, were desirous to print the best authenticated version of the charter of King John; and they state, that "in Lincoln Cathedral, an original of the Great Charter of Liberties, granted by King John in the seventh year of his reign, is preserved in a perfect state. This charter appears to be of superior authority to either of the two charters of the same date preserved in the British Museum. From the contemporary indorsement of the word *Lincolina* on two folds of the charter, this may be presumed to be the charter transmitted by the hands of Hugh, the then bishop of Lincoln, who is one of the bishops named in the introductory clause."—(*Introduction*, xxix.)

Among the other concessions of a less comprehensive nature, the Charter of the Forest was deemed next in importance to Magna Charta. In nothing was the selfish rapacity of the Norman monarchs more conspicuous than in their relentless clearings of great districts of country for the establishment of forests or chases, where the sanctity of their field-sports was protected with a strict legal severity not conceded to the protection of ordinary property and personal freedom. The Charter of the Forest imposed wholesome limits on such inroads, and hence, along with the Great Charter, it has been printed at the commencement of the English statutes. The position of these documents in a series of Acts of Parliament is not so anomalous as it might seem; for it would be very difficult to distinguish the charters from the earliest statutes, which were concessions or admissions granted by the monarch on the requisition of the principal persons of the realm assembled together. Our statutes, indeed, still bear in their phraseology a testimony to this origin.

The early use of the word "charter," as a foundation of constitutional liberties, led to its being applied on various occasions to fundamental constitutional codes or rules of government adopted by various nations. The most memorable instance is the French *Charte*, containing the constitution of the French Government, as adjusted at the restoration in 1815, and amended at the revolution of 1830, which had its origin in an attempt of Charles X. to stretch one of its dubious clauses.

From such public acts as Magna Charta, the concession of privileges by charter from the Crown descended through various grades. Both in England and Scotland the privileges of municipal corporations either were conferred of old by charter, or were presumed to have been so conferred. The power of the Crown has in this form long virtually departed, but it is still competent to incorporate collective bodies with certain limited powers by royal charter: though, in general, it is deemed necessary when the pow-

ers might affect personal or public interests to secure them by Act of Parliament. Insidious privileges were sometimes granted by charter, and were among the objects of the attacks on the Crown's power to grant monopolies in the 17th century.

By the practice of mimicking the usages of the sovereign through all grades of feudality, it became the custom for every feudal lord or superior, high or low, when conceding any privilege as to his fief or landed property, to do so by a charter. Thus, throughout the British empire, and in Scotland especially, one of the most ordinary deeds connected with the commerce in land assumes to this day the shape of a concession of privileges by a sovereign or other high feudal lord to his vassal. One of the essential features which the student of Scottish law has to master in the practice of conveyancing is the constitution of the charter. Although modern practice has ingrafted on it other classes of deeds, to suit the exigences of the commerce in land, such as the disposition, the assignation, &c., yet "the charter" is the original source from which the spirit and tenor of the whole system of conveyancing are to be acquired.

CHARTER-PARTY, a written or partly written and partly printed contract, by which a ship is let or hired for the conveyance of goods on a specified voyage, or for a definite period. By the terms of this contract the owners declare the ship to be "tight, stanch, strong, and every way fitted for the voyage;" and they are accordingly liable in damages to the merchant or charterer, if the ship be unseaworthy, or if they fail to provide her with any necessary equipment or clearances. The shipowners are further bound to have the vessel ready to receive her cargo at the stipulated time; and they are responsible for the proper stowage of the goods received on board. On the loading being completed, the vessel must proceed without delay to her appointed destination; and should she unnecessarily deviate from the regular course of the voyage (a proceeding which might vitiate the merchant's insurances), the owners are liable in damages to the merchant. On arrival at the port of destination the goods are to be delivered "agreeably to bills of lading," the responsibility of the shipowners in this particular being limited by the usual exception against loss or damage by "the act of God, the queen's enemies, fire, and all and every other dangers and accidents of the seas, rivers, and navigation of whatever nature and kind soever." The freight payable to the shipowners is the amount specified in the charter-party, which may in certain cases be either more or less than the rates mentioned in the bills of lading,—the charterer having usually the right of sub-letting the ship in part or in whole to other shippers, on terms agreed upon between themselves, which it is customary to specify in their separate bills of lading, without prejudice to the original agreement. In such cases, however, the shipowners' lien on the goods for freight extends only to the amount specified in the bills of lading; and they must look to the charterer personally for any further sum which may be due to them.

The charterer, on his part, is bound to furnish the cargo at the port of loading, and to take delivery of the same at the port of discharge within specified periods, which are usually called "laydays." He may detain the vessel for a certain fixed time beyond the stipulated laydays on payment of a specified sum as "demurrage" for each day the ship is so detained. The laydays commence on the ship being ready to load or to discharge, even although it may happen from the port being crowded, or from similar causes, that she cannot at the time be placed in a berth where it would be convenient or practicable for the merchant to begin these operations.

The vessel is not bound to proceed nearer to her port of loading and discharging than "she may safely get;" and this generally means that she is not bound to go nearer to a loading port than to the point from which she can safely get away again with her cargo on board. The charterer, therefore, must pay the expense of necessary lighterage in loading or discharging, unless there be a specific agreement to the contrary.

It is usual to insert in charter-parties a clause by which the parties bind themselves to fulfil their contract under a specified sum as penalty for non-performance; but the amount of this penalty is not the absolute limit of the damages which either party may be entitled to recover under any of the other conditions which may have been violated. See CARRIER.

CHARTIER, ALAIN, the most distinguished French man of letters during the 15th century, was born at Bayeux. The date of his birth is not known, but M. Vallet de Viriville places it between 1380 and 1390. After a complete course of study at the university of Paris, he is supposed to have entered the service of Charles VI., who is said to have charged him with important missions. After this, however, he is known to have followed the fortunes of Charles the Dauphin, afterwards Charles VII., and to have been employed by that prince, about 1420, in the triple capacity of clerk, notary, and financial secretary. He is also said to have held a prebend in the cathedral church of Nôtre-Dame de Paris, of which he was likewise arch-deacon, and to have been sent as envoy to the Scottish court. A Latin epitaph, discovered in the 18th century, and pronounced authentic by the biographer already cited, credits him with the enjoyment of other dignities than those referred to, and declares that he "*s'endormit enfin dans le Seigneur*," in the city of Avignon, "*l'an de l'Incarnation*, 1449."

There is some analogy between the fate of Alain Chartier and that of Ronsard. Both enjoyed an extraordinary reputation during their lives, and after death both were neglected and forgotten. Alain Chartier's lot was cast in troublous times—he felt the agony of Agincourt, and witnessed the rise of the Maid—but this would seem to have increased his renown. The story of the famous kiss bestowed by Margaret of Scotland, wife of that Louis the Dauphin who was afterwards to be known as Louis XI., on "*la précieuse bouche de laquelle sont issus et sortis tant de bons mots et vertueuses sentences*," authentic or not, is interesting, if only as a proof of the high degree of estimation in which the ugliest man of his day was held. Jean de Masles, who annotated a portion of his verse, has recorded how the pages and young gentlemen of that epoch were required daily to learn by heart passages of his *Bréviaire des Nobles;* Lydgate, the English rhymester, studied him ardently and affectionately; and Clément Marot and Octavien de Saint-Gélais, writing fifty years after his death, find many fair words for the old poet, their master and predecessor. For the last three centuries, however, Alain Chartier has been remembered rather on account of the kiss aforesaid than for the sake of any of the *bons mots* and *vertueuses sentences* that induced it. The Renaissance of 1830, even, that has made so many glories to blossom anew, has not justified again his old renown in the eyes of men. As a poet his fame has yielded to that of his contemporary, Charles of Orleans; and even his eloquent prose, which is said to be the best part of his work, has awakened no interest whatever. In spite of this, however, Alain Chartier deserves notice as one of the most remarkable and influential men of his time. His writings, both in prose and verse, breathe an ardent spirit of patriotism, and are notable, in some instances, for a boldness of thought and freedom of idea that seem to foreshadow the great utterances of the 16th century.

Alain Chartier, who is credited with the invention of the *rondeau déclinatif*, used all the forms of verse current at that period—roundel, lay, ballad, and complaint. His best books are said to be *Le livre des Quatre Dames*, which was called forth b the battle of Agincourt, and *Le Quadriloque-Invectif*, a fine patriotic dialogue, bearing date 1422. See Mancel, *Alain Chartier, étude bibliographique et littéraire*, 8vo, Paris, 1849.

CHARTISM was a movement for radical reform in English politics, which originated in 1838, reached its culminating point in 1848, and collapsed the same year; it took its name from the "People's Charter" or "National Charter," the document in which the scheme of reform was embodied. The Reform Bill of 1832 left a large class of the population, especially the workingmen, dissatisfied. Accordingly, in 1838, after an unsuccessful attempt to initiate a scheme of more radical reform in the House of Commons, six of the most advanced members of the House had a consultation with the deputies of the "Working-men's Association," the result being the appearance of the People's Charter, which embodied in the six following points the programme of their party:—(1) annual parliaments; (2) universal suffrage; (3) vote by ballot; (4) abolition of the property qualification for membership of the House of Commons; (5) payment of members; (6) equal electoral districts. The most influential of the six members of the House who took part in the drawing up of the charter was O'Connell, and the methods adopted for the propagation of their views

were those practised by the great agitator with such success. Monster meetings were held, at which seditious language was occasionally spoken, and slight collisions with the military took place. Petitions of enormous size, signed in great part with fictitious names, were presented to Parliament; and a great many newspapers were started, of which the *Northern Star*, conducted by Feargus O'Connor, the active leader of the movement, had a circulation of 50,000. In 1840 the Chartist movement was still further organized by the inauguration at Manchester of the National Charter Association, which rapidly became powerful, being the head of about 400 sister societies, which are said to have numbered 40,000 members. Some time after, efforts were made towards a coalition with the more moderate radicals, but these failed; and a land scheme was started by O'Connor, which prospered for a few years. In 1844 the fanatical spirit of some of the leaders was only too well illustrated by their attitude towards the Anti-Corn Law League. O'Connor, especially, entered into a public controversy with Cobden and Bright, in which he was worsted; and he even endeavored to defeat the purpose of the League. But it was not till 1848, during a season of great suffering among the working classes, and under the influence of the revolution at Paris, that the real strength of the Chartist movement was discovered, and the prevalent discontent became known. Early in March disturbances occurred in Glasgow which required the intervention of the military, while in the manufacturing districts all over the West of Scotland the operatives were ready to rise, in the event of the main movement succeeding. Some agitation, too, took place in Edinburgh and in Manchester, but of a milder nature; in fact, while there was a real and wide-spread discontent, men were indisposed to resort to decided measures. The principal scene of intended Chartist demonstration was London. An enormous gathering of half a million was announced for the 10th April on Kennington Common, from which they were to march on the Houses of Parliament to present a petition signed by nearly six million names, in order by this imposing display of numbers to secure the enactment of the six points. Probably some of the more violent members of the party thought to imitate the Parisian mob by taking power entirely into their own hands. The announcement of the procession excited great alarm, and the most decided measures were taken by the authorities to prevent a rising. The procession was forbidden. The military was called out under the command of the Duke of Wellington, and by him concealed near the bridges and other points where the procession might attempt to force its way. Even the Bank and other public buildings were put in a state of defence, and special constables, to the number, it is said, of 170,000, were enrolled, one of whom was destined shortly after to be the emperor of the French. After all these gigantic preparations on both sides, the Chartist demonstration proved to be a very insignificant affair. Instead of half a million, only about 50,000 assembled on Kennington Common, and their leaders, Feargus O'Connor and Ernest Jones, shrank from the responsibility of braving the authorities by conducting the procession to the Houses of Parliament. The monster petition was duly presented, and scrutinized, with the result that the number of signatures was found to have been grossly exaggerated, and that the most unheard of falsification of names had been resorted to. Thereafter the movement specially called Chartism soon died out. The return of national prosperity relieved the working classes of their most pressing grievances; and subsequent legislative changes have in great measure removed the causes that existed for discontent among the classes which mainly supported the charter.

CHARTRES, the chief town of the department of Eure-et-Loire, 55 miles south-west from Paris by railway, stands on a slope skirted by the river Eure, which flows partly within and partly beyond the ramparts. Its houses are antique and straggling; but there are four fine squares, in one of which, used as the herb-market, is an obelisk in memory of General Marceau, a native of the town. Chartres is the seat of a tribunal of the first instance, a tribunal of commerce, a communal college, and a diocesan seminary; and it has a weekly corn-market, which is one of the largest in France and is well managed by a corporation of women. Its chief manufactures are woollens and leather. Its cathedral of Nôtre Dame, a vast Gothic edifice, with two spires of different construction, is reckoned one of the finest cathedrals in France. It was founded in the 11th century by Bishop Fulbert on the site of an earlier church destroyed by fire in 1020. In 1194 another conflagration laid waste the new building, then hardly completed; but clergy and people set zealously to work, and the main part of the present structure was finished by 1240. Though there have been numerous minor additions and alterations since that time, the general character of the cathedral is unimpaired. The upper woodwork was consumed by fire in 1830, as well as the beautiful belfry of the old tower, but the rest of the building was saved; and it still preserves some of its magnificent stained-glass windows of the 13th century. (See Bulteau, *Descript. de la cathédr. de Chartres*, 1850.) The churches of St. Pierre and St. André may also be noticed.

Chartres was one of the principal towns of the Carnutes, and by the Romans was called Autricum, from the river Autura (Eure). From the Romans it passed into the hands of the Frankish kings, and was successively taken by Thierry II., king of Orleans and Burgundy, and by the Normans, who burnt it in 852 and 872. It afterward fell into the hands of the English, from whom it was recovered in 1432. It was attacked unsuccessfully by the Protestants in 1568, and was taken in 1591 by Henry IV., who was consecrated there three years afterwards. In the Franco-Prussian War it was seized by the Germans on 21st Oct., 1870, and continued during the rest of the campaign an important centre of operations. During the Middle Ages it was the chief town of the district of Beauce, and gave its name to the counts of Chartres; and since the time of Louis XIII. the title of duke of Chartres has been hereditary in the family of Orleans. Population of the town in 1872, 19,322; and of the commune, 19,580.

CHARTREUSE, or more usually, to distinguish it from other establishments of the order, La Grande Chartreuse, a famous Carthusian monastery of France, in the department of Isère, situated about 14 miles north of Grenoble, at a height of 4268 feet above the level of the sea, in one of the upper valleys of a group of calcareous mountains, near the sources of the Guiers Mort and the Guiers Vif, two tributaries of the Rhone. The settlement was originally founded in 1084, and derived its name from a small village a short distance to the south-east, which was formerly known simply as Chartreuse or *Cartusia*, but is now distinguished as St. Pierre de Chartreuse. The first convent on the present site was not erected till 1137, and most of the present edifice is of a later date than 1676. It stands in a large meadow, which slopes to the south-west, and is watered by a tiny tributary of the Guiers Mort; on the north a fine forest rises up to the Col La Ruchère, while on the west the valley is shut in by well-wooded heights, and on the east is overshadowed by the white ridges of Grandsom, which rise upwards of 2500 feet above the convent roof. All access to the spot was formerly by difficult and defensible pathways; and before the construction of the modern roads it was very seldom that alien visitors disturbed the monks in their retreat. One of the principal approaches is by the valley of the Guiers Mort, which the traveller enters at St.-Laurent-du-Pont, a village of about 1800 inhabitants, with a deaf-mute institution supported by the Carthusians. Passing up the left bank of the stream, he next reaches the picturesque hamlet of Fourvoirie (Latin *forata via*), so named from the road which was driven up the pass at the suggestion of Le Roux, the thirty-third general of the order, in the 16th century. It is the seat of iron forges, a saw-mill, a farm, and laboratories belonging to the monks; and it was formerly the site of the first gateway that guarded the entrance to their domain. The river is there spanned by a noble three-storied bridge of a single arch; and about three miles higher up is the bridge of St. Bruno, which has replaced the older Pérant bridge still hanging in romantic dilapidation over the torrent. A short distance higher up begins the new part of the road constructed by M. Eugène Viand in 1853–4; it soon leads through the narrow passage of the Œillette or Aiguillette, formerly guarded by a second gateway, beyond which no female footstep was permitted; and after having passed through four separate tunnels, it brings the traveller in sight of the convent in about three hours from St.-Laurent-du-Pont. Other routes of less interest are by the villages of Sappey and La Charmette. There is nothing very striking or beautiful about the architecture of the Chartreuse,—its principal features being the high roofs of dark slate and the cross-surmounted turrets. Within the buildings there are four halls for the

reception of monks from the Carthusian provinces of France, Italy, Burgundy, and Germany, about sixty cells for the resident brethren, a church of the 15th and 16th centuries, several chapels, and a library, which before the Revolution contained a valuable collection both of books and manuscripts. A short distance from the main building is the infirmary, now set apart under the direction of the sisters of charity for the entertainment of female visitors. Since the revolutionary confiscation of 1793 the domain of Chartreuse has belonged to the state, and the monks, who were permitted to return to the monastery in 1816, pay a nominal rent for the use of the buildings and the right of pasturage, and have no longer any property in the neighboring forests, which are in great measure due to their predecessors. Their revenue is augmented by the sale of various pharmaceutical preparations known as the Elixir, the Boule d'Acier (a mineral paste or salve), and the Chartreuse. In the manufacture of the last—a famous aromatic liqueur—carnations, absinthium, and the young buds of the pine tree are employed; there are three kinds—a green, a yellow, and a white—differing in degree of strength. The monks are distinguished by an active benevolence, the effects of which are visible in all the surrounding villages, where churches, schools, hospitals, and similar institutions have been erected and maintained at their expense. See BRUNO and CARTHUSIANS; also Adolphe Joanne's *Dauphiné et Savoie*, 1870, and Jules Taulier's *Guide du Voyageur à la Grande Chartreuse*, 1860.

CHARYBDIS. See SCYLLA AND CHARYBDIS.

CHASE, SALMON PORTLAND (1808–1873), an American statesman, was born in Cornish, New Hampshire, on the 13th of January, 1808. After graduating with distinction at Dartmouth College, at the age of eighteen he opened a classical school at Washington, and commenced the study of law under William Wirt. In 1830 he was admitted to the bar; and he soon after gained for himself considerable reputation by a compilation of the statutes of Ohio. Throughout his whole career he was a consistent and vigorous opponent of slavery. From the first he was willing to risk his hopes of professional success by undertaking the defence of runaway slaves or of those who assisted their escape; and he boldly argued that slavery was merely an institution of the individual States, to which the national Government could not extend its sanction. He took a prominent part in the anti-slavery convention which met at Columbus in 1841, in the first "National Liberty Convention" of 1843, in the "Southern and Western Liberty Convention" of 1845, and in the second "National Liberty Convention" of 1847. He also presided over the "National Convention" of 1848, which nominated Van Buren for president and Adams for vice-president. In 1849 he became member of the senate; and in 1855 he was elected governor of Ohio, in which position he was so popular that he was re-elected, two years after, by an extraordinarily large number of votes. He was also three times nominated for the presidency, though he never attained that dignity.

On the accession of Lincoln to the presidency, in March, 1861, Chase became secretary of the treasury; and he fulfilled the duties of this most important and difficult post with the greatest energy till June, 1864. Still, notwithstanding his ability and zeal, it cannot be said that the measures he adopted were the best even in the extremely difficult circumstances in which he was placed. Though he appears to have apprehended some of the evil consequences likely to arise from the creation of inconvertible notes, he argued that their issue was necessary on the ground that it would increase the loanable capital of the country, while, in fact, employed as it was by Government in defraying expenses, it could have no such effect. At first Chase contemplated raising a large sum by direct taxation; but this course Congress refused to pursue. He was forced, therefore, to resort to a considerable increase of the taxes on imports, to issues of an inconvertible paper currency, and to enormous loans, which were contracted upon unnecessarily expensive terms. The interest was, in reality, about double its nominal amount, owing to the fact that it was paid in gold; and, besides this, a considerable loss was sustained through the arrangement by which the debt contracted in depreciated paper was discharged in coin.

It was under his management that Congress passed the Banking Law of February, 1863, which, as amended in June, 1864, is still in force (see BANKING, vol. iii. p. 293). It was at that time useful in two ways; for it procured for the Government, in its necessity, a considerable loan from the banks, and it replaced the notes of the banks, which had lost their credit through frequent failures, by notes which possessed the Government guarantee. Its great recommendation at present is that it secures the trustworthiness of the note currency.

In December of the year in which he resigned the secretaryship of the treasury, Chase was appointed Chief Justice of the Supreme Court of the United States, and in this capacity he had to undertake the responsibility of superintending the trial of President Johnson. But his health was now broken, and his old activity was no longer possible. In June, 1870, he suffered a shock of apoplexy, and on May 7, 1873, he died at New York.

CHASTELAIN, GEORGES (1403–1475), called *L'Adventureux*, the celebrated Burgundian chronicler, was born at Alost in Flanders. When only seven years old he began the study of letters. This, however, he abandoned to become a soldier, serving first of all as a squire. Particularly favored by Philip the Good, duke of Burgundy, he quitted the career of arms towards 1443, and devoted himself to the service of that prince, who made him successively pantler, orator, and finally grand chronicler of the house of Burgundy. In addition to such duties as these offices entailed upon their holder, Chastelain was often employed diplomatically, and was also accustomed to direct the dramatic entertainments designed for the amusement of the ducal court. A heavy but insolent opuscule in verse, published by him in 1455, had nearly compromised his safety, as it was held to contain reflections injurious to the honor of the king and nobility of France; Chastelain, however, extricated himself from the difficulty by issuing a sort of reply (in prose) to his own libel. About this time, too, at the request of Philip, he began his most important work, the *Grande Chronique*. Philip's son, Charles the Bold, continued to confide in and favor Chastelain as his father had done, and conferred on him the order of the Golden Fleece, with the title of *Indiciaire*—a designation intended as descriptive of one who "démonstroit par escripture authentique les admirables gestes des chevaliers et confrères de l'ordre." At the beginning of the new reign, however, Chastelain retired to Valenciennes, where he busied himself till his death in the production of his *Chronique* (in which he was assisted by Jean Molinet, his disciple and continuator) and of other works, imaginative and historical.

Among his contemporaries, Georges Chastelain acquired by his verses the style and title of a second Homer; but posterity, in relegating his poetry to eternal oblivion, has been careful of his memory. As an historian, Chastelain is deserving of more attention. He was a soldier and traveller, who had yet been trained to letters, the favorite of a splendid prince, and personally acquainted with most of the actors in the great scenes which his position enabled him to study on the very theatre of their action. His method of writing history, to judge by a declaration of his own yet extant, was not such as would have occurred to the mere compiler or writer from dictation. The vast mass of material collected during his long and busy life was intended to be fused and shaped as his own conclusions, his own great experience of men and years, should determine, and not altogether according to the requirements of party and feudal feeling. Impartiality, however, must not be considered one of his virtues. A brilliant satirist, and at the same time, a master of eulogy, it was his interest to use all his gift in his master's service, and he did so use it.

Only three fragments of the *Chronique*, which was to have filled six volumes in folio, are known to exist—the first extending from 1419 to 1422, and the second, with large breaks in the text, from 1461 to 1474. A third mutilated fragment is understood to refer to the period uncovered by the larger chapters, but it neither tells a connected story nor fills the great gap between the other two.

See Buchon, *Chroniques nationales* and *Panthéon littéraire*; Quicherat, *Bibliothèque de l'École des Chartes*; Reiffenberg, *Ducs de Bourgogne*, 8vo, 1836.

CHASTELARD, PIERRE BOSCOBEL DE (1540–1563), a French poet whose name is inseparably connected with that of Mary Queen of Scots, was born in Dauphiné, and was a scion of the house of Bayard. From the service

of the Constable Montmorency, Chastelard, then a page, passed to the household of Marshal Damville, whom he accompanied in his journey to Scotland in escort of Mary (1561). He returned to Paris in the marshal's train, but left for Scotland again shortly afterward, bearing letters of recommendation to Mary from his old protector, Montmorency, and the *Régrets* addressed to the ex-queen of France by Pierre Ronsard, his master in the art of song. He is also understood to have undertaken the charge, for transmission to the poet, of the service of plate with which Mary rewarded him. But he had fallen in love with the queen, who is said to have encouraged his passion. Copies of verse passed between them; she lost no occasion of showing herself partial to his person and conversation. The young man hid himself under her bed, where he was discovered by her maids of honor. Mary pardoned the offence, and the old familiar terms between them were resumed. Chastelard was so rash as again to violate her privacy. He was discovered a second time, seized, sentenced, and hanged the next morning. He met his fate valiantly and consistently, reading, on his way to the scaffold, his master's noble *Hymne de la Mort*—"Très-bien fait et propre pour ne point faire abhorer la mort"—and turning at the instant of doom towards the palace of Holyrood, to address to his unseen mistress the famous farewell—"Adieu, toi si belle et si cruelle, qui me tues et que je ne puis cesser d'aimer." This at least is the version of Brantôme, who is, however, as notoriously untrustworthy as an authority as he is charming as a writer. Another account is that the plaint was a reproach, contained in the exclamation "Cruelle reine!" and emphasized by a threatening gesture addressed to Mary's apartments.

Sworder and amorist, audacious and irreligious, with a strong sense of the nobility of art and some taste for its practice, Chastelard is a favorable specimen of the golden youth of the French Renaissance. As a poet he is not remarkable—merely one of "the mob of gentlemen who wrote with ease," in spite of the notes of truth and passion occasionally to be distinguished through the clink and fall of his verse. But for his madness of love, indeed, it is possible that he would have left no shadow or shred of himself behind. As it is, however, his life and death are of interest as illustrating the wild days in which his lot was cast.

See Chalmers, *Life of Mary Queen of Scots;* Knox, *History of the Reformation;* Mignet, *Histoire de Marie Stuart;* Dargaud, *Histoire de Marie Stuart;* Le Laboureur, *Mémoires de Castelnau;* Brantôme, *Mémoires.* Mr. Swinburne's tragedy of *Chastelard* is too well known to need more than passing reference.

CHATEAUBRIAND, François René, Viscount de (1768–1848), the most brilliant representative of the reaction against the ideas of the French Revolution, and the most conspicuous figure in French literature during the First Empire, was born at St. Malo, September 4, 1768. Here, as beautifully narrated by himself, his naturally poetical temperament was fostered by picturesque influences, the mysterious reserve of his morose father, the ardent piety of his mother, the traditions of his ancient family, the legends and antiquated customs of the sequestered Breton district; above all, the vagueness and solemnity of the neighboring ocean. He received his education at Dol and Rennes, and after declining to enter the church from an absence of vocation, obtained a commission in the army when on the point of proceeding to try his fortune in India (1788).

His thirst for distinction, further excited by the political convulsions of the following year, found vent in a romantic scheme for the discovery of the North West Passage, in pursuance of which he departed for America in 1790. The passage was not found or even attempted, but the adventurer returned enriched with the to him more important discovery of his own powers and vocation, conscious of his marvellous faculty for the delineation of nature, and stored with ideas and imagery, the material of much of his future work. His return coincided with the execution of Louis XVI. Chateaubriand, a Breton and a soldier, could not do otherwise than throw himself into the ranks of the emigrants. After the failure of the duke of Brunswick's invasion he retired to England, where he lived obscurely for several years, gaining an intimate acquaintance with English literature, and elaborating *The Natchez*, a prose epic designed to portray the life of the Red Indian tribes, and inspired by reminiscences of his American travels. Two brilliant episodes of this work, *Atala* and *René*, have acquired universal renown; but the work as a whole, to say nothing of the unreality of its pictures of savage life, belongs to that unfortunate compromise between the forms of prose and poetry in a manner imposed upon the French language by the penury of its poetic diction, but incapable of the perfection of either poetry or prose. Chateaubriand's first publication, however, was the *Essay on Revolutions* (1797). In this remarkable work, which the author subsequently retracted, but took care not to suppress, he appears as a mediator between royalist and revolutionary ideas, a free-thinker in religion, and in philosophy imbued with the spirit of Rousseau. A great change in his views was, however, at hand, induced, as he would have us believe, by the death of his mother in the same year. It is certain that upon his restoration to his country three years subsequently, the *Genius of Christianity* was already in an advanced state. Before publishing it, however, he determined to make an essay with an episode of his romance. *Atala*, or *The Loves of Two Savages*, appeared in 1801, and immediately raised the author to the summit of literary distinction. Exquisite style, impassioned eloquence, and glowing descriptions of nature, gained indulgence for the incongruity between the rudeness of the personages and the refinement of the sentiments, and for the distasteful blending of prudery with sensuousness; the latter was indeed conformable to the example of the author's models and predecessors. Alike in its merits and defects, the piece is a more emphatic and highly-colored "Paul and Virginia;" it has been justly said that Bernardin Saint Pierre models in marble and Chateaubriand in bronze. Encouraged by his success, the author resumed his *Genius of Christianity*, which appeared in the following year, just upon the eve of Napoleon's re-establishment of the Catholic religion, for which it thus almost seemed to have prepared the way. No coincidence could have been more opportune, and Châteaubriand might almost be pardoned for esteeming himself the counterpart of Napoleon in the intellectual order, as he certainly did. In composing his work he had borne in mind the admonition of his friend Joubert, that the public would care very little for his erudition and very much for his eloquence. It is consequently an inefficient production from the point of view of serious argument. The considerations derived from natural theology are but commonplaces rendered dazzling by the magic of style; and the parallels between Christianity and antiquity, especially in arts and letters, are at best ingenious sophistries. The less polemical passages, however, where the author depicts the glories of the Catholic liturgy and its accessories, or expounds its symbolical significance, are splendid instances of the effect produced by the accumulation and judicious distribution of particulars gorgeous in the mass, and individually treated with the utmost refinement of detail. Taken altogether, the work is a masterpiece of literary art, and its immediate effect was very considerable. It admirably subserved the statecraft of Napoleon, who appointed the writer attaché at Rome, and when his insubordinate and intriguing spirit compelled his recall, transferred him as envoy to the canton of the Valais. The murder of the duke of Enghien took place during his absence on this mission. Chateaubriand, to his honor, immediately resigned his post, and subsequently manifested great courage in his indirect censures of Napoleon in a journal of which he had become proprietor, and which was ultimately suppressed. Ere this he had departed on a pilgrimage to Jerusalem, undertaken, as he subsequently acknowledged, less in a devotional spirit than in quest of new imagery, and in deference to the wishes of a lady friend. The journey produced (1811) a record of travel distinguished by its habitual picturesqueness, and also inspired his prose epic of *The Martyrs*, published two years previously. This work may be regarded as the argument of the *Genius of Christianity* thrown into an objective form. Moore's *Epicurean*, and the more ambitious passages of Bulwer's earlier romances, may convey an adequate notion of it to the merely English reader. As in the *Epicurean*, the professed design is the contrast between Paganism and Christianity, which fails of its purpose partly from the absence of real insight into the genius of antiquity, and partly because the heathen are the most interesting characters after all. Two years previously had appeared *René*, another detached episode of *The Natchez*, and perhaps Chateaubriand's most characteristic production. The connecting links in European literature between *Werther* and *Childe Harold*, it

paints with wonderful mastery the misery of a morbid and dissatisfied soul, the type of a character blighted by oversensitiveness on the one hand, and an egotism thinly disguised by poetical sentiment on the other. The representation is mainly from the life, and Chateaubriand must certainly be acquitted of the unreality and affectation which so frequently characterize similar delineations of the poetic temperament. René's morbid despondency is but the too faithful portrait of the desolation begotten in his own mind by the unnatural alliance between opulence of imagination and poverty of heart. His sister Lucile is the Amélie of the story. *The Natchez*, of which *René* was to have formed an episode, was not published until 1826, at which time also appeared the beautiful tale of *The Last of the Abencerrages*, written about 1809, and, as the author asserts, withheld from publication on account of the Peninsular War. With this composition Chateaubriand's career as an imaginative writer is closed; and we have henceforth chiefly to consider him as a politician. His character in this point of view may be comprised in a sentence; he was equally formidable to his antagonists when in opposition and to his friends when in office. His poetical receptivity and impressionableness rendered him honestly inconsistent with himself, while his vanity and ambition, too morbidly acute to be restrained by the ties of party allegiance, made him dangerous and untrustworthy as a political associate. His pamphlet, *Bonaparte and the Bourbons*, published in 1814, while the fate of Napoleon yet trembled in the balance, was as opportune in the moment of its appearance as the *Genius of Christianity*, and produced a hardly less signal effect. Louis XVIII. declared that it had been worth a hundred thousand men to him. Chateaubriand was called to his councils, accompanied him to Ghent during the Hundred Days, and for a time associated himself with the excesses of the royalist reaction. Political bigotry, however, was not among his faults; he gradually drifted into liberalism and opposition, and upon a change of ministry obtained the London embassy, from which he was transferred to represent his country at the Congress of Verona. He here made himself mainly responsible for the iniquitous invasion of Spain,—an expedition undertaken, as he himself admits, with the puerile idea of restoring French prestige by a military parade. He next received the portfolio of foreign affairs, which he soon lost by his desertion of his colleagues on the question of a reduction of the interest on the national debt. After another interlude of effective pamphleteering in opposition, he accepted the embassy to Rome under the Martignac administration, resigned it at Prince Polignac's accession to office, and on the downfall of the elder branch of the Bourbons, made one last extremely brilliant but inevitably fruitless protest from the tribune in defence of the principle of legitimacy. During the first half of Louis Philippe's reign he was still active with his pen, and was regarded as the most efficient champion of the exiled dynasty, but as years increased upon him, and the prospect of his again performing a conspicuous part diminished, he relapsed into an attitude of complete discouragement, and contributed to chill the ardor of his own party. His narrative of his share in the Congress of Verona, the *Life of Rancé*, and his translation of Milton, belong to the writings of these later days. He expired on July 4, 1848, wholly exhausted and thoroughly discontented with himself and the world, but affectionately tended by his old friend Madame Récamier, herself deprived of sight. His remains were interred in Grand Bey, a lonely islet off the coast of Brittany. Shortly after his death his memory was powerfully revived, and at the same time exposed to much adverse criticism, by the publication, with sundry mutilations as has been suspected, of his celebrated *Mémoires d'Outre-Tombe*, the composition of which had occupied him at intervals during the greater part of his life. These memoirs undoubtedly reveal his vanity, his egotism, the frequent hollowness of his professed convictions, and his incapacity for sincere attachment, except, perhaps, in the case of Madame Récamier. They abound, on the other hand, with beauties of the first order, and much of the rough treatment they have experienced is attributable to the animosity of party. Their principal literary defect is the frequent encroachment of the historical element upon the autobiographical, the writer's exaggerated estimate of his own consequence leading him to allow a disproportionate space to transactions in which he had in fact but little share.

Chateaubriand ranks rather as a great rhetorician than as a great poet, rather as a great writer than a great man. Something of affectation or unreality commonly interferes with the enjoyment of his finest works. The *Genius of Christianity* is a brilliant piece of special pleading; *Atala* is marred by its unfaithfulness to the truth of uncivilized human nature, *René* by the perversion of sentiment which solicits sympathy for a character rather deserving of contempt. Chateaubriand's fame owes much to the timeliness of his appearances in print, and even more to the genuine conviction of his countrymen that French literature and European literature are practically convertible terms. They have hence made his position in the former the standard of his influence over the latter, which, for an author so widely read and so generally admired, has in reality been but small. Even in France he is chiefly significant as marking the transition from the old classical to the modern romantic school. He belongs to the latter by the idiosyncrasy of his genius, to the former by the comparative severity of his taste. The fertility of ideas, vehemence of expression, and luxury of natural description, which he shares with the romanticists, are controlled by a discipline imbibed in the school of their predecessors. His palette, always brilliant, is never gaudy; he is not merely a painter but an artist. He is master of epigrammatic and incisive sayings, and has contributed as much as any great French writer to foster the disastrous national partiality for *la phrase*. Perhaps, however, the most truly characteristic feature of his genius is the peculiar magical touch which Mr. Arnold has indicated as a note of Celtic extraction, which reveals some occult quality in a familiar object, or tinges it, one knows not how, with "the light that never was on sea or land." This incommunicable gift is of necessity genuine, and supplies an element of sincerity to Chateaubriand's writings which goes far to redeem the artificial effect of his calculated sophistry and set declamation. It is also fortunate for his fame that so large a part of his writings should directly or indirectly refer to himself, for on this theme he always writes well. Egotism was his master-passion, and beyond his intrepidity and the loftiness of his intellectual carriage his character presents little to admire. He is a signal instance of the compatibility of genuine poetic emotion, and sympathy with the grander aspects both of man and nature, and even munificence in pecuniary matters, with absorption in self and general sterility of heart.

The principal authority for Chateaubriand's biography is his own *Mémoires d'Outre-Tombe*. The *Souvenirs et Correspondance* of Madame Récamier may also be consulted. The best general review of his character and writings is Sainte-Beuve's *Chateaubriand et sa Groupe Littéraire*, Paris, 1872; see also the Count de Marcellus's *Chateaubriand et son Temps*, and for his diplomatic career the latter's *Souvenirs Diplomatiques*. The best edition of his works is Sainte-Beuve's, Paris, 1859–60. (R. G.)

CHATEAUBRIANT, a town of France, at the head of an arrondissement in the department of Loire Inféricure, on the left bank of the Chère, a tributary of the Vilaine, 35 miles N.N.E. of Nantes. It takes its name from a castle founded in 1015 by Briant, count of Penthièvre; and its principal ornament is another castle, built in 1524 by Jean de Laval, and famous in history as the scene of the assassination of Françoise de Foix. There is also an interesting Romanesque church dedicated to St. Jean de Bère. The manufactures are mainly woollen stuffs and confectionery; and the trade is in iron, coal, and wood. Population in 1872, 4134.

CHATEAUDUN, a town of France, capital formerly of the countship of Dunois, and now of an arrondissement in the department of Eure-et-Loir, 28 miles S.S.W. of Chartres. It stands on an eminence near the left bank of the Loir, and has remains of an old castle, several ancient churches, a town-hall, a communal college, a public library, and manufactures of woollens and leather. It was almost entirely destroyed by fire in 1723, and in 1870 it was captured by the Germans. Population in 1872, 5923.

CHATEAU-GONTIER, a town of France, at the head of an arrondissement in the department of Mayenne, on the right bank of the Mayenne river, here crossed by a stone bridge, 17 miles S.S.E. of Laval. It has a fine Gothic church, a communal college, three hospitals, an agricultural society, public baths, extensive bleach fields, and manufactures of linen and woollen stuffs. It is also the entrepôt of a great part of the trade of the department

in wine, slate, iron, and coal. Château-Gontier owes its origin and its name to a castle erected in 1037 by Gunther, the steward of Fulques Nerra of Anjou, on the site of a farm belonging to the monks of St. Aubin d'Angers. On the extinction of the family, the lordship was assigned by Louis XI. to Philippe de Comines. The town suffered severely during the wars of the League, and in the Vendean struggle it was the scene of sanguinary proceedings. Population in 1872, 7048.

CHATEAUROUX, a town of France, capital of the department of Indre, is situated in a fine plain on the left bank of the Indre, 90 miles by rail S.W. of Orleans. It is the seat of a court of assize, and tribunals of primary instance and commerce; and it has a castle, now used as the town-hall, a cathedral, erected about 1873, a society of arts and agriculture, a communal college, a theatre, and a public library. It is ill-built, with narrow, filthy streets. The principal manufacture is woollens, in which a great part of its inhabitants are employed; it has an active trade in woollen yarn, leather, iron, grain, and cattle, and there are quarries of lithographic stone in the neighborhood. The castle from which it takes its name was founded about the middle of the 10th century by Raoul, prince of Déols, and passed into the possession of several noble families. In 1215 one of the earliest of the Franciscan monasteries was founded in the town by William of Chauvigny. Raised to the rank of a countship in 1497, and to that of a duchy in 1616, it finally passed into the possession of Louis II. of Bourbon, prince of Condé, and the castle served for the incarceration of his wife for twenty-three years. General Bertrand was born in the castle in 1773, and his statue adorns the Place Sainte Hélène. Population of the town in 1872, 16,858; of the commune, 18,670.

CHATEAU-THIERRY, a town of France, at the head of an arrondissement in the department of Aisne, on the right bank of the Marne, and connected with an extensive suburb on the opposite bank by a fine stone bridge of three arches. It is the seat of a tribunal of primary instance, and has a communal college, a public library, and manufactures of linen, cotton, leather, and earthenware. It contains a marble statue erected to the memory of La Fontaine, who was born in the town; and his house is still preserved in the street that was formerly called after the Cordeliers, but now bears the name of the poet. On the top of the hill are the ruins of a castle, which is said to have been built by Charles Martel for Thierry IV., and is plainly the origin of the name of the town. Château-Thierry was formerly the capital of the district of Brie Pouilleuse, and received the title of a duchy from Charles IX. in 1566. Its position has brought upon it numerous disasters from time to time. It was captured by the English in 1421, by Charles V. in 1545, and by the Spanish in 1591. During the wars of the Fronde it was pillaged in 1652; and in the campaign of 1814 it suffered severely. On February 12 of the latter year the Russo-Prussian forces were beaten by Napoleon in the neighborhood. Population of the town in 1872, 5347; of the commune, 6623.

CHATELLERAULT, a town of France, at the head of an arrondissement in the department of Vienne, on the right bank of the Vienne, here crossed by a handsome stone bridge, which connects it with the suburb of Châteauneuf on the opposite side of the river, 24 miles N.N.E. of Poitiers. It stands in a fertile valley, and has several fine promenades, but is irregularly built. It has tribunals of primary instance and commerce, a fine Gothic church, a public fountain, a communal college, an exchange, a hospital, a society of agriculture, and a theatre. It is one of the chief seats of the manufacture of cutlery in France; and has a Government manufactory of swords and bayonets, established in 1820. There is a large trade in wines, dried fruits, slates, iron, corn, hemp, and timber. Population in 1872, 13,363.

Châtellerault, or *Castrum Heraldi*, derives its name from a castle built in the 11th century. In 1514 it was made a duchy in favor of Gilbert of Bourbon, count of Montpensier, but not long after it was reunited to the Crown. In 1548 it was bestowed on James Hamilton, second earl of Arran; but it was forfeited by failure of male issue. The title, however, continued to be claimed by the dukes of Hamilton and the earls of Abercorn, who were both descended by the female side from the original possessor. A decree of the French Council of State decided against the earl, and the title was rebestowed on the duke of Hamilton by Napoleon III.

CHATHAM, a town of England, in the county of Kent, on the south side of the Medway about 15 miles from its junction with the estuary of the Thames, and 27 miles east of London. Though still nominally distinct, it is practically united with Rochester on the west, and is in close proximity to Brompton and Gillingham on the east. In Chatham proper the streets are for the most part narrow, and with the exception of the docks and fortifications, there are but few objects of interest. St. Mary's

Plan of Chatham.

church is a brick building erected about 1788, but occupying the site of an earlier structure of the 14th century; it contains a monumental brass to the memory of Stephen Borough, the discoverer of the northern passage to Russia. There are a few remains of the hospital for lepers founded by Bishop Gundulf in 1078; but the funds for its maintenance were appropriated by decision of the court of chancery to the new hospital of St. Bartholomew erected in 1863 within the boundaries of Rochester. The almshouse, established in 1592 by Sir John Hawkins for poor decayed seamen and shipwrights, is still in existence, the building having been re-erected in the present century; but the fund called the Chatham Chest, originated by Hawkius and Drake in 1588, was incorporated with Greenwich Hospital in 1802. The town possesses numerous churches and chapels of various denominations, a ragged school, a nau-

tical school, a mechanics' institute, and a lecture hall. The Medway union workhouse is situated a short distance to the south-east. The water supply is obtained from springs at the village of Lupton, about half of a mile further off in the same direction; and extensive reservoirs were constructed in 1862 at Star Hill in the neighborhood of the village. Numerous brickyards, lime-kilns, and flour-mills are in the surrounding district, and the town carries on a large retail trade, partly from the presence of the garrison. The fortifications are among the most elaborate in the kingdom. The so-called Chatham Lines ought rather to bear the name of the village of Brompton which they enclose. They were commenced in 1758 and completed in 1807; but various alterations and additions have since been effected. They are strengthened by several detached forts and redoubts, and consist of a very intricate system of trenches, batteries, and subterranean passages. Fort Pitt, which rises above the town to the west, was built in 1779, and is now used as a general military hospital; it was regarded as the principal establishment of the kind in the country till the foundation of Netley in Hampshire. The lines include the Chatham, the Royal Marine, the Brompton, the Hut, and St. Mary's barracks; the garrison hospital and Melville hospital; the arsenal with its large park of artillery; the gymnasium, established in 1864 for gymnastic exercise; the military school for the practical instruction of sappers and engineers, opened in 1812; a military institute for the men in garrison; the convict prison; and, finally, the extensive system of dockyards which has made the town so famous.

Numerous Roman remains, both architectural and domestic, have been discovered at Chatham and Brompton; but they appear to have belonged to the Roman city of Rochester. Till the reign of Elizabeth the place was a mere insignificant village; but before 1588 the queen established the first dockyard on the site of what is now called the Ordnance Wharf, and erected Castle Upnor on the opposite bank of the river for its defence. The situation was changed in the following reign, and under the Charleses extensive additions were made. The history of the town since the attack of the Dutch in 1667 has been mainly the history of the naval and military establishments. The parliamentary borough, which returns one member, includes the towns of Chatham and Brompton, and the villages of Gillingham, Chatham Hill, and New Brompton, and covers an area of 2707 acres. The population of the borough in 1871 numbered 45,792 persons, of whom 24,873 were males and 20,919 females.

CHATHAM, William Pitt, First Earl of (1708–1778), one of the greatest of English statesmen and parliamentary orators, was born at Westminster on the 15th November, 1708. He was the younger son of Robert Pitt of Boconnock, in Cornwall, and grandson of Thomas Pitt, governor of Madras, who was known as Diamond Pitt, from the fact of his having sold a diamond of extraordinary size to the Regent Orleans for £135,000. It was mainly by this fortunate transaction that the governor was enabled to raise his family, which was one of old standing, to a position of wealth and political influence. The latter he acquired by means of the former in the direct open method, then so common, purchasing the burgage tenures of Old Sarum, which was thus destined to become famous as represented by William Pitt a hundred years before it became notorious as the typical "rotten borough" in the debates on the first reform bill.

Of the early life of William Pitt comparatively little is known. He was educated at Eton, and in January, 1726, was entered as a gentleman commoner at Trinity College, Oxford. There is evidence that he was an extensively read, if not a minutely accurate classical scholar; and it is interesting to know that Demosthenes was his favorite author, and that he diligently cultivated the faculty of expression by the practice of translation and re-translation. An hereditary gout, from which he had suffered even during his school-days, compelled him to leave the university without taking his degree, in order to travel abroad. He spent some time in France and Italy; but the disease proved intractable, and he continued subject to attacks of growing intensity at frequent intervals till the close of his life. In 1727 his father had died, and on his return home it was necessary for him, as the younger son, to choose a profession. Having chosen the army, he obtained through the interest of his friends a cornet's commission in the dragoons. But his military career was destined to be short. His elder brother Thomas having been returned at the general election of 1734 both for Oakhampton and for Old Sarum, and having preferred to sit for the former, the family borough fell to the younger brother by the sort of natural right usually recognized in such cases. Accordingly, in January, 1735, William Pitt entered Parliament as member for Old Sarum. Attaching himself at once to the formidable band of discontented Whigs known as the Patriots, whom Walpole's love of exclusive power had forced into opposition, he became in a very short time one of its most prominent members. His maiden speech was delivered in April, 1736, in the debate on the congratulatory address to the king on the marriage of the prince of Wales. The occasion was one of compliment, and there is nothing striking in the speech as reported; but it served to gain for him the attention of the house when he presented himself, as he soon afterwards did, in debates of a party character. So obnoxious did he become as a critic of the Government, that Walpole thought fit to punish him by procuring his dismission from the army. Some years later he had occasion vigorously to denounce the system of cashiering officers for political differences, but with characteristic loftiness of spirit he disdained to make any reference to his own case. The loss of his commission was soon made up to him. The heir to the throne, as has usually been the case in the house of Hanover, if not in reigning families generally, was the patron of the opposition, and the ex-cornet became groom of the bed-chamber to the prince of Wales. In this new position his hostility to the Government did not, as may be supposed, in any degree relax. He had all the natural gifts an orator could desire,—a commanding presence, a graceful though somewhat theatrical bearing, an eye of piercing brightness, and a voice of the utmost flexibility. His style, if occasionally somewhat turgid, was elevated and passionate, and it always bore the impress of that intensity of conviction which is the most powerful instrument a speaker can have to sway the convictions of an audience. It was natural, therefore, that in the series of stormy debates, protracted through several years, that ended in the downfall of Walpole, his eloquence should have been one of the strongest of the forces that combined to bring about the final result. Specially effective, according to contemporary testimony, were his speeches against the Hanoverian subsidies, against the Spanish convention in 1739, and in favor of the motion in 1742 for an investigation into the last ten years of Walpole's administration. It must be borne in mind that the reports of these speeches which have come down to us were made from hearsay, or at best from recollection, and are necessarily therefore most imperfect. The best-known specimen of Pitt's eloquence, his reply to the sneers of Horatio Walpole at his youth and declamatory manner, which has found a place in all handbooks of elocution published during the last hundred years, is evidently, in form at least, the work, not of Pitt, but of Dr. Johnson, who furnished the report to the *Gentleman's Magazine*. Probably Pitt did say something of the kind attributed to him, though even this is by no means certain in view of Johnson's repentant admission that he had often invented not merely the form but the substance of entire debates.

In 1742 Walpole was at last forced to succumb to the long-continued attacks of the opposition, and was succeeded as prime minister by the earl of Wilmington, though the real power in the new Government was divided between Carteret and the Pelhams. Pitt's conduct on the change of administration was open to grave censure. The relentless vindictiveness with which he insisted on the prosecution of Walpole, and supported the bill of indemnity to witnesses against the fallen minister, was in itself not magnanimous; but it appears positively unworthy when it is known that a short time before Pitt had offered, on certain conditions, to use all his influence in the other direction. Possibly he was embittered at the time by the fact that, owing to the strong personal dislike of the king, caused chiefly by the contemptuous tone in which he had spoken of Hanover, he did not by obtaining a place in the new ministry reap the fruits of the victory to which he had so largely contributed. The so-called "broad-bottom" administration formed by the Pelhams in 1744, after the dismissal of Carteret, though it included several of those with whom he had been accustomed to act, did not at first include Pitt himself even in a subordinate office. Before

the obstacle to his admission was overcome, he had received a remarkable accession to his private fortune. The eccentric duchess of Marlborough, dying in 1744, at the age of ninety, left him a legacy of £10,000 as an "acknowledgment of the noble defence he had made for the support of the laws of England and to prevent the ruin of his country." As her hatred was known to be at least as strong as her love, the legacy was probably as much a mark of her detestation of Walpole as of her admiration of Pitt. It may be mentioned here, though it does not come in chronological order, that Pitt was a second time the object of a form of acknowledgment of public virtue which few statesmen have had the fortune to receive even once. About twenty years after the Marlborough legacy, Sir William Pynsent, a Somersetshire baronet to whom he was personally quite unknown, left him his entire estate, worth about three thousand a year, in testimony of approval of his political career.

It was with no very good grace that the king at length consented to give Pitt a place in the Government, although the latter did all he could to ingratiate himself at court, by changing his tone on the questions on which he had made himself offensive. To force the matter, the Pelhams had to resign expressly on the question whether he should be admitted or not, and it was only after all other arrangements had proved impracticable, that they were reinstated with the obnoxious politician as vice-treasurer of Ireland. This was in February, 1746. In June of the same year he was promoted to the more important and lucrative office of paymaster-general, which gave him a place in the Privy Council, though not in the Cabinet. Here he had an opportunity of displaying his public spirit and integrity in a way that deeply impressed both the king and the country. It had been the usual practice of previous paymasters to appropriate to themselves the interest of all money lying in their hands by way of advance, and also to accept a commission of one-half per cent. on all foreign subsidies. Although there was no strong public sentiment against the practice, Pitt altogether refused to profit by it. All advances were lodged by him in the Bank of England until required, and all subsidies were paid over without deduction, even though it was pressed upon him, so that he did not draw a shilling from his office beyond the salary legally attaching to it. Conduct like this, though obviously disinterested, did not go without immediate and ample reward, in the public confidence which it created, and which formed the mainspring of Pitt's power as a statesman.

The administration formed in 1746 lasted without material change till 1754. It would appear from his published correspondence that Pitt had a greater influence in shaping its policy than his comparatively subordinate position would in itself have entitled him to. His conduct in supporting measures, such as the Spanish treaty and the Continental subsidies, which he had violently denounced when in opposition, had been much criticised. One of his biographers, Mr. Thackeray, takes the trouble to offer an elaborate defence of it; but the vindication is in part unnecessary, and in part unsatisfactory. Within certain limits, not indeed very well defined, inconsistency has never been counted a vice in an English statesman. The times change, and he is not blamed for changing with the times. Pitt in office, looking back on the commencement of his public life, might have used the plea "A good deal has happened since then," at least as justly as some others have done. Allowance must always be made for the restraints and responsibilities of office. In Pitt's case, too, it is to be borne in mind that the opposition with which he had acted gradually dwindled away, and that it ceased to have any organized existence after the death of the prince of Wales in 1751. Then in regard to the important question with Spain as to the right of search, Pitt has disarmed criticism by acknowledging that the course he followed during Walpole's administration was indefensible. All due weight being given to these various considerations, it must be admitted, nevertheless, that Pitt did overstep the limits within which inconsistency is usually regarded as venial. His one great object was first to gain office, and then to make his tenure of office secure by conciliating the favor of the king. The entire revolution which much of his policy underwent in order to effect this object bears too close a resemblance to the sudden and inexplicable changes of front habitual to placemen of the Tadpole stamp to be altogether pleasant to contemplate in a politician of pure aims and lofty ambition. Humiliating is not too strong a term to apply to a letter in which he expresses his desire to "efface the past by every action of his life," in order that he may stand well with the king.

In 1754 Henry Pelham died, and was succeeded at the head of affairs by his brother, the duke of Newcastle. To Pitt the change brought no advancement, and he had thus an opportunity of testing the truth of the description of his chief given by Sir Robert Walpole, "His name is treason." But there was for a time no open breach. Pitt continued at his post; and at the general election which took place during the year he even accepted a nomination for the duke's pocket borough of Aldborough. He had sat for Seaford since 1747. When Parliament met, however, he was not long in showing the state of his feelings. Ignoring Sir Thomas Robinson, the political nobody to whom Newcastle had entrusted the management of the Commons, he made frequent and vehement attacks on Newcastle himself, though still continuing to serve under him. In this strange state matters continued for about a year. At length, just after the meeting of Parliament in November, 1751, Pitt was dismissed from office, having on the debate on the address spoken at great length against a new system of Continental subsidies, proposed by the Government of which he was a member. Fox, who had just before been appointed Secretary of State, retained his place, and though the two men continued to be of the same party, and afterwards served again in the same Government, there was henceforward a rivalry between them, which makes the celebrated opposition of their illustrious sons seem like an inherited quarrel.

Another year had scarcely passed when Pitt was again in power. The inherent weakness of the Government, the vigor and eloquence of his opposition, and a series of military disasters abroad combined to rouse a public feeling of indignation which could not be withstood, and in December, 1756, Pitt, who now sat for Oakhampton, became Secretary of State, and leader of the Commons under the premiership of the duke of Devonshire. He had made it a condition of his joining any administration that Newcastle should be excluded from it, thus showing a resentment which, though natural enough, proved fatal to the lengthened existence of his Government. With the king unfriendly, and Newcastle, whose corrupt influence was still dominant in the Commons, estranged, it was impossible to carry on a Government by the aid of public opinion alone, however emphatically that might have declared itself on his side. In April, 1757, accordingly, he found himself again dismissed from office on account of his opposition to the king's favorite Continental policy. But the power that was insufficient to keep him in office was strong enough to make any arrangement that excluded him impracticable. The public voice spoke in a way that was not to be mistaken. Probably no English minister ever received in so short a time so many proofs of the confidence and admiration of the public, the capital and all the chief towns voting him addresses and the freedom of their corporations. From the political deadlock that ensued relief could only be had by an arrangement between Newcastle and Pitt. After some weeks' negotiation, in the course of which the firmness and moderation of "the Great Commoner," as he had come to be called, contrasted favorably with the characteristic tortuosities of the crafty peer, matters were settled on such a basis that, while Newcastle was the nominal, Pitt was the virtual head of the Government. On his acceptance of office he was chosen member for Bath.

This celebrated administration was formed in June, 1757, and continued in power till 1761. During the four years of its existence it has been usual to say that the biography of Pitt is the history of England, so thoroughly was he identified with the great events which make this period, in so far as the external relations of the country are concerned, one of the most glorious in her annals. A detailed account of these events belongs to history; all that is needed in a biography is to point out the extent to which Pitt's personal influence may really be traced in them. It is scarcely too much to say that, in the general opinion of his contemporaries, the whole glory of these years was due to his single genius; his alone was the mind that planned, and his the spirit that animated the brilliant achievements of the British arms in all the four quarters of the globe. Posterity, however, has taken the liberty of revising this enthusiastic verdict, and has placed his renown on what seems a truer and therefore a firmer basis. It has recognized

more fully than his contemporaries the independent genius of those who, as subordinates or allies, carried out his purposes. The heroism of Wolfe would have been irrepressible, Clive would have proved himself "a heaven-born general," and Frederick the Great would have written his name in history as one of the most skilful strategists the world has known, whoever had held the seals of office in England. But Pitt's relation to all three was such as to entitle him to a large share in the credit of their deeds. It was his discernment that selected Wolfe to lead the attack on Quebec, and gave him the opportunity of dying a victor on the heights of Abraham. He had personally less to do with the successes in India than with the other great enterprises that shed an undying lustre on his administration; but his generous praise in Parliament stimulated the genius of Clive, and the forces that acted at the close of the struggle were animated by his indomitable spirit. Frederick the Great's Seven Years' War might well have been another Thirty Years' War, if Pitt had not furnished him with an annual subsidy of £700,000, and in addition relieved him of the task of defending Western Germany against France.

Contemporary opinion was, of course, incompetent to estimate the permanent results gained for the country by the brilliant foreign policy of Pitt. It has long been generally agreed that by several of his most costly expeditions nothing was won but empty glory. It has even been said that the only permanent acquisition that England owes directly to him is her Canadian dominion; and strictly speaking, this is true, it being admitted that the campaign by which the Indian empire was virtually won was not planned by him, though brought to a successful issue during his ministry. But material aggrandizement, though the only tangible, is not the only real or lasting effect of a war policy. More may be gained by crushing a formidable rival than by conquering a province. The loss of her Canadian possessions was only one of a series of disasters suffered by France, which radically affected the future of Europe and the world. Deprived of her most valuable colonies both in the East and in the West, and thoroughly defeated on the Continent, her humiliation was the beginning of a new epoch in history. The victorious policy of Pitt destroyed the military prestige which repeated experience has shown to be in France as in no other country the very life of monarchy, and thus was not the least considerable of the many influences that slowly brought about the French Revolution. It effectually deprived her of the lead in the councils of Europe which she had hitherto arrogated to herself, and so has affected the whole course of Continental politics to the present time. It is such far-reaching results as these, and not the mere acquisition of a single colony, however valuable, that constitute Pitt's claim to be considered as on the whole the most powerful minister that ever guided the foreign policy of England.

The first and most important of a series of changes which ultimately led to the dissolution of the ministry was the death of George II. on the 25th October, 1760, and the accession of his grandson George III. The new king had, as was natural, new counsellors of his own, the chief of whom, Lord Bute, was at once admitted to the cabinet as a secretary of state. Between Bute and Pitt there speedily arose an occasion of serious difference. The existence of the so-called family compact by which the Bourbons of France and Spain bound themselves in an offensive alliance against England having been brought to light, Pitt urged that it should be met by an immediate declaration of war with Spain. To this course Bute would not consent, and as his refusal was endorsed by all his colleagues save Temple, Pitt had no choice but to leave a cabinet in which his advice on a vital question had been rejected. On his resignation, which took place in October, 1761, the king urged him to accept some signal mark of royal favor in the form most agreeable to himself. Accordingly he obtained a pension of £3000 a year for three lives, and his wife, Lady Hester Grenville, whom he had married in 1754, was created Baroness Chatham in her own right. In connection with the latter gracefully-bestowed honor it may be mentioned that Pitt's domestic life was a singularly happy one.

Pitt's spirit was too lofty to admit of his entering on any merely factious opposition to the Government he had quitted. On the contrary, his conduct after his retirement was distinguished by a moderation and disinterestedness which, as Burke has remarked, "set a seal upon his character." The war with Spain, in which he had urged the Cabinet to take the initiative, proved inevitable; but he scorned to use the occasion for "altercation and recrimination," and spoke in support of the Government measures for carrying on the war. To the preliminaries of the peace concluded in February, 1763, he offered an indignant resistance, considering the terms quite inadequate to the successes that had been gained by the country. When the treaty was discussed in Parliament in December of the preceding year, though suffering from a severe attack of gout, he was carried down to the house, and in a speech of three hours' duration, interrupted more than once by paroxysms of pain, he strongly protested against its various conditions. The physical cause which rendered this effort so painful probably accounts for the infrequency of his appearances in Parliament, as well as for much that is otherwise inexplicable in his subsequent conduct. In 1763 he spoke against the obnoxious tax on cider, imposed by his brother-in-law, George Grenville, and his opposition, though unsuccessful in the house, helped to keep alive his popularity with the country, which cordially hated the excise and all connected with it. When next year the question of general warrants was raised in connection with the case of Wilkes, Pitt vigorously maintained their illegality, thus defending at once the privileges of Parliament and the freedom of the press. During 1765 he seems to have been totally incapacitated for public business. In the following year he supported with great power the proposal of the Rockingham administration for the repeal of the American Stamp Act, arguing that it was unconstitutional to impose taxes upon the colonies. He thus endorsed the contention of the colonists on the ground of principle, while the majority of those who acted with him contented themselves with resisting the disastrous taxation scheme on the ground of expediency. The Repeal Act, indeed, was only passed *pari passu* with another censuring the American Assembly, and declaring the authority of the British Parliament over the colonies "in all cases whatever;" so that the House of Commons repudiated in the most formal manner the principle Pitt laid down. His language in approval of the resistance of the colonists was unusually bold, and perhaps no one but himself could have employed it with impunity at a time when the freedom of debate was only imperfectly conceded.

Pitt had not been long out of office when he was solicited to return to it, and the solicitations were more than once renewed. Unsuccessful overtures were made to him in 1763, and twice in 1765, in May and June,—the negotiator in May being the king's uncle, the duke of Cumberland, who went down in person to Hayes, Pitt's seat in Kent. It is known that he had the opportunity of joining the marquis of Rockingham's short-lived administration at any time on his own terms, and his conduct in declining an arrangement with that minister has been more generally condemned than any other step in his public life. Even Thackeray, his admiring biographer, has admitted that in this matter he was "neither kind as a man nor wise as a politician." In the autumn of 1766 Rockingham was dismissed, and Pitt was entrusted by the king with the task of forming a Government entirely on his own conditions. The result was a cabinet, strong much beyond the average in its individual members, but weak to powerlessness in the diversity of its composition. Burke, in a memorable passage of a memorable speech, has described this "chequered and speckled" administration with great humor, speaking of it as "indeed a very curious show, but utterly unsafe to touch and unsure to stand on." Pitt chose for himself the office of Lord Privy Seal, which necessitated his removal to the House of Lords; and he became Viscount Pitt and Earl of Chatham.

By the acceptance of a peerage the great commoner lost at least as much and as suddenly in popularity as he gained in dignity. One significant indication of this may be mentioned. In view of his probable accession to power, preparations were made in the city of London for a banquet and a general illumination to celebrate the event. But the celebration was at once countermanded when it was known that he had become earl of Chatham. The instantaneous revulsion of public feeling was somewhat unreasonable, for Pitt's health seems now to have been beyond doubt so shattered by his hereditary malady, that

he was already in old age though only fifty-eight. It was natural, therefore, that he should choose a sinecure office and the ease of the Lords. But a popular idol nearly always suffers by removal from immediate contact with the popular sympathy, be the motives for removal what they may.

One of the earliest acts of the new ministry was to lay an embargo upon corn, which was thought necessary in order to prevent a dearth resulting from the unprecedentedly bad harvest of 1766. The measure was strongly opposed, and Lord Chatham delivered his first speech in the House of Lords in support of it. It proved to be almost the only measure introduced by his Government in which he personally interested himself. His attention had been directed to the growing importance of the affairs of India, and there is evidence in his correspondence that he was meditating a comprehensive scheme for transferring much of the power of the company to the Crown, when he was withdrawn from public business in a manner that has always been regarded as somewhat mysterious. It may be questioned, indeed, whether even had his powers been unimpaired he could have carried out any decided policy on any question with a cabinet representing interests so various and conflicting; but, as it happened, he was incapacitated physically and mentally during nearly the whole period of his tenure of office. He scarcely ever saw any of his colleagues, though they repeatedly and urgently pressed for interviews with him, and even an offer from the king to visit him in person was declined, though in the language of profound and almost abject respect which always marked his communications with the court. It has been insinuated both by contemporary and by later critics that being disappointed at his loss of popularity, and convinced of the impossibility of co-operating with his colleagues, he exaggerated his malady as a pretext for the inaction that was forced upon him by circumstances. But there is no sufficient reason to doubt that he was really, as his friends represented, in a state that utterly unfitted him for business. He seems to have been freed for a time from the pangs of gout only to be afflicted with a species of mental alienation bordering on insanity. This is the most satisfactory, as it is the most obvious, explanation of his utter indifference in presence of one of the most momentous problems that ever pressed for solution on an English statesman. Those who are able to read the history in the light of what occurred later may perhaps be convinced that no policy whatever initiated after 1766 could have prevented or even materially delayed the declaration of American independence; but to the politicians of that time the coming event had not yet cast so dark a shadow before as to paralyze all action, and if any man could have allayed the growing discontent of the colonists and prevented the ultimate dismemberment of the empire, it would have been Lord Chatham. The fact that he not only did nothing to remove existing difficulties, but remained passive while his colleagues took the fatal step which led directly to separation, is in itself clear proof of his entire incapacity. The imposition of the import duty on tea and other commodities was the project of Charles Townshend, and was carried into effect in 1767 without consultation with Lord Chatham, if not in opposition to his wishes. It is probably the most singular thing in connection with this singular administration, that its most pregnant measure should thus have been one directly opposed to the well-known principles of its head.

For many months things remained in the curious position that he who was understood to be the head of the cabinet had as little share in the government of the country as an unenfranchised peasant. As the chief could not or would not lead, the subordinates naturally chose their own paths and not his. The lines of Chatham's policy were abandoned in other cases besides the imposition of the import duty; his opponents were taken into confidence; and friends, such as Amherst and Shelburne, were dismissed from their posts. When at length in October, 1768, he tendered his resignation on the ground of shattered health, he did not fail to mention the dismissal of Amherst and Shelburne as a personal grievance.

Soon after his resignation a renewed attack of gout freed Chatham from the mental disease under which he had so long suffered. He had been nearly two years and a half in seclusion when, in July, 1769, he again appeared in public at a royal levee. It was not, however, until 1770 that he resumed his seat in the House of Lords. He had now almost no personal following, mainly owing to the grave mistake he had made in not forming an alliance with the Rockingham party. But his eloquence was as powerful as ever, and all its power was directed against the Government policy in the contest with America, which had become the question of all-absorbing interest. His last appearance in the House of Lords was on the 2d April, 1778, on the occasion of the duke of Richmond's motion for an address praying the king to conclude peace with America on any terms. In view of the hostile demonstrations of France the various parties had come generally to see the necessity of such a measure. But Chatham could not brook the thought of a step which implied submission to the "natural enemy" whom it had been the main object of his life to humble, and he declaimed for a considerable time, though with sadly diminished vigor, against the motion. After the duke of Richmond had replied, he rose again excitedly as if to speak, pressed his hand upon his breast, and fell down in a fit. He was removed to his seat at Hayes, where he died on the 11th May. With graceful unanimity all parties combined to show their sense of the national loss. The Commons presented an address to the king praying that the deceased statesman might be buried with the honors of a public funeral, and voted a sum for a public monument which was erected over his grave in Westminster Abbey. Soon after the funeral a bill was passed bestowing a pension of £4000 a year on his successors in the earldom. He had a family of three sons and two daughters, of whom the second son, William, was destined to add fresh lustre to a name which is one of the greatest in the history of England.

Dr. Johnson is reported to have said that "Walpole was a minister given by the king to the people, but Pitt was a minister given by the people to the king," and the remark correctly indicates Chatham's distinctive place among English statesmen. He was the first minister whose main strength lay in the support of the nation at large as distinct from its representatives in the Commons, where his personal following was always small. He was the first to discern that public opinion, though generally slow to form and slow to act, is in the end the paramount power in the state; and he was the first to use it not in an emergency merely, but throughout a whole political career. He marks the commencement of that vast change in the movement of English politics by which it has come about that the sentiment of the great mass of the people now tells effectively on the action of the Government from day to day,—almost from hour to hour. He was well fitted to secure the sympathy and admiration of his countrymen, for his virtues and his failings were alike English. He was often inconsistent, he was generally intractable and overbearing, and he was always pompous and affected to a degree which, Macaulay has remarked, seems scarcely compatible with true greatness. Of the last quality evidence is furnished in the stilted style of his letters, and in the fact recorded by Seward that he never permitted his under-secretaries to sit in his presence. Burke speaks of "some significant, pompous, creeping, explanatory, ambiguous matter, in the true Chathamic style." But these defects were known only to the inner circle of his associates. To the outside public he was endeared as a statesman who could do or suffer "nothing base," and who had the rare power of transfusing his own indomitable energy and courage into all who served under him. "A spirited foreign policy" has always been popular in England, and Pitt was the most popular of English ministers, because he was the most successful exponent of such a policy. In domestic affairs his influence was small and almost entirely indirect. He himself confessed his unfitness for dealing with questions of finance. The commercial prosperity that was produced by his war policy was in a great part delusive, as prosperity so produced must always be, though it had permanent effects of the highest moment in the rise of such centres of industry as Glasgow. This, however, was a remote result which he could have neither intended nor foreseen. More directly attributable to him was the policy which led to the pacification of the Highlands of Scotland. With the happy instinct of a chivalrous mind he advised the formation of the Highland regiments, and so succeeded in transforming high-spirited though mistaken rebels into the bravest and most loyal soldiers of the British crown.

See *A History of the Right Hon. William Pitt, Earl of Chatham* (2 vols. 4to, 1827), by the Rev. Francis Thackeray; *Cor-*

respondence of William Pitt, Earl of Chatham (4 vols. 8vo, 1838–40); and Almon's *Anecdotes of Chatham, with his Speeches in Parliament* (2 vols. 4to, 1792). A volume of Pitt's letters to his nephew, Thomas Pitt, Lord Camelford, was published in 1804. (W. B. S.)

CHATHAM ISLANDS, a group in the Pacific, 560 miles east of New Zealand, lying between 43° 40′ and 45′ 20′ S. lat., and between 176° 10′ and 177° 20′ W. long. It consists of three islands, a large one called Wari-Kauri, or Chatham Island, a smaller one, Rangi-Haute, or Pitt's Island, and a third, Rangatira, or South-east Island. There are also several small rocky islets. Chatham Island, according to Dieffenbach, contains an area of 305,280 acres; of which, however, 57,600 acres are lakes and lagoons. In the centre is a large brackish lake called Tewanga, about 25 miles long and 6 or 7 broad, which at the southern end is separated from the sea by a sandbank only 150 yards wide, which it occasionally bursts through. The southern part of the island has an undulating surface, and is covered either with an open forest or with high ferns. In general the soil is extremely fertile, and where it is naturally drained, a rich vegetation of fern and flax (*Phormium tenax*) has sprung up, giving firmness to the soil and yielding a rich harvest to the planter. On the north-west are three or four conical hills of basalt, which are surrounded by oases of fertile soil. On the western side is Petre Bay, 40 miles across, on which, at the mouth of the River Mangatu, is Waitangi, the principal settlement. The country to the east of the great lagoon is quite flat, and is scarcely 50 feet above the sea-level. The climate is very mild, in winter varying only from 45° to 60°. The changes of temperature are less sudden than in New Zealand. The inhabitants cultivate potatoes, turnips, cabbages, taro (esculent arum), tobacco, and pumpkins. The trees and shrubs resemble those of New Zealand, but the former are of very small size. Horses and cattle are bred in considerable numbers for the New Zealand market. Birds of many kinds, chiefly ducks, snipes, plovers, curlews, redbills, sandlarks, and parroquets, abound. Fish are plentiful on the coast, and whaling is actively prosecuted all round the group. Pitt's Island is about 12 miles long and 8 broad; it has no harbor. These islands were discovered in 1791 by Lieutenant Broughton, who gave them the name of Chatham from the brig which he commanded. The natives, who are known as Morioris or Maiorioris, were conquered in 1832–33 by the Maoris of New Zealand, who killed great numbers of them, and in 1839 half of those left died of an epidemic of influenza. Their numbers have been reduced from 1500 to 140, and they are now a feeble and degenerate race. The geology and the flora and fauna of the islands indicate their physical connection with New Zealand, to which politically they belong.

CHÂTILLON-SUR-SEINE, a town of France, formerly the capital of the Pays de la Montagne or Country of the Mountain, in Burgundy, and now at the head of an arrondissement in the department of Côte d'Or, is situated about 40 miles south-west of Troyes on the Upper Seine. It is built on both sides of the river, and formerly consisted of two distinct portions known as Chaumont and Bourg, each with its own fortifications. It is the seat of a court of primary instance, and possesses the ruins of a magnificent castle, a hospital, a town-house, a communal college, a public library, and some fine promenades. The church of St. Vorle dates from the 12th century, and contains a number of frescoes included among the historic monuments of France. Marshal Marmont, duke of Ragusa, who was born in the town in 1774, has left a memento in the shape of a handsome château. A considerable trade is maintained by Châtillon in timber, wool, leather, and lithographic stones; and it has cloth-factories, paper-mills, foundries, flour-mills, and various other industrial establishments. The origin of the town probably dates from the 5th century. For several centuries it was a favorite residence of the dukes of Burgundy. In modern times it is mainly remarkable for the conference held, in February, 1814, between Napoleon and the Allies, in which the former rejected the proposal that he should rule over the France of pre-Revolutionary limits. Population in 1872, 4691.

CHATSWORTH, the seat of the duke of Devonshire, one of the most splendid private residences in England, is situated in Derbyshire, on the River Derwent, 3½ miles north-east of the village of Bakewell, and 8 miles west of the town of Chesterfield. It stands on the left bank of the river, opposite the hamlet of Edensor, and as seen from the west presents a magnificent façade in fine relief against the wooded ridge of Bunker's Hill. The building is in the Ionic style, and the principal part is composed of four nearly equal sides, surrounding an open quadraugular court with a fountain in the centre. A wing and other somewhat extensive additions have been made since 1820. Chatsworth contains some beautiful wood carvings by Gibbons and Watson, several pieces of sculpture by Canova, Thorwaldsen, Chantrey, and Wyatt, and a unique collection of original drawings by Titian, Rubens, Salvator Rosa, Raphael, Claude Lorraine, and others of the older masters. The park is upwards of 11 miles in circuit; the gardens are among the most celebrated in the kingdom, and cover an area of twelve acres. The grand conservatory, an acre in extent, erected by Sir Joseph Paxton, is unequalled by any in Europe; and the waterworks, which include one fountain with a jet 260 feet high, are only surpassed by those of Versailles. The domain of Chatsworth is mentioned in *Domesday Book* as Chetesvorde. In the 16th century it was purchased by Sir William Cavendish. The mansion which he erected afterwards served as a place of confinement for Mary Queen of Scots from 1570 to 1581. It has entirely disappeared; and the present building was commenced in 1688 by the first duke of Devonshire, and was completed in 1840 by the seventh.

CHATTANOOGA, a city of the United States, in the county of Hamilton, Tennessee, about 250 miles by water from Knoxville, at the foot of Lookout Mountain, on the left bank of the Tennessee river, which is navigable for steamers during eight months of the year. It has free communication by four railway lines, and carries on a pretty extensive trade in the produce of the surrounding district, which is well supplied with timber, iron-ore, and coal. Among its industrial establishments are saw-mills and wood-work factories. In 1863 the Confederates were defeated here by the Federal forces under General Grant. Population in 1870, 6093, of whom 2221 were colored.

CHATTERTON, Thomas (1752–1770). Among the poets of the 18th century, Thomas Chatterton occupies a place altogether unique. He indeed claims scarcely less the interest of the psychologist as a marvellous example of matured intellectual precocity, than that of the student of English literature as a poet remarkable in an age of varied literary excellence. Fully to estimate the characteristics in which Chatterton stands out with such exceptional prominence, it has to be kept constantly in view that he was a posthumous child, the son of a poor widow, self-taught in all but the merest rudiments of education acquired at a charity school; that, so far from receiving encouragement, he was thwarted at every step in his strange, brief career; and that he was buried by strangers, in a pauper's grave, when only seventeen years of age.

Born though Chatterton was in a humble rank of life, his pedigree has a curious significance. The office of sexton of St. Mary Redcliffe, at Bristol, one of the most beautiful specimens of parochial church architecture in England, had been transmitted for nearly two centuries in the Chatterton family; and throughout the brief life of the poet it was held by his uncle, Richard Phillips. The poet's father—the first of the Chattertons who aspired to a position requiring education and natural ability—was a musical genius, somewhat of a poet, an antiquary, and a dabbler in occult arts. He was one of the subchanters of Bristol Cathedral, and master of the Pyle Street Free School in the vicinity of Redcliffe church. But whatever hereditary tendencies may have been transmitted from the father, the sole training of the boy necessarily devolved on his mother, who was in the fourth month of her widowhood at the time of his birth (20th November, 1752).

The young widow established a girls' school, took in sewing and ornamental needlework, and so brought up her two children, a girl and boy, till the latter attained his eighth year, when he was admitted to Colston's Charity. But the Bristol blue-coat school had little share in the education of its marvellous pupil. The hereditary race of sextons had come to regard the church of St. Mary Redcliffe as their own peculiar domain; and, under the guidance of his uncle, the orphan child found there his favorite haunt. The knights, ecclesiastics, and civic dignitaries, recumbent on its altar tombs, became his familiar associates.

and by and by, when he was able to spell his way through the inscriptions graven on their monuments, he found a fresh interest in certain quaint oaken chests in the muniment room over the porch on the north side of the nave, where parchment deeds, old as the Wars of the Roses, long lay unheeded and forgotten. His father, the schoolmaster, had already made free with them for wrappers to his copy books; his mother turned them to account for thread papers and patterns; and they formed the child's playthings almost from his cradle. He learned his first letters from the illuminated capitals of an old musical folio, and turned to account deeds and charters of the Henrys and Edwards as his primers. Wayward, as it seems, almost from his earliest years, and manifesting no sympathy with the ordinary pastimes of children, he was regarded for a time as deficient in intellect. But he was even then ambitious of distinction. One of his sister's earliest recollections of him was his thirst for pre-eminence. He was confident in his own resources, and while still little more than a child was wont to say that a man might do anything he chose. But from his earliest years he was liable to fits of abstraction, sitting for hours in seeming stupor, or yielding after a time to tears, for which he would assign no reason. He had no one near him to sympathize in the strange world of fancy which his imagination had already called into being, or to feel any interest in the wonderful productions of his pen, which ere long were the fruits of such musings.

The influence of this lack of appreciative sympathy, along with the suspicions which his incomprehensible love of solitude excited, helped to foster his natural reserve, and beget that love of mystery which exercised so great an influence on the development of his genius. When the strange child had attained his sixth year his mother began to recognize his capacity; at eight he was so eager for books that when unrestrained he would read from an early hour till bed-time; and by the time he reached his eleventh year he had become a contributor to *Felix Farley's Bristol Journal*. A beautiful cross of curious workmanship had adorned the churchyard of St. Mary Redcliffe for upwards of three centuries, until, in 1763, it became an object of offence to an over zealous churchwarden, and was swept away. The spirit of veneration was strong in the boy; and taking up his pen, he sent to the local journal a clever satire on the parish Vandal. Other juvenile productions followed, characteristic of the precocity of their author; and under various disguises he sported with the satiric muse, or in graver mood strove to awake some reverence for the past in the unsympathetic community amid which his lot was cast. He had a bold independent bearing; and except during his fits of reverie, he was frank and companionable, and manifested a special fondness for female society. But his delight was to lock himself in a little attic which he had appropriated as his study, and there, with books, parchments, and drawing materials, the child already dallied with the muse, and began the strange literary maskings on which his fame depends.

On the 3d of August, 1760, when in his eighth year, Chatterton was admitted to all the privileges of Colston's Hospital. This charity is popularly styled the Blue-coat School of Bristol, and as such has been referred to as an institution of a similar character to that of Christ's Hospital, London. But except in the quaint, half-monkish garb of its inmates, Colston's Hospital bore little resemblance to the foundation where Barnes and Markland acquired their scholarship, and Lamb and Coleridge found culture for their genius. The "great house on St. Augustine's Back," which had been converted to the use of Colston's Charity, was a fine civic mansion erected in Tudor times on the site of a dissolved house of Friars Carmelites. Queen Elizabeth had held court there in 1581; and when the Stuarts succeeded to the Tudors, its hospitalities had been exercised by Sire Ferdinand Gorges, one of the merchant princes of the old seaport. But though Edward Colston, as the representative of a line of merchant adventurers who had flourished in Bristol in the reign of Edward III., no less deserved that title, the civic mansion when transferred to his care rather resembled the dwelling of the older friars, except in its lack of their redeeming feature of monkish learning. Bristol had its grammar school, with liberal endowments and university exhibitions, for the sons of its more favored citizens. But the rules of Colston's Hospital provided for the training of its inmates in "the principles of the Christian religion, as laid down in the church catechism," and in fitting them to be apprenticed in due course to some trade. But Chatterton was too young, as yet, to comprehend the difference between the two schools. He was thirsting for knowledge, and was greatly elated at his election on the foundation, "thinking," as his foster-mother said, "that he should there get all the learning he wanted." But he speedily discovered that its meagre curriculum was inadequate to his cravings, and he indignantly complained that he could not learn so much as at home.

Chatterton remained an inmate of Colston's Hospital for upwards of six years, learning little more than the most ordinary elements of a common school education; and its chief value was that it lightened to his poor mother the burden of his maintenance. Some influences, however, of a more congenial character are traceable to the friendly sympathy of one of its ushers. Thomas Phillips, himself a writer of verse, strove to excite a spirit of emulation among the older of his pupils, and found in Chatterton a response to his appeal. Three of his companions are named along with him, as youths whom Phillips's taste for poetry stimulated to rivalry, and ere long enlisted among the contributors to *Felix Farley's Journal*. But Chatterton had already conceived more daring literary adventures; and it was while still an inmate of Colston's Charity that he essayed on Phillips his first serious attempt to pass off verses of his own as the production of a poet of the 15th century. Except, indeed, in the immaturity and inexperience inseparable from his years, Chatterton was the superior of those to whose society he was limited, and was in all essential respects his own teacher. His little pocket-money was spent in borrowing books from a circulating library; and he early ingratiated himself with book collectors, by whose aid he found access to Weever, Dugdale, and Collins, as well as to Chaucer, Spenser, and other writers strangely out of the line of reading of a charity boy, or indeed of any boy of his age. His holidays were mostly spent at his mother's house; and much of them in the favorite retreat of his attic study there. He had already conceived the romance of an imaginary monk of the 15th century, and lived for the most part in an ideal world of his own, relegated to that elder time when Edward IV. was England's king, and Master William Canynge—familiar to him among the recumbent effigies in Redcliffe church—still ruled in Bristol's civic chair. "The Storie of William Canynge," a poem of great beauty which constitutes one of the shorter pieces of his ingenious romance, represents the bard endowed by Truth, a heavenly maid, with divine insight, and so translated to those elder times, and that more real poetic life, in which Chatterton had revelled from his own childhood:—

> "Straight was I carried back to times of yore,
> Whilst Canynge swathed yet in fleshly bed,
> And saw all actions which had been before,
> And all the scroll of Fate unravelled;
> And when the fate-marked babe acome to sight,
> I saw him eager gasping after light.
> In all his simple gambols and child's play,
> In every merry-making, fair, or wake,
> I kenn'd a perpled light of wisdom's ray;
> He ate down learning with the wastel-cake;
> As wise as any of the aldermen,
> He'd wit enow to make a mayor at ten."

This beautiful picture of the childhood of the ideal patron of Rowley is in reality that of the poet himself,—"the fate-marked babe," with his wondrous child-genius, and all his romantic dreams realized. The first lines are, indeed, referred to by Mr. Skeat, in his annotated edition of the poems, as "clearly an oversight," in which the poet writes in his own person and modern character, and so introduces "an unconscious admission of forgery." The literary masquerade which thus constituted the life-dream of the boy was wrought out by him with marvellous consistency into a coherent romance, until the credulous scholars and antiquaries of his day were persuaded into the belief that there had lain in the parish chest of Redcliffe church for upwards of three centuries, a collection of poems of rare merit, the work of Thomas Rowley, an unknown priest of Bristol in the days of Henry VI. and his poet laureate, John Lydgate.

Among the Bristol patrons of Chatterton, Mr. George Catcott and Henry Burgum, his partner in their trade as pewterers, occupy a prominent place. The former was one of the most zealous accreditors of Rowley, the imaginary

priest and poet of the times of the Roses, and continued to collect his reputed writings long after the death of their real author. The credulity of the other was subjected to a more severe test. He had come from Gloucestershire to Bristol, a poor friendless boy, and himself owed to one of Colston's charities his first start in life. He had risen, mainly by his own exertions, to the position of a successful tradesman, and gave full license to the vanity with which he asserted the claims of his new position. On him, accordingly, the blue-coat boy palmed off the De Bergham pedigree, and other equally apocryphal evidences of the pewterer's descent from an ancestry old as the Norman Conquest. The De Bergham quarterings, blazoned on a piece of parchment doubtless recovered from the Redcliffe muniment chest, was itself supposed to have lain for centuries in that ancient depository. The pedigree was professedly collected by Chatterton from original records, including the "Rowley MSS." Into this he introduced an ingenious romance of one of the pewterer's ancestors, who was also a metallurgist, though after a more dignified fashion. According to this the De Bergham of that elder time obtained from Henry VI. a royal patent to play the alchemist, and so to transmute pewter and other base metals into gold. He left issue four sons, one of whom figures as "Edward Asheton of Chatterton, in Com. Lanc. in the right of his wife, the daughter and heiress of Radcliffe de Chatterton of Chatterton, the heir general of many families." The pedigree still exists in Chatterton's own handwriting, copied into a book in which he had previously transcribed portions of antique verse, under the title of "Poems by Thomas Rowley, priest of St. John's, in the city of Bristol;" and in one of these, "The Tournament," Syrr Johan de Berghamme plays a conspicuous part. The ennobled pewterer rewarded Chatterton with five shillings, and was satirized for this valuation of a noble pedigree in some of his latest verse. The pedigree and all its accessories are crude enough; but as the production of a boy not fourteen years of age, whose whole education had been acquired in a charity school, it is a remarkable evidence of precocity.

On the 1st of July, 1767, before he had completed the seventh year of his residence in Colston's Hospital, Chatterton was transferred to the office of Mr. John Lambert, attorney, to whom he was bound apprentice as a clerk. There he was left much alone; and after fulfilling the routine duties devolving on him, he found leisure for his own favorite pursuits. An ancient stone bridge on the Avon, built in the reign of Henry II., and altered by many later additions into a singularly picturesque but inconvenient thoroughfare, had been displaced by a structure better adapted to modern requirements. In the month of September, 1768, when Chatterton was in the second year of his apprenticeship, the new bridge was partially opened for traffic. Shortly afterwards the editor of *Felix Farley's Journal* received from a correspondent, signing himself *Dunelmus Bristoliensis*, a "description of the mayor's first passing over the old bridge," professedly derived from an ancient MS. Mr. William Barrett, F.S.A., surgeon and antiquary, who was then accumulating materials for a history of Bristol, secured the original manuscript, which is now preserved in the British Museum, along with other Chatterton MSS., most of which were ultimately incorporated by the credulous antiquary into a learned quarto volume, entitled the *History and Antiquities of the City of Bristol*, published nearly twenty years after the poet's death.

The publication of the description of the ancient opening of the bridge naturally excited inquiry; for the picturesque narrative acquired a suitable flavor of antiquity, without being too much obscured for the general reader, by its archaic language and spelling; and so a desire was manifested to trace it to its source. Chatterton was ere long recognized as a contributor, on presenting himself at the office of the *Bristol Journal* with another of his productions; and then it was that the definite story made its appearance—over which critics and antiquaries wrangled for nearly a century—of numerous ancient poems and other MSS. taken by the elder Chatterton from a coffer in the muniment room of Redcliffe church, and transcribed, and so rescued from oblivion, by his son.

The dream of the boy-poet was of an age devoid of all the sordid meanness of his own, and of a patron of the muses generous as the ideal Canynge of his romance. Living in this imaginary world he continued to invent, and ascribe to the authorship of the good priest Thomas Rowley, dramatic, lyrical, and descriptive poems, along with letters, fragments of local or general history, and other miscellaneous productions in prose, nearly all of them pertaining to the Romance of Rowley and Master Canynge, the old citizen and mayor of Bristol. With a persistent coherence to this ideal, which he had formed in his own mind while still a mere child, Chatterton produced nearly all the marvellous literary creations on which his fame depends. In the interval between his first-known antique ballad, the "Elinoure and Juga," written while still an inmate of Colston's Hospital, and his leaving Bristol at the age of seventeen, his pieces include the "Bristowe Tragedy," another and longer ballad; his "Ælla, a Tragycal Interlude," as he styles it, but in reality a dramatic poem of sustained power and curious originality of structure; his "Goddwyn," another dramatic poem; his "Tournament," "Battle of Hastings," "The Parliament of Sprites," with numerous smaller pieces of antique verse—forming altogether a goodly volume of poetry, the rare merit of which is indisputable, wholly apart from the fact that it was the production of a mere boy.

Yet this only partially illustrates the fertility of his genius. During the same period he had thrown off numerous lyrics, and had given vent to his satirical humor in several lengthened poems, which, though for the most part inferior in merit to his antique verse, would excite wonder as the sole productions of any boy of his age. But the authorship even of those modern poems was rarely avowed. The habit of secretiveness grew ere long into a love of mystery, which ultimately proved prejudicial to the boy. Unfortunately for him his ingenious romance had either to be acknowledged as his own creation, and so in all probability be treated with contempt, or it had to be sustained by the manufacture of spurious antiques. To this accordingly Chatterton resorted, and found no difficulty in gulling the most learned of his credulous dupes with his parchments.

The literary labors of the boy, though diligently pursued at his desk, were not allowed to interfere with the duties of Mr. Lambert's office. Nevertheless such a mode of employing any portion of his time was peculiarly distasteful to the Bristol attorney. He was wont to search his apprentice's drawer, and to tear up any poems or other manuscripts that he could lay his hands upon; so that it was only during the absences of Mr. Lambert from Bristol that he was able to expend his unemployed time in his favorite pursuits. But repeated allusions, both by Chatterton and others, seem to indicate that such intervals of freedom were of frequent occurrence. Then he could finish his average two hours of legitimate office work, attend to whatever other duties devolved upon him, and thereafter betake himself to song or satire, or abandon himself to the romance of that antique world in which his pleasantest hours were passed.

But such intervals of freedom only tended to increase his dislike for the restraints of office-life under his master's eye. In every changing mood of mind he was prone to seek relief in his pen;—yielding at times to earnest thought, and giving lyrical form to his religious feelings and convictions; at other times giving freest scope to his satirical humor, and subjecting all who came within its range to ridicule or scornful invective; or again, lapsing into romantic reverie, and revelling in the creations of his antique muse. Some of his modern poems, such as the piece entitled "Resignation," are of great beauty; and these, with the satires, in which he took his revenge on all the local celebrities whose vanity or meanness had excited his ire, are alone sufficient to fill a volume. The Catcotts, Burgum, Barrett, and others of his patrons, figure in these satires, in imprudent yet discriminating caricature, along with mayor, aldermen, bishop, dean, and other notabilities of Bristol. But such satirical sallies were the mere sportive effusions of the boy, in which he thoughtlessly exposed even the foibles of his friends. Towards Lambert his feelings were of too keen a nature to find relief in such sarcasm. When he does give utterance to them, it is with a bitter sense of one deeply wronged. Doubtless the abilities of the attorney's clerk were widely different from what he had bargained for; but it is obvious that the boy whom he had received into his house was regarded by him with no more sympathy than any transient menial who drudged for hire. At length, in 1770, Chatterton's connection with Lambert was brought to an abrupt close. Thus far the muse had rewarded him only by the pleasure of secret hours spent in her service. The very appreciation of his antique poems by the few to whom they had been communicated was accompanied by an utter ignoring of any capacity on the part of their real author; and every attempt to win recognition of his merits only subjected him to fresh slights. The ambition to be able to hold his place among his companions, in dress, and in the pastimes suited to their age, made him increasingly sensitive to his menial position, and tempted him to look to his pen for other returns than the pleasure derived from his romantic dream. Mr. Cottle gives an extract from a letter written about this time, in which he curses the Muses, exclaiming, "I abominate them and their works. They are the nurses of poverty and insanity."

As the boy began to realize the practical necessities of life, and indulge in dreams of fame and fortune consequent on the recognition of his merits, he resolved to attempt the introduction of Rowley to the world. Accordingly in December, 1768, while still only entering on his seventeenth year, he wrote to Dodsley, the London publisher, stating his ability to procure for him "copies of several ancient poems, and an interlude, perhaps the oldest dramatic piece extant, wrote by one Rowley, a priest in Bristol, who lived in the reigns of Henry VI. and Edward IV." To this letter he appended the initials of his favorite pseudonym, *Dunelmus Bristoliensis*, but directed the answer to be sent to the care of Thomas Chatterton, Redcliffe Hill, Bristol. To this, as well as to another letter enclosing an extract from the tragedy of "Ælla," no answer appears to have been returned. The diplomacy of the romancer was only too characteristic of his inexperience; though we have a hint in the second letter of another and perhaps more practical idea for the publication of his antique drama. "If it should not suit you, I should be obliged to you if you would calculate the expense of printing it, as I will endeavor to publish it by subscription on my own account."

In the Rowley romance, Chatterton pictures the old poet as the chaplain and confidential friend of Master Canynge, mayor of Bristol, builder of the church of St. Mary on Redcliffe Hill, and patron of all liberal arts,—who rejoiced in gathering round him a group of poets, and making them the sharers of his bounty. Rowley sends to him his verses from time to time, ever sure of some liberal acknowledgment in return; and Master Canynge supplies him with funds that he may expend them in travelling and collecting manuscripts for his library. Dean Milles, President of the Society of Antiquaries, and one of the most zealous maintainers of the genuineness of the imaginary Rowley, describes the old mayor and his literary associates as a parallel to Mæcenas with his three friends, Virgil, Horace, and Varus. No wonder, therefore, that Chatterton, conceiving the idea of finding sympathy and aid at the hand of some modern Canynge, bethought him of Horace Walpole, subsequently fourth earl of Orford. This patrician virtuoso loved to dally with the muses, and had made art and letters the business of his life. He professed extreme social liberalism, and not only indulged in a mediæval renaissance of his own, but was the reputed author of the *Castle of Otranto*, a spurious antique of times akin to those in which Chatterton had in like fashion delighted to revel. From the point of view of the inexperienced youth, the idea of finding in Walpole the patron of whom he dreamt was by no means an extravagant one. He accordingly addressed a letter to him, giving him an account of the Rowley poems and other MSS. as genuine antiques of the fifteenth century, and enclosing, as a specimen, a brief poem on Richard I.—probably his Eclogue styled "Nygelle," which extends to eight stanzas. To this Walpole replied with courteous acknowledgments. He characterized the verses as "wonderful for their harmony and spirit," and added, "Give me leave to ask you where Rowley's poems are to be had? I should not be sorry to print them; or at least a specimen of them, if they have never been printed." The courtesy of his correspondent tempted the poor boy to a more unreserved communication. He replied, enclosing additional specimens of antique verse, and telling Walpole that he was the son of a poor widow, and clerk to an attorney, but had a taste for more refined studies, and hinted a wish that he might help him to some more congenial occupation. Walpole's manner underwent an abrupt change. The specimens of verse had been submitted to his friends Gray and Mason, the poets, and pronounced modern. They did not thereby forfeit the wonderful harmony and spirit which Walpole had already professed to recognize in them. But he now coldly replied, advising the boy to stick to the attorney's office; and "when he should have made a fortune," he might betake himself to more favorite studies.

Walpole has been loaded with more than his just share of responsibility for the fate of the unhappy poet. That he shut his eyes to the merits of the wonderful poems sent to him by a boy of sixteen, and dwelling alone on the mystification with which they were palmed on him as genuine antiques, returned them to their author and thought no more about them, is what hundreds would do in like circumstances. Yet the literary fraud was no more than he himself had practised in his *Castle of Otranto*; and all the fame which he so greedily coveted was as nothing, compared with what he might have made his own, had he befriended the boy, of whom he admitted when too late, "I do not believe there ever existed so masterly a genius."

Chatterton now abandoned the antique muse, turned his attention to periodical literature and the politics of the day, and exchanged *Felix Farley's Bristol Journal* for the *Town and Country Magazine* and other London periodicals. Assuming the vein of Junius—then in the full blaze of his triumph—he turned his pen against the duke of Grafton, the earl of Bute, and the princess of Wales. It was while thus busied with politics and modern satire, that another and very different production was penned, which, whether written in jest or earnest, brought his Bristol career abruptly to a close. He had just despatched one of his political diatribes to the *Middlesex Journal*, when he sat down on Easter Eve, 17th April, 1770, and penned his "Last Will and Testament," a strange satirical compound of jest and earnest, in which he intimated his intention of putting an end to his life the following evening. Among his satirical bequests, such as his "humility" to the Rev. Mr. Camplin, his "religion" to Dean Barton, and his "modesty" along with his "prosody and grammar" to Mr. Burgum, he leaves "to Bristol all his spirit and disinterestedness, parcels of goods unknown on its quay since the days of Canynge and Rowley." In more genuine earnestness he recalls the name of Mr. Clayfield, a friend to whom he owed intelligent sympathy, and leaves to him "the sincerest thanks my gratitude can give,"—adding, with grave humor, the bequest of a full valuation to be paid to Mr. Clayfield, as his executor, of "whatever any person may think the pleasure of reading my works worth." According to his foster-mother's account, the will was purposely prepared in order to frighten his master into letting him go. If so, it had the desired effect. Lambert cancelled his indentures; his friends and acquaintances made him up a purse; and so, with light heart, and a bundle of manuscripts of rare worth by which he still fondly hoped that his fortune was to be achieved, he set forth, at the age of seventeen, to play his brief part as a man of letters in the great metropolis.

Chatterton was already known to the readers of the *Middlesex Journal* as a rival of Junius, under the *non de plume* of Decimus. He had also been a contributor to Hamilton's *Town and Country Magazine*, and speedily found access to the *Freeholder's Magazine*, another political miscellany strong for Wilkes and liberty. His contributions were freely accepted; and the sanguine youth flattered himself that his position was already established, and his fortune sure. He wrote accordingly in the most hopeful terms to his mother and sister, and spent the first money received by him in purchasing acceptable gifts for both. His pride and ambition were amply gratified by the promises and interested flattery of editors and political adventurers; Wilkes himself had noted his trenchant style, "and expressed a desire to know the author;" and Lord Mayor Beckford graciously acknowledged a political address of his, and greeted him "as politely as a citizen could." But of actual money he received but little. He was not only frugal, but abstemious, while he flattered himself with dreams of coming triumphs and ample recompense. His diligence was great, and his versatility wonderful. He could assume the style of Junius or Smollett, reproduce the satiric bitterness of Churchill, parody Macpherson's Ossian, or in graver mood ape the rhythmical niceties of Pope, or the polished grace of Gray and Collins. He wrote political letters, eclogues, lyrics, operas, and satires, both in prose and verse. He played in all ways the versatile mocking-bird, while still planning the resumption of his antique romance, with the hope of winning thereby not only fortune but enduring fame.

In the month of June, 1770—after Chatterton had been some nine weeks in London—he removed from Shoreditch, where he had hitherto lodged with a relative, to an attic in Brook Street, Holborn. His busy pen had dashed off songs, pasquinades, a burletta, an oratorio, satirical sketches, and political articles enough to fill more than one month's magazine. But for most of these the payment was delayed; and now state prosecutions of the press rendered letters in the Junius vein no longer admissible, and threw him back on the lighter resources of his pen. In Shoreditch, as in his lodgings at the Bristol attorney's, he had only shared a room; but now, for the first time, in his new lodgings, he enjoyed the delights of uninterrupted solitude. His bed-fellow at Mr. Walmsley's, Shoreditch, noted that much of the night was spent by him in writing; and now that all restraint was removed the dawn frequently found him still at work. Fancy once more had free play; the romance of his earlier years revived, and he transcribed from an imaginary parchment of the old priest Rowley his "Excelente Balade of Charitie." This fine poem, perversely disguised in archaic language, he sent to the editor of the *Town and Country Magazine*, and had it rejected.

The high hopes of the sanguine boy had begun to fade. He had not yet completed his second month in London, and already failure and starvation stared him in the face. Mr. Cross, a neighboring apothecary whose acquaintance he had made, and who had been fascinated by his fine conversational powers, discerned ere long the evidence of the privations to which he was reduced, and repeatedly invited him to join him at dinner or supper; but he repelled the proffered hospitality. His landlady also, suspecting his necessity, pressed him to share her dinner, but in vain. "She knew," as she afterwards said, "that he had not eaten anything for two or three days." But he was offended at her urgency, and assured her that he was not hungry. Only a month before, he had written to his sister in the highest spirits, with talk of china, silver fans, and fine silks in store for them, and had actually sent them valued presents bought with his first earnings. But the needy political adventurers in whose service he had enlisted changed their tone when he began to press for payment for his contributions; and

the note of his actual receipts found in his pocket-book after his death, shows that Hamilton, Fell, and other editors who had been so liberal in flattery, had paid the inexperienced youth at the rate of a shilling for an article, and somewhat less than eightpence each for his songs; while much which had been accepted was held in reserve, and still unpaid for. The beginning of a new month revealed to him the indefinite postponement of their publication, and with it of the prospect either of payment or of further demand for his labors. He had wished, according to his foster-mother, to study medicine with Barrett; and one of his companions specially refers to the charm which the practice of physic had for him. In his desperation he now reverted to this, and wrote to Barrett for such a letter as might help him to an opening as a surgeon's assistant on board an African trader. He appealed also to Mr. Catcott to forward his plan, but in vain. The letters were written before the middle of the month, and he continued to hope against hope, as he awaited their replies. What these were we can only surmise. On the 24th of August, 1770, he retired for the last time to his attic in Brook Street, carrying with him the poison which he there drank, after tearing into fragments whatever literary remains were at hand. In the morning he was found, with limbs and features distorted by his last convulsions, a ghastly corpse.

Thus perished by his own hand, in an obscure lodging in London, among strangers and in absolute want, a youth assuredly without his equal in that eighteenth century. He was only seventeen years and nine months old; yet he had already written poems which fill two ample volumes, and which now, upwards of a century after his death, command our admiring wonder for the rare evidence of genius and sustained power which they display. The intelligent labors of the Rev. W. W. Skeat have at length presented them in a form worthy of their unique merit, not only as evidence of fine poetic genius, but as an unparalleled example of youthful precocity displayed in spite of every disadvantage that poverty and adverse fate could interpose to prevent its display. Yet even now comparatively few know what a rich vein of romance and true poetry lies concealed under the antique guise of the Rowley poems, or how singular is the study which they involve. The best of his numerous productions, both in prose and verse, require no allowance to be made for the immature years of their author, when comparing him with the ablest of his contemporaries. Yet he was writing spirited satires at ten, and he produced some of the finest of his antique verse before he was sixteen years of age. He pictures Lydgate, the monk of Bury St. Edmunds, challenging Rowley to a trial at versemaking, and under cover of this fiction, produces his "Songe of Ælla," a piece of rare lyrical beauty, worthy of comparison with any antique or modern production of its class. Again, in his "Tragedy of Goddwyn," of which only a fragment has been preserved, the "Ode to Liberty," with which it abruptly closes, is a wonderful specimen of bold imagery which may claim a place among the finest martial lyrics in the language.

The collection of poems in which such specimens occur furnishes by far the most remarkable example of intellectual precocity in the whole history of letters; nor is it the least among all the notable features which distinguish the boy's writings, that, from first to last, he consistently maintained his romance of Canynge and Rowley through all the diverse scenes of verse and prose in which those imaginary characters are made to figure. The age at which he died, before he had even reached manhood, adds to the tender pity which his fate awakens even now, upwards of a century after his death. Collins, Burns, Keats, Shelley, and Byron all awaken sorrow over the premature arrestment of their genius; but the youngest of them survived to his twenty-fifth year, while Chatterton was only seventeen when he perished despairingly in his miserable garret.

The death of Chatterton attracted little notice at the time; for the few who then entertained any appreciative estimate of the Rowley poems regarded him as their mere transcriber. He was interred in a burying ground attached to Shoe Lane Workhouse, in the parish of St. Andrew's, Holborn, which has since been converted into a site for Farringdon Market. But a story has been current from an early date, and credited by some trustworthy investigators, that the body of the poet was recovered through the intervention of one of his London relatives, and secretly interred by his uncle, Richard Phillips, in Redcliffe Churchyard. There a monument has since been erected to his memory, with the appropriate inscription, borrowed from his "Will," and so supplied by the poet's own pen—"To the memory of Thomas Chatterton. Reader! judge not. If thou art a Christian, believe that he shall be judged by a Superior Power. To that Power only is he now answerable." (D. W.)

CHAUCER, Geoffrey (*c.* 1340–1400). There are few fields of research in which antiquarians, from Speght to Furnivall, have labored so zealously and successfully as the life of Chaucer. The secret of their success has been that Chaucer was more actively engaged in public affairs than any poet of celebrity since his time, and has consequently left many traces in official records. The chief biographical fact known to Speght was that Chaucer gave evidence in a case tried at Westminster in 1386 touching the right of Lord Scrope to bear certain arms, and then deposed that he was "forty years old and upward," and had borne arms for twenty-seven years. A casual fact of this sort offered no clue to further investigation; but the fact that Chaucer received from Edward III. a pension of twenty marks was more suggestive. This clue was first energetically followed up by Godwin, the author of *Caleb Williams* and *Political Justice*, who searched diligently through several records, chiefly the Patent, Close, and French Rolls, for other notices of Chaucer's name, and succeeded in enriching his biography of Chaucer, published in 1804, with various important particulars. He was followed by Sir Harris Nicolas, who made an exhaustive examination of the Issue Rolls of the Exchequer, and published the results in 1843. Another determined search through records which Godwin and Nicolas had shrunk from was made in 1873 by Mr. Furnivall, and this also resulted in several important finds.

It is to Mr. Furnivall that we are indebted for finally settling the parentage of Chaucer. Speght in the course of his researches had hit upon the name of one Richard Chaucer, a vintner, who died in 1348, and made a bequest to the church of St. Mary Aldermary. Merely on the ground of the name, Speght supposed this to be the father of Chaucer; but Urry and Tyrwhitt, in the 18th century, disputed this, and wished to give the poet a higher lineage, because in the grant of a pension made to him in 41 Edward III. he was described as "valettus noster." Mr. Furnivall settled the question by bringing to light a deed dated 1380, in which Chaucer, relinquishing his right in a house belonging to his father, described himself as "the son of John Chaucer, vintner." By other documents this John Chaucer is shown to be the son of Speght's Richard. It is thus established that both the poet's father and his grandfather were London vintners. The precise date of his birth has not been ascertained. The accepted date till lately was 1328. The difficulty with this date was his being described as "forty years and upwards" in 1386, and of late opinion has inclined to 1340 as a more probable year. This is favored by the discovery that the poet was Richard Chaucer's grandson and not his son, and fits in better with the facts than 1328.

How Chaucer was educated, whether like "Philogenet," the name which he assumes in the *Court of Love*, he was "of Cambridge clerk," and how he was introduced to the notice of the court, is left to conjecture. His name occurs in the household book of the wife of Prince Lionel, second son of Edward III., in 1357, probably, Mr. Furnivall conjectures, as a page. He bore arms in Edward III.'s invasion of France in 1359, John Chaucer being also in the expedition, probably in connection with the commissariat. There was little fighting in that expedition, the ravages of the English for several years before having left little to fight for; but in the course of a disastrous retreat, compelled rather by hunger than by martial force Chaucer was taken prisoner. In 1360 the king paid £16 for his ransom. From 1360 to 1366 there is a gap in the record of his life; but in the latter year his name occurs in a list of the members of the royal household as one of thirty-seven "esquires" of the king, who were to receive a gift of clothes at Christmas. By this time also he would seem to have been married, if the Philippa Chaucer, one of the demoiselles of Queen Philippa, who in 1366 was granted a yearly pension of ten marks, was, as is most probable, his wife (see the discussion of the question in Sir H. Nicolas's memoir). In 1367 Chaucer himself received a pension of twenty marks from the king, being described as "dilectus valettus noster." To show that in being courtier and scholar he had not ceased to be soldier, he took part in another inglorious expedition against France in 1369, in which from the Fabian tactics pursued by the French king there was little opportunity for distinction. He was back in London towards the end of 1370, and henceforward devoted himself to more peaceful pursuits. His talents for diplomacy and his acquaintance with commerce were recognized by the crown. In 1372 he was despatched to Genoa as a commissioner to arrange a commercial treaty with the Genoese. About this embassy much has been written, on the supposition that he may have made the acquaintance of Petrarch in the course of his visit to Italy. Whether in recognition of his services or on other grounds, he received on his return, in 1374, the grant of a pitcher of wine daily;

and soon after, in further evidence of the royal favor, he was appointed comptroller of the customs and subsidy of wools, skins, and tanned hides in the port of London. In 1376 he was associated with Sir John Burley on some secret service, the nature and place of which are not known, and in 1377 he was sent on the secret mission to Flanders. And it was not merely in commercial matters that the poet was considered serviceable; in 1378, after the accession of Richard II., he was attached to a mission sent into France to negotiate a marriage for the young king. His fortunes continued steadily to improve; with his pension of twenty marks from the king, £10 from the duke of Lancaster, his allowance for robes as one of the king's esquires, his salary as comptroller, his payments for occasional services, his pitcher of wine (commuted in 1378 into an annuity of twenty marks), and his wife's pension, he had no reason to complain that his genius was neglected. The wonder was that his genius was not smothered. His employment as comptroller was not a sinecure; he was bound to write the rolls of his office with his own hand, and he had to be continually present at his office, not having the option of appointing a deputy. Apparently as he rose in the world he was allowed to make an easier arrangement; in 1382 he was appointed comptroller of the petty customs of the port of London, with the privilege of appointing a deputy; and in 1385 he was allowed to appoint a deputy for the other comptrollership. In 1386 he touched the summit of his fortune, being returned to Parliament as a knight of the shire of Kent. But that was an unfortunate year for him; his patron, John of Gaunt, lost his ascendency at court, and a commission which sat to inquire into the abuses of the preceding administration superseded Chaucer in his two comptrollerships. In the course of two years he was obliged to transfer his annuities to another man, probably selling them for a sum of ready money. The return of Lancaster to power in 1389 again brightened his prospects; he was appointed clerk of the king's works, and four years afterwards obtained a grant of an annuity of £20. How much he wanted this assistance appears from the fact that he was several times obliged to apply for small portions of it in advance. When Bolingbroke came to the throne in 1399 he gave the old poet an additional annuity of forty marks, which came in time to comfort the last year of his life. The minutes of his pension cease in 1400, and, according to the inscription on his tomb, he died on the 25th of October of that year.

These are the main facts of Chaucer's life as brought to light by successive investigators, and they form a tolerably complete outline biography, more complete than Spenser's or Shakespeare's. They are significant facts, throwing light on the singularly varied circumstances, aptitudes, and occupations of the man, supplementing in a really substantial way what may be gathered from his works. They show that Chaucer was not merely a poet and a scholar, deeply read in what then passed for science and philosophy, as well as in the rich literature of his poetical predecessors, but a soldier, a courtier, a man of business, familiar from the circumstances of his birth and subsequent rise in position with all sides of the life of his time, ready to undertake any kind of employment that his powerful patrons chose to obtain for him,—comptrollership of customs, secretaryship of an embassy, diplomatic commissionership, guardianship of a minor. Mr. Furnivall has also discovered that, rather late in life, he was charged with being concerned in the "raptus" (abduction, probably) of a girl, which would show that he was willing to undertake more questionable services, unless the "raptus" was for his own benefit. Great caution must be observed in trying to fill up from hints in his poems the gaps in the documentary facts of his biography,—great caution, that is, if we wish to get at the truth and not merely to speculate for the sake of speculating. Antiquarian speculators are usually more distinguished for fancy than imagination. They catch at hints and push them to conclusions without having imagination enough to take account of qualifying considerations. Thus it has often been taken for granted that in the description of the poet of the *Canterbury Tales*, we have an authentic portrait of Chaucer himself. The poet is a very quiet unobtrusive man, and the Host, master of the ceremonies, suddenly casts his eye on him, and addresses him in his bullying way:—

> What man art thou? quod he.
> Thou lookest as thou wouldst find an hare,
> For ever upon the ground I see thee stare.
> Approachè near, and lookè merrily.
> Now ware you, sirs, and let this man have space.
> He in the waist is shapen as well as I;
> This were a puppet in an arm to embrace
> For any woman, small, and fair of face.
> He seemeth elvish by his countenance,
> For unto no wight doth he dalliance.

There is no reason to suppose that this quaint, shy little figure was any more like Chaucer than the *Spectator* was like Addison or Steele. The allusion to his waist, coming from the burly host, is evidently jocular, and the whole picture is in all likelihood a humorous description of the opposite of Chaucer's own appearance. We must be particularly careful in accepting literally the statements of a writer one of whose favorite veins of humor, appearing in every one of his works, is self-depreciation. We should remember that Chaucer wrote for a limited audience, all of whom knew him personally, and for whose amusement he was in the habit of making comical allusions to himself. His jokes were more of the nature of family jokes than we are now accustomed to in writings intended for wide and promiscuous circulation. When he made the eagle in the *House of Fame* complain of his being heavy to carry, or promise to make him the butler of the gods, or append to the statement that he lived like a hermit, the qualification —"although thine abstinence is little," or remind him that he had had no personal experience of love, he knew that these little jests at his own expense would be fully appreciated by his few readers. The extreme of frivolous conjecture is reached when it is supposed that his wife was a termagant because he "chaffs" women frequently. His graceful and chivalrous compliments to women are quite as frequent as his chaff. There is, indeed, one passage in the *House of Fame* which is pretty clearly intended for his wife, that where the eagle cries "awake" to him—

> Right in the samè voice and steven (sound)
> That useth one I couldè neven (name).

But if it had been anything more serious than commonplace conjugal banter, he would hardly have dared to circulate it. A conjecture of an equally frivolous kind is that he was unmarried in 1369, because in that year he spoke of having suffered for eight years pangs which none but one could heal. The pangs may have been matrimonial pangs, or pangs of poverty, or purely imaginary pangs, officially becoming in the poet-narrator; but Mr. Furnivall is so convinced that the poet's sickness was a real love-sickness, and that he was not then married to the queen's demoiselle Philippa Chaucer, that he accounts for this lady's name by supposing her to have been Chaucer's cousin.

A similar inelasticity of conjecture appears in the grounds on which certain of the works commonly attributed to Chaucer are rejected as spurious. The *Testament of Love*, the *Assembly of Ladies*, and the *Lamentation of Mary Magdalene* bear no internal marks of being Chaucer's, and are now universally rejected; but of late some commentators have adopted a test of genuineness which would deprive us of several works which are in no respect unworthy of Chaucer's genius. It is known from Chaucer's own statement in the undisputed *Legend of Good Women* that he translated the *Roman de la Rose*, but Mr. Bradshaw refuses to believe that the extant translation, of which we have only one 15th century manuscript, can be his, because its rhymes do not conform to a rhyme-test which Chaucer observed in works which are undoubtedly his. The extant *Romance of the Rose* admits the adverbial *ly* to rhyme with the adjectival or infinitival *ye*, and it cannot be Chaucer's because *y* is never allowed to rhyme with *ye* in the *House of Fame* and the *Canterbury Tales*. For the same reason—no other of any shadow of validity has yet been adduced—the *Court of Love*, which Mr. Swinburne calls "that most beautiful of young poems," and the *Flower and the Leaf*, which Dryden and Hazlitt have praised and quoted as a choice example of the poet's genius, have also been pronounced to be spurious. We cannot give up such poems unless more urgent reasons are advanced for their confiscation. They cannot be set aside as spurious so long as their variation from the rhyming rule, which the commentators have shown much ingenuity in detecting, can be explained in any reasonable way. There is no getting over the plain question which every one asks when first told that they are not Chaucer's. If they are not his, who else

could have written them? Is it conceivable that the name of the writer of such works could have been utterly unknown in his own generation, or if known could have been by accident or design so completely suppressed? If he deliberately tried to palm them off as Chaucer's upon the transcribers, would not this rule of rhyme have been precisely the sort of mechanical likeness which he would have tried to preserve? The *Court of Love* we have special reasons for declining to give up. It might be argued that, though the *Flower and the Leaf* bears internal marks of being Chaucer's, although its picturesque richness, its tender atmosphere, and the soft fall of its words are like his, yet it is easy to grow the plant once you have the seed, and it may be the work of an imitator. The *Flower and the Leaf* professes to be written by a lady, and there may have been at the court some wonderful lady capable of it, although it passed in the monkish scriptorium as Chaucer's. But there is some external evidence for the authenticity of the *Court of Love*, which also contains traces of Chaucer's most inimitable quality, his humor. Mr. Minto has put forward some minor considerations for believing this to be Chaucer's (*Characteristics of English Poets*, p. 22), but the strongest fact in its favor is that the *Court of Love* was imitated by James I. of Scotland in the *King's Quhair*, and that in paying the customary compliment to his poetical masters, he mentions no names but Lydgate and Gower, who were clearly incapable of writing the poem, and Chaucer. James's captivity in England began five years after Chaucer's death, and it is simply inconceivable that he could have attributed the *Court of Love* to Chaucer in ignorance, and without having heard a whisper of its real authorship. If, indeed, this rhyme-test were absolute, we should have to treat these other considerations as inexplicable difficulties and submit. But when we remark that all the poems in which *y ye* rhymes occur are earlier works of Chaucer's, if they are his at all, bearing the touch of his hand but wanting the sustained strength of his mature workmanship, and when we remember that the *y ye* rhyme was the common practice of his predecessors, a very simple explanation of the rhyme difficulty becomes apparent. Chaucer adhered to the practice of his predecessors till he felt strong enough to impose upon himself a restriction of his own devising.

At what periods of his life Chaucer wrote his poetry we have no means of ascertaining. There are no manuscripts of any of his works that can be referred to his own time; the earliest of them in existence are not supposed to have been written till several years after his death. The only one of his works of which the date is fixed by an external circumstance is the *Book of the Duchess;* if, as is taken for granted, this was written to commemorate the death of the first wife of his patron John of Gaunt, its date is 1369. Chaucer, if born in 1340, would then have been twenty-nine, and there is none of his extant works, except the translation of the *Romance of the Rose* and the *Dream* (which we hold to be Chaucer's, though its authenticity is not worth contending for), which can be confidently assigned to an earlier period. Philogenet, in the *Court of Love*, professes to be eighteen, but this is not the slightest reason for concluding that Chaucer was that age when he wrote it. The *Book of the Duchess* is certainly not very mature work for a poet of twenty-nine, and it is probable that Chaucer did not cultivate the art, as he certainly did not develop the faculty, till comparatively late in life. The translation of the *Romance of the Rose* is to all appearance the earliest of his surviving compositions. If we may judge from his evident acquaintance with dry studies, and his capacity for hard business work, the vintner's son received a scholastic training in the *trivium* and *quadrivium* which then formed the higher education. If he had been nurtured on troubadour love from his youth up, it is exceedingly unlikely that he would afterwards have been able to apply himself to less fascinating labors. His study of mathematics and astronomy in his old age for the benefit of "little Lewis, his son," looks like a return such as we often see in age to the studies of youth. But, indeed, he can hardly be said ever to have lost his interest in such studies, for in his theory of sound in the *House of Fame* and his description of alchemical processes in the Canon's Yeoman's Prologue he shows a genuine scholar's interest in the dry details of learning. His knowledge of the Trouvère and Troubadour poetry, from which his genius received its impulse, probably began with his introduction, however that was brought about, to court society. He was about seventeen at the date of the first mention of his name as attached to the household of Prince Lionel. It is permissible to conjecture that he had French poets to beguile his captivity in France a few years afterwards.

Professor Ten Brink divides Chaucer's works into three periods:—a period of French influence, lasting up to 1372–3, the date of his visit to Italy; after that a period of Italian influence, lasting up to 1387, the supposed date of his *House of Fame;* finally, a period of mature strength and originality, in which he pursued the bent of his own genius. Not much is gained by this division into strict periods. It is obvious enough that, in the *House of Fame*, the *Legend of Good Women*, and the general plan of the *Canterbury Tales*, Chaucer strikes out more unmistakably a path for himself, and exhibits a maturer power, a more masterly freedom of movement than in his earlier works, but there profitable division ends. To erect a period of Italian influence, implying that at any time the stimulus that Chaucer received from Italian sources was at all comparable to the stimulus he received from French sources, is most misleading. The difference between the *Book of the Duchess* and the *House of Fame*, or between the *Court of Love* and *Troilus and Cresside*, is not to be explained by an influx of Italian influence; it is part of the self-governed development, the spontaneous expansion of his own mind. As he went on writing, his powers continued to expand, and to take in materials and suggestions from all quarters open to him, French, Italian, or Latin. Comparing the *Troilus*, the raw material of which is taken from Boccaccio's *Filostrato*, with his *Romance of the Rose*, we can trace no change in method or in spirit fairly attributable to Italian influence. In both translations he shows a bold independence of his originals; they are not so much translations as adaptations. He does not imbibe the spirit of Guillaume de Lorris or Jean de Meun in the one and the spirit of Boccaccio in the other; he boldly modifies all three to bring them into harmony with his own conceptions of love's laws, and in both his so-called translations there is the same high spirit of chivalry and the same tender worship and kindly mockery of woman. Where he chiefly shows advance of strength, apart from the mere technical workmanship, is in his grasp of character; and that is a clear development on the lines of his earlier conceptions and not a new acquisition. His Cresside and his Pandarus were not the Cresside and Pandarus of Boccaccio; they are regenerated by him and developed till they become figures that might have moved in his own *Court of Love.* He held the knightly and "gentle" character too high to adopt Boccaccio's conceptions. In the method also, *Troilus* has a close affinity with Chaucer's earlier work and his first models. Troilus's pursuit of Cresside is the pursuit of the Rose over again in the concrete. The greater subtilty of the stages is due to the increased strength of the narrator's faculty.

M. Sandras is in the main right as to the extent of Chaucer's obligations to French sources, although he fails to recognize the forceful individuality of the man. Chaucer was really an English *trouvère*, thoroughly national, English in the whole texture of his being, but a *trouvère.* We must not allow our conviction of his loyalty to his own English nature to blind us to the fact that he was a poet in the school of Guillaume de Lorris; nor on the other hand must we allow the peculiar extent of his obligations to his predecessors in the school to obscure the fact that he was an original poet. M. Sandras is a special pleader for one side of the case, and naturally presses unfairly against the other. Chaucer, writing in a different language from his masters, was at liberty to borrow from them more literally than he could have done if he had written in their language; but though M. Sandras proves with superfluous completeness that he freely appropriated from them not merely stories and hints of stories, but narrative methods, phrases, images, maxims, reflections,—not only treated their works as quarries of raw material, but adopted their architectural plans, and even made no scruple of seizing for his own purposes the stones which they had polished, still he so transmuted the borrowed plans and materials that his works are original wholes unmistakably stamped with his own individuality. Whatever he appropriated, whether ore or wrought metal, all passed through his own alembic, and his moulds were his own, though shaped ac-

cording to the fashion of the school. The very affluence of Chaucer's pages, their wealth of color, of tender and humorous incident, of worldly wisdom, is due to his peculiar relations to his predecessors, to the circumstance which enabled him to lay them so royally under tribute. He was not the architect of his own fortune, but the son and heir of a family which for generations had been accumulating wealth. Edward III.'s spoliation of the French was nothing to Chaucer's, and the poet had this advantage, that his appropriations neither left the spoiled country desolate nor corrupted the spoiler.

"The ground-work of literary genius," Mr. Matthew Arnold says, "is a work of synthesis and exposition, not of analysis and discovery; its gift lies in the faculty of being happily inspired by a certain intellectual and spiritual atmosphere, by a certain order of ideas, when it finds itself in them, of dealing divinely with these ideas, presenting them in the most effective and attractive combinations—making beautiful works with them, in short." The poet's constructive power must have materials, and ideas round which materials accumulate. The secret of the richness and enduring character of Chaucer's work is that he had a fruitful idea ready to his hand, an idea which had been flowering and bearing fruit in the minds of two centuries, which had inspired some later songs and tales, which had been illustrated, expounded, formulated by every variety of native invention and critical ingenuity. Chivalrous love had been the presiding genius, the inspiring spirit of several generations of poets and critics when Chaucer began to write. Open any of his works, from the *Court of Love* down to the *Canterbury Tales*, and you find that the central idea of it is to expound this chivalrous sentiment, either directly by tracing its operation or formulating its laws, or indirectly by setting it off dramatically against its counterpart, the sentiment of the villain or churl. Gradually as years grew upon him, and his mind assumed more and more its natural attitude of descriptive impartiality, he became less a partisan of the sentiment, more inclined to view it as one among the varieties of human manifestation, but never to the last does he become wholly impartial. Not even in the *Canterbury Tales* does he set the churl on a level with "the gentles." Thoroughly as he enjoyed the humor of the churl, freely as his mind unbent itself to sympathize with his unrestrained animal delights, he always remembers, when he comes forward in his own person, to apologize for this departure from the restraints of chivalry.

The very opposite of this is so often asserted about the *Canterbury Tales* that it almost has a paradoxical air, although nothing can be more plain to any one who takes the trouble to read the tales observantly. It has been said to be the crowning merit of Chaucer that he ignores distinctions of caste, and that his pilgrims associate on equal terms. It should be noticed, however, in the first place, that in the Prologue, he finds it necessary to apologize for not "setting folk in their degree," "as that they shouldè stand;" and, in the second place, that although he does not separate the pilgrims according to their degrees in the procession, yet he draws a very clear line of separation between them in the spirit of their behavior. At the outset of the pilgrimage the gentles are distinctly so mentioned as taking a sort of corporate action, though in vain, to give a more decorous aspect to the pilgrimage. When the knight tells his tale, it is loudly applauded by the whole company, but the poet does not record their verdict indiscriminately; he is careful to add, particularly by "the *gentles* every one." And though all applauded the tale, the more vulgar and uproarious spirits were somewhat restive under its gravity, the host called for a merry tale, and the Pardoner eagerly stepped forward to comply with his request. But "the gentles" interposed, and began to cry that they must have no ribaldry; "tell us," they said, "some moral tale that we may learn." And the gentles would have carried their point if the Miller, as the poet is most careful to make clear, had not been so drunk that he insisted upon telling a noble tale that he knew, and would forbear for no man. Chaucer is profuse in his apologies for introducing such a tale; it was a churlish tale, he admits, told in a churlish manner, and he does not wish to be responsible for it.

> "Every gentle wight I pray
> For Goddès love, deemeth not that I say
> Of evil intent; but for I must rehearse
> Their talès all, be they better or worse,
> Or ellès falsen some of my matter."

If gentle readers do not like it, they may turn over the leaf, and choose another tale; there is plenty "of storial thing that toucheth gentillesse." They must not blame him for repeating this churlish tale; "the Miller is a churl, ye know well this," and such tales are in his way. Gentle readers must not take it too seriously; "men should not make earnest of game;" it is, after all, only for their amusement that he thus exhibits to them the humors of the lower orders.

Such is the elaborate apology that Chaucer makes for introducing into his verse anything inconsistent with the sentiments of chivalry. It may be said that it is all a humorous pretence; and so no doubt it is, still it is characteristic that the pretence should be of so courtly a tone. All through the *Canterbury Tales* Chaucer is very careful to remember that he was writing for a courtly audience, studious to guard against giving offence to the chivalrous mind. He contrives that the gentles shall mix with the churls without sustaining any loss of dignity; they give the churls their company, and with polite compliance let them have their own gross will, but they never lay aside the restraints of their own order. Every here and there is some trace of deference to them, to show that their ribald companions have not wholly forgotten themselves, and are only receiving a saturnalian license for the time. Nothing is done to throw any disrespect on the gentle order; its members—the Knight, the Squire, the Monk, the Prioress, the Second Nun; and the professional men—the Lawyer, the Doctor, the Clerk—admit no ribaldry into their tales, and no ribald tales are told about them. The ribaldry is confined to the meaner members of the company,—the Reeve, the Miller, the Friar, the Summoner, the Wife of Bath; the narrators as well as the subjects of the ribald tales are of churlish and not of gentle position.

The *Canterbury Tales* are really in their underlying design an exposition of chivalrous sentiment, thrown into relief by contrast with its opposite. The spirit of chivalry is the vital air of all Chaucer's creations, the rain, the wind, and the sun which have quickened their germ and fostered their growth. We to whom the chivalrous spirit, at least in the fantastic developments of its vigorous mediæval youth, is an historical thing are apt to overlook this. There is so much on the surface of Chaucer's poems, such vivacity of movement, such tender play of feeling, such humor, such delight in nature, in green leaves and sweet air, sunshine and bird-singing, that few of us care to look beneath. The open air, on the breezy hillside or by the murmuring brook, seems the only proper atmosphere for such a poet. There, no doubt, with sun and wind contending playfully to divert us from the printed pages, there perhaps more than anywhere else, Chaucer is a delightful companion; but it is the duty of the dry-as-dust critic to remind us that Chaucer's sweet verses were first read under wholly different conditions, in tapestried chambers, to the gracious ear of embroidered lords and ladies. It was from such an audience that Chaucer received in a vapor what he poured back in a flood. This is the secret of his exquisite courtliness of phrase, his unfailing tone of graceful deference, his protestations of ignorance and lack of cunning, his tender handling of woeful love-cases, the gentle playfulness of his satire, the apologetic skill with which he introduces a broader and more robust humanity into his verse. If you place yourself within the circle for which the poet wrote, you see the smile play on sweet lips as he proceeds; you see the tear gather in the eye; you see the needle laid aside, as the mind of the fair listener is transported to the poet's flowery mead, or plied more briskly as she bends over her work to conceal her laughter at his more vulgar adventures. It was because Chaucer wrote for such an audience that his picture of the life of the time, various and moving as it is, is so incomplete on one side.

There was more than romancing in green fields and Canterbury pilgriming in the travelled times in which Chaucer lived; there were wars, plagues, insurrections, much misery and discontent. But for the disagreeable side of the 14th century we must go to the writer of Piers the Plowman; we find little trace of it in Chaucer. The outside of the walls of the Garden of Mirth is painted with horrible and squalid figures,—Ire, Envy, Covetice, Avarice, Felony, Villany, Sorrow, Eld, and Poverty; but no such figures are admitted within the gates; the concierge

is Idleness; the chief inmates are Love, Sweetlooking, Beauty, Richesse, Largesse, Franchise, and Courtesy; and Mirth and Gladness are the master and mistress of the ceremonies.

All Chaucer's works are steeped in the nectar of the court; the perfume of chivalrous sentiment breathes from them all. It is impossible, as we have said, to determine strictly the order of their composition, though it is very easy to distinguish his earlier from his later work. There is a passage in the Prologue to the *Legend of Good Women* which settles the position of that poem. The poet there pretends to have an interview with the king and queen of love, as he is out on a May morning to worship the daisy. The king challenges his worthiness to do homage to this his own flower, and upbraids him with having translated the *Romance of the Rose*, which (in its second part at least) is a heresy against love's law, and also with having told the story of Cresside, and thrown discredit on women. But the queen of love, Alcestis, speaks up for the poet; perhaps, she pleads, he was ordered to do these translations and durst not refuse; and he had done good service by extending the praise of love among the unlearned folk, for—

> "He made the book that hight the house of Fame,
> And eke the death of Blanchè the Duchess,
> And the Parliament of Fowlès as I guess,
> And all the love of Palamon and Arcite,
> Of Thebès, though the story is knowen lite;
> And many a hymnè for your holy days
> That highten Ballads, Roundels, Virelays."

The translation of the *Romance of the Rose* was probably the first of these works. It may have been written soon after or during his captivity in France, when he was a youth of twenty, but there is no appreciable difference of style between it and the *Book of the Duchess*, which if it commemorates, as there is every reason to believe, the death of the first wife of John of Gaunt, must have been written after 1369, when Chaucer was twenty-nine. The idea of writing in the vulgar tongue may have been suggested to him by the example of Dante. The *House of Fame* is probably later than the *Book of the Duchess*. The *Court of Love* is not mentioned by name in the above list, but it may be referred to in the following lines of the prologue:—

> "Hast thou not in a book that lyeth in thy chest
> The greatè goodness of the Queen Alceste
> That turned was into a dayèseye?"

Alcestis is, under Venus, the lady and queen of the Court of Love. It is easy to conceive why Chaucer should have kept the *Court of Love* in his chest. The tide of Puritanic religious sentiment which was destined to sweep into temporary oblivion the airy structures of the chivalric imagination had already in the middle of Chaucer's life begun to rise. In the *Court of Love* he fully accepted the troubadour notion of love and marriage, making the husband the natural enemy of the lover; and he may have had to accommodate himself to the taste of the Fair Maid of Kent, the Widow of the Black Prince, the Alcestis of the time, and put his poem out of sight, only pleading that even in it he had paid homage to "the greatè goodness of the Queen Alceste."

There is no good edition of Chaucer, not even a good text. The only text or rather collection of texts that the Chaucerian scholar would think of using is the valuable parallel six-text edition, published by the *Chaucer Society*. For the general reader one text is about as good as another; there is little to choose between Tyrwhitt's, Bell's, and Dr. Morris's text in the Aldine edition. (W. M.)

CHAUDES-AIGUES, an old town of Upper Auvergne in France, in the department of Cantal, 17 miles S.S.W. of St. Flour. It is celebrated for its hot mineral springs, which vary in temperature from 135° to 177° Fahr., and at their maximum rank as the hottest in France. The water, which is very slightly alkaline, is employed not only for medical purposes, but also in the washing of fleeces, the incubation of eggs, and various other economic applications; and it furnishes a ready means of heating the houses of the town during winter. In the immediate neighborhood is the cold chalybeate spring of Condamine. The warm springs were known to the Romans, and are mentioned by Sidonius Apollinaris. The population of the town is about 2000.

CHAUMONT, a town of France, the capital of the department of Haute Marne, on an eminence between the Marne and the Suize, 145 miles S.E. of Paris by the railway which here crosses a fine viaduct. It is the seat of tribunals of primary instance and commerce, is tolerably well built, and has an elegant town-hall, a court-house, a communal college, a hospital, a theatre, a public library, and a botanical garden. A single tower remains of the Castle of Haute Feuille, which belonged to the counts of Champagne; and there is a triumphal arch erected by Napoleon I. and finished by Louis XVIII. The church of St. Jean-Baptiste, a building of the 13th century, and the chapel of the old college of the Jesuits, are classed among the historic monuments of France. Coarse woollens, hosiery, and gloves are manufactured in the town; and there is a considerable trade in the iron and iron-wares of the department. The rise of Chaumont into importance dates from 1190, when it received a charter from the counts of Champagne. In the 13th century it became the seat of a provost; and in the 16th it was surrounded with fortifications. It was here that the treaty of 1814 was concluded by which England, Austria, Russia, and Prussia formed an alliance against Napoleon. Population in 1872, 8474.

CHAUNY, a town of France, in the department of Aisne, 20 miles W.N.W. of Laon, situated partly on the right bank of the Oise and partly on an island at the commencement of the canal of St. Quentin. It has some trade in cider, linen, cloth, and hosiery, and is a depôt for coals from Flanders and glass mirrors from St. Gobain. Population in 1872, 8831.

CHAUVIN, Étienne (1640–1725), a celebrated minister of the Reformed religion, was born at Nîmes. At the revocation of the Edict of Nantes he retired to Rotterdam; and in 1695 the elector of Brandenburg appointed him professor of philosophy at Berlin, where he enjoyed considerable reputation as a representative of Cartesianism, and as a student of physics. His principal work is a laborious *Lexicon Rationale, sive Thesaurus Philosophicus*, which he published at Rotterdam in 1692, and of which a new and enlarged edition was printed at Leeuwarden in 1703. He also wrote *Theses de Cognitione Dei*, and started the *Nouveau Journal des Savants* (1694–98). Chauvin died in 1725.

CHAUX DE FONDS, a town of Switzerland, in the canton of Neuchâtel, and 10 miles N.W. of the city of that name, at a height of 3200 feet above the level of the sea, in the rugged and narrow valley of the Jura. Rebuilt after the conflagration of 1794, the town has a handsome and pleasant appearance, and its public buildings include a church with vaulted roof, extensive schools and a theatre. There are also some peculiar subterranean mills turned by a stream before it sinks into the ground. The principal trade is the manufacture of watches, which are turned out at the rate of 150,000 annually; but gilding, enamelling, and carving are also carried on, as well as the manufacture of scientific and musical instruments. The watch trade was introduced in 1679, and is conducted on the principle of the division of labor. Population in 1872, 19,930.

CHAVES, a town of Portugal, not far from the frontier, in the province of Tras-os-Montes, on a plain near the right bank of the Tamega, which is here crossed by a fine old Roman bridge of eighteen arches. It was formerly one of the principal fortifications in the country, and in fact derives its present name from its forming the "keys" or "*chaves*" of the north. It has hot saline springs which were known in ancient times as the *Aquæ Flaviæ*. In one of its churches is the tomb of Alphonso I.; and it gave the title of marquis to Pino de Fonseca, the gallant supporter of Dom Miguel. Population formerly about 20,000, now 4870.

CHAZELLES, Jean Mathieu de (1657–1710), a French mathematician and engineer, was born at Lyons in 1657. He was employed for some time by Cassini in measuring the meridian, and afterwards taught mathematics to the duke of Mortemar, who procured him the preferment of hydrographic professor for the galleys of Marseilles. In 1686 Chazelles went on board the galleys in their campaigns, and kept his school at sea. He was sent to the west coast in July, 1689, to examine the practicability of so contriving galleys that they might live upon the ocean, and be employed to tug the men-of-war when becalmed;

and having set sail with fifteen galleys from Rochefort, he cruised as far as Torbay, in Devonshire, and took part in the descent upon Teignmouth. On his return he published his observations, with maps of the coasts and harbors he had visited. These maps were inserted in the *Neptune Français*, published in 1692. In 1693, Monsieur de Pontchartrain, secretary of state for the marine, engaged Chazelles to publish a second volume of the *Neptune Français*, which was to include the hydrography of the Mediterranean. For this purpose he passed through Greece, Turkey, and Egypt. When in Egypt he measured the pyramids, and finding that the angles formed by the sides of the largest were in the direction of the four cardinal points, he concluded that this position must have been intended, and also that the poles of the earth and meridians had not deviated since the erection of these colossal structures. Chazelles likewise made a report of his voyage in the Levant, and another concerning the position of Alexandria. He was made a member of the Academy in 1695, and died in 1710.

CHEDUBA, an island in the Bay of Bengal, situated ten miles from the coast of Aracan, between 18° 40′ and 18° 56′ N. lat., and between 93° 31′ and 93° 50′ E. long. It extends about 20 miles in length from north to south, and 17 miles from east to west, and its area of 250 square miles supports a population of 10,000. The channel between the island and the mainland is navigable for boats, but not for large vessels. The surface of the interior is richly diversified by hill and dale, and in the southern portion some of the heights exceed a thousand feet in elevation. There are various indications of former volcanic activity, and along the coast are earthy cones covered with green-sward, from which issue springs of muddy water emitting bubbles of gas. Copper, iron, and silver ore have been discovered; but the island is chiefly noted for its petroleum wells, the oil derived from which is of excellent quality, and is extensively used in the composition of paint, as it preserves wood from the ravages of insects. Timber is not abundant, but the gamboge tree and the wood-oil tree are found of a good size. Tobacco, cotton, sugar-cane, hemp, and indigo are grown, but the staple article is rice, which is of superior quality, and the chief article of export. The inhabitants of the island are mainly Mughs. Cheduba fell to the Burmese in the latter part of the last century. From them it was captured in 1824 by the British, whose possession of it was confirmed in 1826 by the treaty concluded with the Burmese at Yandaboo.

CHE-FOO, or YEN-TAI, as it is called by the natives, a seaport town of Northern China, on the southern coast of the Gulf of Pih-chih-li, in the province of Shan-tung near the mouth of the Yi-ho, and about 30 miles east of the city of Tang-chow-foo. Till recently it was quite a small place, and had only the rank of an unwalled village; but it was chosen as the port of Tang-chow opened to foreign trade in 1858 by the treaty of Tien-tsin, and it is now the residence of a Tau-tai, or intendant of a circuit, the centre of a gradually-increasing commerce, and the seat of a British consulate, a Chinese custom-house, and a considerable foreign settlement. The native town is yearly extending, and though most of the inhabitants are small shop-keepers and coolies of the lowest class, the houses are for the most part well and solidly built of stone. The foreign settlement occupies a position between the native town and the sea, which neither affords a convenient access for shipping nor allows space for any great extension of area. Its growth, however, has hitherto been steady and rapid. Various streets have been laid out, a large hotel erected for the reception of the visitors who resort to the place as a sanitarium in summer, and the religious wants of the community supplied by a Roman Catholic and a Protestant church. Though the harbor is deep and extensive, and possessed of excellent anchorage, large vessels have to be moored at a considerable distance from the shore. The foreign trade is mainly in the hands of the English and Americans, the Germans and the Siamese ranking next in importance. In 1872 there entered the port 233 British vessels, with a tonnage of 97,239 tons and cargoes valued at £144,887; while in the same year the ships of all other nationalities numbered 348, with a tonnage of 149,197 tons and a value of £177,168. The imports are mainly woollen and cotton goods, iron, and opium; and the exports include bean-cake, bean-oil, and peas, raw silk, and straw-braid manufactured by the peasants of Lai-chow-foo, walnuts from Tsing-chow-foo, a coarse kind of vermicelli, vegetables, and dried fruit. A certain amount of trade is carried on with the Russian settlements of Manchuria, in which the edible sea-weed gathered in the shallows of the coast is exchanged for piece goods, liqueurs, and sundries from China.

CHEESE, a solidified preparation from milk, the essential constituent of which is the proteinous or nitrogenous substance *casein*. All cheese contains in addition some proportion of fatty matter or butter, and in the more valuable varieties, the butter present is often greater in amount than the casein. Cheese being thus a compound substance of no definite chemical composition is found in commerce of many different varieties and qualities; and such qualities are generally recognized by the names of the localities in which they are manufactured. The principal distinctions arise from differences in the composition and condition of the milk operated upon, from variations in the method of preparation and curing, and from the use of the milk of other animals besides the cow, as, for example, the goat and the ewe, from the milk of both of which cheese is manufactured on a commercial scale.

The quality and the composition of the milk operated on are of prime importance in cheese-making. Not only does this substance vary widely in richness and flavor owing to the breed, the nature of the food, and the state of the health of the animal yielding it, and many other circumstances; but in cheese-making the differences are still further increased, in some cases by adding cream to it, and in others by using it as skim-milk or milk deprived of a portion of its fat. Taking as a standard the ordinary sweet milk of cows, the following analyses (No. 1 given on the authority of Dr. Parkes, and No. 2 by Dr. Voelcker) may be taken to represent its average composition:—

Composition.	No. 1.	No. 2.
Water	86·7	86·65
Butter	3·7	3·99
Casein	4·0	3·47
Milk Sugar	5·0	5·11
Mineral matter	0·6	0·78

The object of the cheese-maker is to obtain in a solid form as large a proportion as possible of the casein and butter contained in the milk dealt with. The poverty in these constituents of the whey or liquid matter separated in the process of making cheese is therefore, to some extent, a measure of the success of the operation. The average composition of the whey drained off may be thus stated:—

Water	92·95
Butter	0·24
Casein	0·81
Milk Sugar and Lactic Acid	5·27
Mineral matter	0·73

Milk, as is well known, if allowed to stand for some time, becomes thick, and is then separable into two portions—a solid white curd, and a greenish liquid whey. Such a coagulation and separation is essential in the making of cheese; but only to a small extent, in Holland and some other localities, is the natural acid coagulation taken advantage of. It has been assumed that the solid constituents of milk are held in solution by an alkaline substance, and that coagulation is the result of the neutralization of the alkali by the development within the fluid of lactic acid, as in the case of sour milk, or by the addition of an acid substance as is sometimes the practice; but this theory does not satisfactorily account for all the phenomena of coagulation. Acid substances, however, do readily curdle cheese, and hydrochloric acid, tartaric acid, vinegar, and cream of tartar have all been employed to produce coagulation for cheese-making. The curding is also, in practice, produced by the action of such substances as the juice of figs, and decoctions of thistle tops, artichoke flowers, the butter-wort, and other plants. But the substance used uniformly in Great Britain, and in all great cheese-producing districts, is rennet, a preparation of the fourth or digesting stomach of the suckling calf. Rennet is prepared by cutting up the membrane in strips, salting, smoking, and sometimes treating it with spices and aromatics. The

influence of rennet is due to the fact of its exciting a kind of fermentative action; but that it thereby changes the sugar of milk (lactin) into lactic acid, and so coagulates the casein, has been denied by Dr. Voelcker, who holds its action to be "*sui generis*, and as yet only known by its effects."

In the practice of cheese-making it is found necessary, in order to hasten the coagulating action of rennet, and to produce a curd of sufficient hardness, to heat the milk to a temperature which varies from 72° to 85° or 90° Fahr. The lower temperature, it is found, yields a soft cheese, retaining much whey and ripening soon; while the increased heat produces a firm curd and a solid slow-ripening cheese. After due coagulation the curd is broken, and by a variety of manipulative processes as much as possible of the whey is drained away, and the curd is reduced to comparatively dry crumbly fragments. At this stage, sometimes, but not frequently, the curd is salted; it is then collected into a clean cheese-cloth, placed in a cheese vat of the form and size of the cheese to be made, and submitted to pressure in the cheese press. While in the press it is frequently turned, a good deal of whey meantime continuing to exude; and it is found that the amount of pressure has much influence on the solidity and rate of ripening of the cheese. As soon as a sufficient skin has formed on the cheese to preserve its shape, it is removed from the press and salted by repeated rubbings of salt over its surface. The cheese is then put aside in a clean, cool, airy situation for ripening, a process which takes a variable period according to the quality of the cheese, its method of preparation, and other circumstances.

The ripening of cheese is the result of a slow process of decay caused by a spontaneous fermentative action. In hard, solid, poor cheeses it acts very slowly, while in those which contain butter in large proportions its action is very energetic, and they cannot be preserved for any considerable period. Cheese when newly made has an acid reaction, but by degrees from without inwards the acid reaction becomes less apparent, and the cheese ripens. A portion of the casein suffers decomposition, evolving ammonia and ammoniacal bases which neutralize the acid of the cheese. In a similar way the fat is partly decomposed, and the resulting fatty acids also combine with the ammonia evolved by the casein. When this action is allowed to proceed too far the cheese becomes alkaline, putrefactive decay ensues, free ammonia is evolved, an offensive odor is produced, and sometimes even poisonous compounds are formed. A satisfactory indication of ripening found in Stilton and other rich cheeses is the appearance of a green mould, streaked throughout the mass, produced by the fungus *Aspergillus glaucus*. A red mould also develops from *Sporendonema Casei*, and when the ripening becomes advanced the cheese mite, *Acarus domesticus*, is produced with great rapidity in inconceivable numbers.

In England the milk of cows only is used in the manufacture of cheese. Excluding the so-called cream cheeses —a preparation of a soft buttery consistence made from cream gently pressed, which must be used new and fresh,— British cheese may be divided into three classes:—1st, that made with whole milk plus cream; 2d, that made with whole milk; and 3d, that made with milk minus cream, or skim-milk. Stilton and double Gloucester belong to the first class, being made of morning milk to which the cream of the previous evening's milking is added. Whole milk cheeses are represented by single Gloucester, Cheshire, Cheddar, and Dunlop; and the ordinary country cheese used by the laboring classes represents the third class. It must, however, be understood that all gradations in richness are met with in cheese, as seen by the table below, and that quality depends on other circumstances besides proportion of butter. Of foreign cheese imported into Great Britain, the most important in point of quantity and value is American; and since the introduction of the factory system of cheese-making in the United States, this has greatly improved in quality and become an important and extensive article of commerce. A large quantity of cheese, both fat and poor, is also made and exported from Holland. Parmesan cheese and Gruyère cheese, which are highly relished on account of their flavor, are skim-milk products, the former being colored and artificially flavored with saffron. The celebrated French Roquefort cheese is made from ewe's milk, and matured in the caves of Roquefort, where a uniform low temperature is found throughout the year. The accompanying table, compiled from various sources, gives the average composition of the principal kinds of cheese at present known in commerce:—

	Water.	Casein.	Fat.	Milk-Sugar, &c.	Ash and common Salt.
Stilton	20·27	33·45	43·98	.....	2·20
Cheshire	32·59	26·06	32·51	4·53	4·31
Cheddar	30·32	28·18	35·53	1·66	4·31
Double Gloucester	33·41	27·75	32·69	2·23	3·92
Single Gloucester	36·50	25·75	28·75	4·68	4·32
Wiltshire	39·22	34·22	19·26	2·28	5·02
Dunlop	38·46	25·87	31·86	.....	8·81
Ordinary skim-milk	39·43	30·37	27·08	0·22	2·90
American	27·29	25·87	35·41	6·21	5·22
Dutch (Gouda)	36·10	29·43	27·54	6·94	.....
Camembert	51·94	18·90	21·05	4·40	4·71
Parmesan	27·56	44·08	15·95	6·69	5·72
Gruyère	40·00	31·50	24·00	1·50	3·00
Brie	45·25	18·48	25·73	4·94	5·61
Roquefort	34·55	26·52	30·14	3·72	5·67
Neufchâtel (cream cheese)	36·58	8·00	40·71	15·80	0·51

As an article of food cheese is used in a double capacity. Rich cheese in an advanced stage of ripeness is eaten in small quantities partly on account of its piquancy, and partly also as a digestive stimulant. Skim-milk cheese, and all the varieties poor in fat, again, are valuable articles of food on account of their high percentage of nitrogenous matter, and the cheaper qualities are, on this account, extensively consumed among the classes by whom other animal food is not usually obtainable. As an article of ordinary diet, cheese labors under the disadvantage of being hard of digestion; and especially when it is toasted, as is frequently the practice, it really is, as has been observed, "about as digestible as leather." According to Dr. Frankland's experiments, the maximum amount of force produced by the complete oxidation of 1 lb of Cheshire cheese within the human body is 2704 foot-tons.

The imports of cheese into Great Britain during the year 1875 amounted to 1,626,413 cwt., of an estimated value of £4,705,229; of this quantity about one-half was imported from the United States and one-fourth came from Holland. Of course the imports only represent a small proportion of the total quantity consumed.

CHEETAH, or Hunting Leopard (*Guepardа jubata*), a Carnivorous Mammal belonging to the family *Felidæ*, but exhibiting in form and habits such a mixture of feline and canine characteristics as have led naturalists to regard it as a transition form between the cat and dog groups. Unlike the typical *Felidæ*, its head is short and round, its legs elongate and slender, and the flesh tooth of the upper jaw thin and longitudinally compressed. Its claws, being only partially retractile, get blunted by exposure to the surface of the ground, and so are less adapted to the purely feline mode of capturing prey. The cheetah attains a length of 3 to 4 feet, is of a pale fulvous color, marked with numerous spots of a deep black on the upper surface and sides, and is nearly white beneath. The fur is somewhat crisp, altogether lacking the sleekness which characterizes the fur of the typical cats. Its tail is long and somewhat bushy at the extremity. In confinement it soon becomes fond of those who are kind to it, and gives evidence of its attachment in an open, dog-like manner. According to Mr. Bennet (*Tower Menageries*) "the character of the cheetah seems to be entirely free from that sly and suspicious feeling of mistrust which is so strikingly visible in the manner and actions of all the cats, and which renders them so little susceptible of real or lasting attachment;" and it is the opinion of the same writer that the cheetah might be thoroughly domesticated and "rendered nearly as familiar and faithful as the dog himself." The cheetah is found throughout Africa and Southern Asia, and has been employed for centuries in India and Persia in hunting antelopes and other ruminant game. According to Sir W. Jones, this mode of hunting originated with Hushing, king of Persia, 865 B.C., and afterwards became so popular that certain of the Mongol emperors were in the habit of being accompanied in their sporting expeditions by a thousand hunting leopards. In prosecuting this sport at the present day the cheetah is conveyed to the field in a low car without sides, hooded and chained like hunting-birds

in Europe in the days of falconry. When a herd of deer or antelopes is seen, the car, which bears a close resemblance to the ordinary vehicles used by the peasants, is usually brought within 200 yards of the game before the latter takes alarm; the cheetah is then let loose and the hood removed from its eyes. No sooner does it see the herd, than dropping from the car on the side remote from its prey, it approaches stealthily, making use of whatever means of concealment the nature of the ground permits, until observed, when making a few gigantic bounds, it generally arrives in the midst of the herd and brings down its victim with a stroke of its paw. The sportsman then approaches, draws off a bowl of the ruminant's blood, and puts it before the cheetah, which is again hooded and led back to the car. Should it not succeed in reaching the herd in the first few bounds, it makes no further effort to pursue, but retires seemingly dispirited to the car. In Africa the cheetah is only valued for its skin, which is worn by chiefs and other people of rank. It forms an article of export from Senegal.

CHEKE, Sir John (1514–1557), was born of good family at Cambridge, and was educated at St. John's College. His learning gained him the position of king's scholar, and in 1540 he was chosen to fill the chair of Greek then instituted by Henry VIII. Together with Sir Thomas Smith he has the honor of being one of the first who revived the knowledge of that language in England. He specially interested himself in its pronunciation; and he finally carried his point, through his popularity with the students, notwithstanding the strenuous opposition of the chancellor, Bishop Gardiner. Among those whom he taught were William Cecil and Roger Ascham, the latter of whom, in his *Schoolmaster*, gave him the highest praise both for scholarship and character. About 1544 he was appointed tutor to Prince Edward, and on the accession of his pupil to the throne he received several considerable grants, and, among other honors, rose to the position of secretary of state. Unfortunately for himself he followed the duke of Northumberland, and acted as secretary to Lady Jane Grey during her nine days' nominal reign. In consequence Mary threw him into the Tower, and confiscated his wealth. In September, 1554, he obtained his liberty, with leave to travel abroad. He visited Italy, gave lectures on Greek at Padua, and afterwards was forced to support himself by teaching that language at Strasburg. In 1556 he was lured to Brussels by a message that his wife was in that town, and, on his way thither, was seized by order of Philip of Spain, and again brought to the Tower. He was immediately visited by two Catholic priests, who failed to convert him till he was informed that he must recant or be burned. Upon this he yielded, and made two public recantations. He did not long survive his disgrace, and in September, 1557, he died in London. Perhaps the most interesting of Cheke's works is the *Hurt of Sedition* (1549), which gives advice to the people who had risen in rebellion under Ket. To seek equality, he argues, is to make all poor; and, besides, "riches and inheritance be God's providence, and given to whom of His wisdom He thinketh good." He also wrote Latin translations of some of St. Chrysostom's homilies; *De Obitu Martini Buceri* (1551); *De Pronunciatione Græcæ Linguæ* (1555); *De Superstitione*, presented to King Henry VIII.; translation of *Leo de Apparatu Bellico; Carmen Heroicum, aut Epitaphium in Antonium Deneium.* See Life by Strype.

CHELMSFORD, the county-town of Essex, in England, 29 miles N.N.E. of London, with which it is connected by the Great Eastern Railway. It is situated in a valley on the Chelmer, near the confluence of the Cann, and has communication by the river with Maldon and the sea, 11 miles to the east. The Cann is crossed by two bridges, one of stone and the other of cast-iron; and there is also a bridge over each of the two branches into which the Chelmer is divided at this part of its course. In the neighborhood of the island enclosed by this bifurcation are the works of the gas company, and the wharves for the barges on the river. Besides the parish church of St. Mary, an ancient and elegant edifice, rebuilt in 1428 and again in 1800, the town has seven churches and chapels belonging to different denominations, a grammar school founded by Edward VI., an endowed charity school, a mechanics' institute, a museum, and a library. It is the seat of the county assizes and quarter sessions, and has an elegant and commodious shire hall. Its corn and cattle markets are among the largest in the county; for the former a fine exchange was provided in 1856 at a cost of £10,000, and a similar sum is being expended on an enclosure for the latter. In the centre of the square in which the corn-exchange is situated there stands a bronze statue, by Bailey, of Lord Chief-Justice Tindal, who was a native of the parish. There are corn mills, tanneries, and a brewery in the town; but most of the inhabitants are engaged in agriculture or the trades immediately connected with it. About a mile to the north is situated the county jail at Springfield Hill, and at a distance of two miles to the south is the racecourse, with a grand stand erected in 1863. The town, not being a corporation, is under the government of a local board, and within the limits of that jurisdiction it had 9318 inhabitants in 1872.

Chelmsford lies but a short distance from the site of the Roman colony of Cæsaromagus, usually identified with Writtle. At the time of the Conquest the manor was held by the bishops of London; and in the reign of Henry I. the town was indebted for its bridge over the Cann to Bishop Maurice. After this improvement it rapidly increased in prosperity, and in the reign of Edward III. it sent four representatives to the council at Westminster. Of the Dominican convent founded in the town at an early period there are no remains; but a chronicle composed by friar Langford is still extant.

CHELSEA, formerly a village about two miles west of London, on the left bank of the Thames, but now an integral part of the great metropolis. It gives its name to a parish and a parliamentary borough, the former with 71,089 inhabitants, and the latter, which includes Fulham, Hammersmith, Kensington, and part of Willesden, with 258,050, at the census of 1871. It is connected with the district of Battersea on the other side of the river by three bridges, known respectively as Battersea, Albert, and Chelsea suspension bridges. Like many of the suburban villages of London, it has an interesting history of its own. In 785 it is mentioned by the name of Cealscythe as the seat of an ecclesiastical synod; and in *Domesday Book* it appears as Cercehede or Chelched. The name was still written Chelchith in the time of Sir Thomas More, who had a house in the village, but it began to assume the form of Chelsey in the 16th century. The manor was bestowed by Henry VIII. on Catharine Parr, and it afterwards passed successively into the possession of the duke of Northumberland, Lord Cheyne, and Sir Hans Sloane. It was at Chelsea that Sir John Danvers introduced the Italian style of gardening, which was so greatly admired by Bacon and soon after became prevalent in England; and here in our own day were the gardens of the English botanist William Curtis, arranged according to the Linnean system. During the 18th century the village was the residence of many of the most famous men of the period. Atterbury, Swift, and Arbuthnot lived in Church-lane; Guy, Smollett, and Steele were for a time inmates of Monmouth House; and Count Zinzendorf established a Moravian society at Lindsay House. Sir Robert Walpole's residence was extant till 1810; and till 1824 the bishops of Winchester had a palace at the end of Cheyne Walk, a fine promenade extending along the river and now fronted by part of the Thames embankment, which has greatly improved its appearance. The house and grounds of the earl of Ranelagh were a favorite resort from 1742 till 1803; and Cremorne, which was built by the earl of Huntingdon, father of Steele's "Aspasia," is still a place of popular amusement. The old church and churchyard contain the tombs of Sir Thomas More, Sir Hans Sloane, George Herbert's mother, Thomas Shadwell, Woodfall the printer of Junius, and other persons of celebrity. Of greater importance than any of the buildings already mentioned is the great Chelsea Hospital for invalid soldiers, built by Sir Christopher Wren (1682–1690), on the site of King James's College; and to the north of the hospital is the Royal Military Asylum, founded by Frederick Duke of York, for the education of children connected with the army. For further details see the article London.

CHELSEA, a city of the United States, in Suffolk county, Massachusetts, forming part of the suburbs of Boston. It is situated on the north bank of the Mystic River, which separates it from Charlestown, while Chelsea creek lies between it and East Boston. It communicates

both with Charlestown and with East Boston by bridges. (See plan, vol. iv. p. 65.) Its public buildings comprise the city hall, Winnisimmet hall, the naval hospital, the marine hospital, an academy of music, a free public library opened in 1870, a high school, a national bank, and about a dozen churches; and among its industrial establishments are several foundries, brick-works, worsted factories, soapworks, and oilworks, a manufactory of washing machines, a brewery, and a salt-refinery. It is supplied with water from the works in Charlestown, which are fed by the Mystic River. In 1871 there were 3092 houses in the city, and in 1874 the population amounted to 20,695, showing an increase since 1830 of 19,925. The first settlement dates from 1630, and in the following year Winnisimmet ferry was established. Till 1738 the place itself was known as Winnisimmet, and was regarded as part of Boston, but in that year it was organized as a separate town, for the convenience of its inhabitants, who found it difficult to attend the municipal meetings of the city. In 1857 it obtained a city-charter of its own.

CHELTENHAM, a parliamentary and municipal borough of England, in Gloucestershire, situated about 88

Cheltenham (Central part).

miles N.W. from London, in a valley watered by the Chelt, and sheltered on the E. and N.E. by the Cotswold Hills. Its streets and buildings are spacious and elegant, and its spas and promenades are reckoned among the finest in England. The "Promenade" *par excellence*, indeed, which extends for more than a mile, and is lined with trees, will bear comparison with any in Europe. Besides the parish church of St. Mary's, which probably dates from the 14th century, there are ten Episcopalian churches and numerous other places of worship; several of them are beautiful specimens of modern architecture, and the Roman Catholic church of Saint Gregory is especially admired. Among the educational institutions the most important are the well known Cheltenham College, which dates from 1842, and numbers upwards of 600 pupils; a foundation grammar school, originally established in 1574 by Richard Pates of Gloucester; a Church of England college for the training of teachers for national and parochial schools; and the Ladies' College at Cambray House opened in 1854. Of the charitable institutions may be mentioned the General Hospital and Dispensary, which is supported by donations and subscriptions, and the Female Orphan Asylum, which owes its existence to Queen Charlotte. There are no manufacturing establishments of any importance; and the prosperity of the town, which has the reputation of being one of the healthiest, cleanest, cheapest, and best regulated places in the kingdom, is mainly due to its being a fashionable and educational resort. The mineral springs are four in number—the Old Wells, Montpellier, Cambray, and Pittville; and with the exception of Cambray, which is chalybeate, they all furnish a saline water. The Pittville spring is the mildest and most attractive, and it also possesses the best pump-room in the town,—a handsome building, surrounded by an Ionic colonnade, which was erected in 1825 by Joseph Pitt, at a cost of £20,000.

Cheltenham probably existed at a very early period, and Roman remains have been discovered on its site. The manor is described in *Domesday-Book* as *terra regis*, or king's land, and it possessed important privileges granted by several charters. In the reign of Queen Elizabeth the town was relieved from the burden of sending two members to Parliament. It rose rapidly into importance at the commencement of the eighteenth century through the discovery of its mineral waters, which were visited in 1788 by George III., and soon after attracted general attention. In 1804 it consisted of only one street, and contained 710 houses and 3076 inhabitants; whereas at the census of 1871 the parish, which has an area of 4203 statute acres, contained 7825 inhabited houses, and had a population of 41,924. The Parliamentary borough, which was extended by an Act of 31 and 32 Vict. to an area of 4451 acres, and contains part of the parish of Leckhampton, had in the same year 8321 inhabited houses and a population of 44,519 persons, of whom 18,370 were males, and 26,149 females. It returns one member to Parliament, and is the seat of a County Court, a centre under the Bankruptcy and Judicature Acts, and the depôt of the county police.

CHEMISTRY.—Historical Introduction.—The acquaintance of the ancients with the modes of extracting several of the metals from their ores, and also with the arts of dyeing, tanning, and glassmaking, and their recognition of various kinds of salts, earths, and inflammable substances show that they must have been possessed of a knowledge of a considerable number of chemical facts; but that this knowledge was to any extent gained by experimental research rather than by mere accident, or that when acquired it was applied to the classification of chemical phenomena, or to the establishment of any theory explanatory of them, there is no evidence to show. Until comparatively recent times the principles of metaphysical philosophy were not recognized as distinct from those of chemistry; men of learning gave themselves up to speculation upon the obvious physical characteristics of matter, whilst they neglected the indirect observation of their intrinsic and specific properties; analogies were a sufficient basis for the classification of bodies, and a consideration of their external peculiarities—"a decomposition of bodies," to use the words of Whewell, "into adjectives, not into substantives"—stood in the place of analysis. Thus we find that the qualities of the "elements" of the school of Aristotle are all physical, they are dry or humid, warm or cold, light or heavy; the idea of substances distinguished by special chemical properties was as yet no less foreign to men's minds than a knowledge of their ultimate composition.

Ideas similar to those of Aristotle concerning the elementary constitution of the universe were early prevalent in the East, whence they appear to have found their way into Europe. The elements, according to the Hindus, were earth, air, fire, water, and ether; and in the fourth book of "Chow," forming part of the Chinese historical records known as the *Shoo King*, there is a document supposed to date from 2000 B.C., in which is given an account of the five elements, namely, earth, fire, water, metal, and wood. Of what precisely was meant by an "element" in the language of the ancient philosophers and early chemists it is difficult to get any definite idea; the term could hardly, in fact, be used otherwise than in a vague sense before the exact processes of chemical analysis had shown that the properties of matter vary according to the presence or absence within it of definite quantities of certain substances, distinct in properties from one another, and unresolvable into other substances.

To the doctrine of a plurality of elements, as opposed to the systems of Thales and Heraclitus, may be ascribed the origin of the conception that by the analysis and synthesis

of bodies the various kinds of matter with all their diversity of physical features might be produced, a conception that took practical shape in the processes of alchemy, which, as Liebig has remarked, "was never at any time different from chemistry." During the alchemistical period a knowledge of the properties of bodies was acquired; afterwards chemistry showed the relations, connections, and limits of these properties. The first mention of *chemistry* (*χημεία*) is found in the dictionary of Suidas, who flourished in the 11th century; he defines it as "the preparation of silver and gold," and relates that Diocletian, lest the Egyptians should become rich and capable of resisting the Roman power, caused their books on chemistry to be burnt. He further asserts that the art was known as early as the period of the Argonautic expedition, the golden fleece being a treatise written on skins (*δέρμασι*) concerning the making of gold. The belief in the art of making gold and silver, held by the Greeks from the 5th to the 15th century, was by them communicated to the Arabs, possibly not long after the conquest of Egypt in 640; and from the 11th to the 15th century alchemy was diligently studied by the philosophers of Italy, France, Germany, and England.

That the claims of alchemy, notwithstanding repeated demonstrations of their futility, so long received the serious attention of mankind, is attributable to various causes. Not only did impostors find free scope in the credulity of an age of ignorance for the exercise of their arts; but men of talent and culture, relying on tradition, were led honestly to support the doctrine of the transmutation of metals. The existence of the philosopher's stone having once been accepted as an ascertained fact, it is not extraordinary that Isaacus Hollandus is able to indicate the method of its preparation from "adamic" or "virgin" earth, and its action when medicinally employed; that Roger Bacon, Raymond Lully, Basil Valentin, and John Price know the exact quantities of it to be used in transmutation; and that George Rippel, in the 15th century, has grounds for regarding its action as similar to that of a ferment. In the view of some alchemists, the ultimate principles of matter were Aristotle's four elements, the proximate constituents were sulphur and mercury, the father and mother of the metals; gold was supposed to have attained to the perfection of its nature by passing in succession through the forms of lead, brass, and silver; gold and silver were held to contain very pure red sulphur and white quicksilver, whereas in the other metals these materials were coarser and of a different color. Geber, judging from an analogy instituted between the healthy human being and gold, the most perfect of the metals, regarded silver, mercury, copper, iron, lead, and tin in the light of lepers that required to be healed.

To the evidence of their imaginations the alchemists were able to add that of actual observation; the fact that many ores resembling metals were changed and decomposed by heat could not but offer support to theories formed at a time when the nature of chemical combination was not understood; and the apparent transition of many bodies into one another, as, for example, that of clouds into water, was not less wonderful to them than the transmutation of the lighter metals into gold.

It was in the 16th century that a new race of alchemists, or spagyrists, as they were termed, arose, who, abandoning the search for the philosopher's stone, began to direct their energies to the discovery of chemical remedies for the various diseases of the body. "The true use of chemistry," says Paracelsus (1493–1541), "is not to make gold, but to prepare medicines." Rejecting the teaching of Galen, he admitted three or four elements, the *star*, the *root*, the *element*, and the *sperm* or *true seed*, which were originally confounded together in the *chaos* or *yliados;* these elements he asserted were composed of the three principles *sideric salt* and *sulphur* and *mercury*, the cause respectively of the qualities of fixity, combustibility, and fluidity and volatility. The theories of Paracelsus found many advocates, amongst whom may be mentioned Thurneysser (1530–1596), Bodenstein, Taxites, Dorn, Sennert, and Duchesne; and with some modifications they were maintained in the 17th century by Dr. Willis (1621–1675), the celebrated English anatomist and iatro-chemist, and by Lefevre and Lémery in France, according to whose system matter consisted of the active principles *mercury* or *spirit*, *sulphur* or *oil*, and *salt*, and the passive principles *water* or *phlegm* and *earth*.

Among the contemporaries, but not the followers of Paracelsus, the German metallurgist Agricola (1494–1555) deserves mention; his great work, *De Re Metallica*, is the most valuable contribution to practical chemistry that appeared in the 16th century. Libavius also, who died in 1616, did much to forward chemical science at this period. From his writings, however, in which he puts forward the views both of Paracelsus and of Aristotle concerning the constitution of bodies, it does not appear that his notions of chemical combination were more definite than those of his predecessors.

J. B. Van Helmont (1577–1644), who, like Paracelsus, repudiated the doctrines of the Galenists, held opinions that in many respects were no advance upon those of the former. He looked upon water as the true principle of all existing things, inclusive of the three principles, salt, sulphur, and mercury, which therefore were not elements; to air, however, he granted the rank of a true element. The *archæus*—something without form, and independent of the elements—he imagined to draw all bodies from water, to which its generating spirit was attracted by the odor of a *ferment* or *aura vitalis*. The vapor produced by the fermentation of water was, according to Van Helmont, a gas, and the same term was by him for the first time applied to carbon dioxide, which he termed *gas sylvestre*, and to other bodies resembling air.

To Francis de la Boë Sylvius (1614–1672), who studied with care the works of Van Helmont and of Descartes, is due the foundation of the iatro-chemical sect among physicians. In his view the health of the human frame depends upon the relation of its fluids, which were acid and alkaline (*acidum* and *lixivum*), and these by union produced a neutral and milder substance; two kinds of diseases were distinguished, the result either of alkaline or of acid acridity. The new doctrine served to explain many chemical facts, and led to the establishment by Lémery and Macquer of a distinction between acid and alkaline or, as they were afterwards called, basic compounds. This recognition of this chemical difference in bodies and their consequent disposition to unite prepared the way for the conception of chemical attraction or affinity.

In the works of Glauber (1604–1668), alchemy, the preparation of chemical medicines, and the processes employed by him for that end are treated of. His *Miraculum Mundi* has for its subject the virtues of the *sal mirabile*, sulphate of sodium, or Glauber's salt, of which he was the discoverer; and in other of his works he describes various chlorides of the metals, the sulphates of iron and copper, and sulphuric, nitric, and hydrochloric acids, but with respect to their ultimate constitution he advances no theory; he variously states in his different works that mercury and salt are the principles of all metals, that salt is the origin of all things, and again that water and earth have produced all the minerals and metals.

The first to attempt to overthrow the doctrines of the iatro-chemists was Robert Boyle (1627–1691), who in 1661 published the first edition of *The Sceptical Chemist, or Chymico-Physical Doubts and Paradoxes touching the Experiments whereby vulgar Spagyrists are wont to endeavor to evince their Salt, Sulphur, and Mercury to be the true Principles of Things*, a treatise in which he shows the doubtful character of the doctrine of the threefold constitution of matter, and lays stress upon the influence of heat in the formation of new bodies, not necessarily pre-existent as such in the substances from which they are produced. If, as he tells us, he is somewhat too indulgent of suspicion against the hypotheses or arguments of other chemists, he is only acting in compliance with the advice of Aristotle, and bending a crooked stick the contrary way, to reduce it at length to straightness. Into the mouth of "Themistius" he puts the complaint that "Aristotle's hypothesis had not been called in question till in the last century Paracelsus and some few other sooty empiricks, . . . having their eyes darkened and their brains troubled with the smoke of their furnaces, began to rail at the Peripatetick doctrine which they were too illiterate to understand, and to tell the credulous world that they could see the three ingredients in mixed bodies, which, to gain themselves the repute of inventors, they endeavored to disguise by calling them—instead of earth, and fire, and vapor—salt, sulphur, and mercury, to which they gave the canting title of hypostatical principles." Boyle inclines to a belief in "but one universal matter of things, as it is known that

the Aristotelians themselves acknowledge, who called it *materia prima; . . .* the portions of this matter seem to differ from one another in certain qualities or accidents, fewer or more." He thinks that elementary corpuscles are of various sizes, and of more sorts than three or four or five; and that the combination of two of these corpuscles may give rise to a new body as really one as either of the corpuscles before they were mingled or confounded, this concretion being endowed with distinct qualities, and no more by fire or any known way of analysis divisible into the corpuscles that had first concurred to make it, than either of them could by the same means be subdivided into other particles. He furthermore deduces from his arguments the corollary, "That it may as yet be doubted whether or no there be any determinate number of elements; or, if you please, whether or no all compound bodies do consist of the same number of elementary ingredients or material principles." In another work, *The Imperfections of the Chemical Doctrine of Qualities*, Boyle points out the arbitrary nature of Sylvius's classification of all substances as acids and alkalies, and the needlessness and unsatisfactory character of his hypothesis. Iatrochemistry was opposed also by Conring (1606–1681), Sydenham (1624–1689), Pitcairne (1652–1713), and his pupil Boerhaave (1668–1738), the author of the excellent *Elementa Chemiæ;* and though vigorously supported by De Blegny, Borrichius, Viridet, Vieussens, and others, it gradually lost repute, and was finally overthrown by F. Hoffmann (1660–1742).

Of the labors of Kunckel (1630–1702) in the cause of chemistry it is impossible to give an account within the compass of the present sketch; but whilst the science was enriched by means of his numerous researches, amongst which may be mentioned those on phosphorus, it received no assistance from his theoretical views concerning the constitution of bodies; thus, for instance, he rejected the belief in the three principles of Paracelsus, yet maintained that all metals contained common quicksilver; and though their increase in weight by calcination was not, according to him, due to the absorption of ponderable fiery material, the explanation he offered of this phenomenon was even less satisfactory.

To Becher (1635–1682) and to Stahl (1660–1734) chemistry owes the introduction of the first consistent theory of the constitution of compounds and of chemical action. Becher held that the primary ingredients of matter were water and earth, and that from these were produced three earths—the fusible or stony, the fatty, and the fluid earths,—improperly called salt, sulphur, and mercury. Stahl, who developed the doctrines of Becher, enumerated four elements—water, acid, earth, and phlogiston. Becher had explained the calcination of metals on the supposition that they consisted of an earth and a something of which they became deprived on ignition; the burning of brimstone was, in like manner, thought to be its resolution into an acid and true sulphur, or that combustible part which was dispelled by heat. It was this supposed combustible body to which the name phlogiston (*φλογίστον*, combustible) was applied by Stahl—the *materia aut principium ignis non ipse ignis.* The phlogiston of Stahl answers in some measure to the souls and spirits assigned to metals and salts by the alchemists, or to what Geber called the "humidity," and Cardan the "celestial heat" of metals. When by means of charcoal a metallic calx was reduced, or a compound containing sulphur was obtained from fused sodium sulphate, phlogiston was supposed to be absorbed from the charcoal, which with lamp black and other reducing agents came in time to be regarded as nearly pure phlogiston. Bodies that would not burn were thought to have already parted with their phlogiston. From a consideration of the insolubility of most combustible substances arose the idea that phlogiston was a dry and earthy body, capable of receiving a motion of great velocity—the *motus verticillaris*—manifested when ignition or flame was produced. John Rey had in 1630 remarked that metals grow heavier when calcined by the absorption of "thickened air," but had given no general theory of combustion, or explanation why many substances become lighter or are lost sight of when heated. Boyle, too, had noticed the increase of weight caused by the calcination of metals, and had attributed it to the combination of the latter with heat particles; and Stabel and others were not slow to object that this fact negatived the supposition that calcination consisted in a subtraction of phlogiston; the Stahlians, however, met the difficulty by declaring that substance to be the principle of levity or negative weight.

F. Hoffmann, who contributed greatly to the progress of analytical chemistry in Germany, held with Stahl that sulphur consisted of acid and phlogiston, and that combustible bodies contained something which might be described as phlogiston, but thought it possible that the calces of metals were formed, not by the subtraction of phlogiston, but by the combination of the metals with an acid material. Boerhaave, without directly attacking the phlogistic theory, casts doubts upon the assumption of the existence of a combustible principle and of earthy substances in the metals. The view of Homberg (1652–1715) was that the principle of combustibility in inflammable minerals and in vegetable substances was sulphur; and E. F. Geoffroy (1672–1731) regarded phlogiston as a sulphurous or oily principle. Amongst the most active supporters of the doctrines of Stahl were Neumann (1683–1737); J. H. Pott (1692–1777), distinguished for his researches on the behavior of mineral substances at high temperatures; Marggraf (1709–1782); and Macquer (1718–1784), the discoverer of arsenic acid. Other celebrated chemists who flourished during the phlogistic period were Réaumur (1683–1757), Hellot (1685–1765), and Duhamel du Monceau (1700–1781), who first proved the nature of the base of common salt.

The phlogistic theory of Stahl, though incorrect, was of no small assistance towards a true understanding of chemical phenomena. It was based upon experimental data, the interpretation of which served for the correlation of facts of which but vague and enigmatic explanations had formerly been given. The supposed subtraction of phlogiston in the calcination of metals, though equivalent in reality to the addition of oxygen, was yet a loss of potential energy, by virtue of the combination of the metal with the gas; and the gain of phlogiston was an increase of potential energy, attendant on the removal of oxygen.

It was only in the latter part of the 18th century tha the influence of the presence of air upon the formation of many chemical compounds was generally perceived, and that through the use of the balance the nature of gases began to be comprehended and such airy nothingness became commonly regarded as an intimate and necessary constituent of various solid and fluid bodies. The phlogistic theory gave to its adherents so plausible and moreover so circumstantial an account of the modes of chemical action, that facts and observations which caused at a later time a complete revolution in the theory of chemistry, such, for instance, as regarded the existence and properties of oxygen, remained without explanation, and almost unheeded. Robert Hooke, so early as 1665, in his *Micrographia*, foreshadowed the discoveries of Priestley and his contemporaries, when he advanced the opinion that in common air there existed a substance like, if not the same as, that fixed in saltpetre, and which at an elevated temperature dissolved combustibles such as sulphurous bodies with a rapidity sufficient to occasion the motion of fire, and to create light; this solvent he considered to be far less for a given bulk of air than of saltpetre. The investigations of Mayow (1645–1679) are particularly interesting. In treatises published at Oxford in 1668 and 1674 oxygen is actually described by him under the name of *fire-air, aërial spirit,* and *nitre-air;* all acids are said to contain it, and it is necessary for combustion and respiration, processes which are therefore analogous; it is the nitre-air of the atmosphere that causes fermentation and the souring of wines, that produces sulphuric acid from sulphur, and effects the calcination of metals.

Early in the 18th century Newton in his *Opticks* indicated the nature and the modes of formation of gases. "Dense bodies," he tells us, "by fermentation rarefy into several sorts of air; and this air by fermentation, and sometimes without it, returns into dense bodies;" and further on he remarks that the particles shaken off from bodies by heat or fermentation, so soon as they are beyond the reach of the attraction of the body, recede from it, and also from one another with great strength, so as sometimes to take up above a million of times more space than they did before in the form of a dense body. This vast contraction and expansion seem to him unintelligible by

feigning the particles of air to be springy and ramous, or rolled up like hoops, or by any other means than a repulsive power; the particles of fluids which do not cohere strongly are most easily rarefied into vapor; but those which are grosser, or cohere by a stronger attraction, are not separated without a stronger heat, or perhaps not without fermentation; being rarefied by fermentation they become true permanent air, those particles receding from one another with the greatest force, and being most difficultly brought together, which upon contact adhere most firmly.—(*Opticks*, bk. iii., qu. 30 and 31, 1730.)

In 1727 Dr. Stephen Hales (1677–1761), who had for some years been engaged in investigations similar to those of Mayow, gave to the world in his *Statical Essays* the collective results of his observations. The atmosphere he describes in this work as a fine elastic fluid, with particles of very different natures floating in it, whereby it is fitted to be the breath of life of vegetables as well as of animals. The effect of respiration and of the burning of sulphur in air is to deprive it of its elasticity; and country air is cleaner and more elastic than that of towns. Elasticity, we read, is not an essential immutable property of air particles; "they are easily changed from an elastic to a fixed state by the strong attraction of the acid, sulphurous, and saline particles, which abound in the air. Whence it is reasonable to conclude that our atmosphere is a chaos, consisting not only of elastic, but also of unelastic air particles, which in great plenty float in it."—(*Stat. Ess.*, vol. i. 4th ed., 1769.) Hales did not, however, attempt to determine the distinctive properties of the various gaseous constituents of the atmosphere, and of the substances on which he experimented; all are indiscriminately designated "air." It is air that is generated by fermentation, and that contributes to the briskness of Pyrmont and other mineral waters; 108 cubic inches of air are procured from a cubic inch of iron filings and the same quantity of oil of vitriol; and 33 cubic inches of air are the result of distilling a cubic inch of dog's blood. Hales determined also the volume of air to be obtained by distilling certain quantities of amber, chalk, coal, grey pyrites, aqua-fortis, antimony, tobacco, and other materials, but apparently with no other end in view than the establishment of the fact that air is contained in a great number of substances. He had learned to interrogate, but not to cross-examine nature.

The first important step towards a knowledge of the specific properties of the various gaseous bodies was that made in the middle of the 18th century by Dr. Black, who experimentally proved that the causticity acquired on ignition by mild magnesia and lime was attributable not to the entrance into them of ponderable caloric, but to the expulsion of a peculiar kind of air, which occurred fixed, or in a state of combination, in the unburnt or mild earths, and caused them to be heavier before than after exposure to heat. He found it possible, in fact, to impart to these substances a large amount of heat, which became latent, whilst at the same time their weight was lessened by the loss of "fixed air" (carbon dioxide). It was discovered by Black that alkalies in contact with quicklime became caustic by giving up their fixed air to the lime, which was thereby increased in weight and rendered mild. It was thus, by employing the balance as an experimental test of the composition of bodies, that Black laid the foundation of quantitative chemistry, and in so doing gave the first occasion to the strife that twenty years later began to rage between the followers of Stahl and the antiphlogistians.

Foremost in the number of those who after Black distinguished themselves as pneumatic chemists, was Dr. J. Priestley (1733–1804). His first discovery, made in 1772, was nitric oxide gas, which he soon employed in the analysis of air. Boyle, more than a century before Priestley began his experiments, had stated in *The Sceptical Chemist*, that "without the addition of any extraneous body, quicksilver may by fire alone, and that in glass vessels, be deprived of its silver-like color, and be turned into a red body; from this red body, without addition, likewise may be obtained a mercury bright and specular as it was before."—(*Boyle's Works*, ed. Birch, p. 352, Lond. 1744.) On the 1st of August, 1774, Priestley discovered that the red oxide of mercury evolved a gas when heated. This gas (oxgyen) being superior even to the air as a supporter of combustion was regarded by him as *dephlogisticated air;* the incombustible part of the atmosphere he supposed to be saturated with phlogiston, on the assumption that a gas was so much the better adapted for supporting combustion as it contained within itself a smaller quantity of that body. Common air, by drawing phlogiston from burning substances, became, as he thought, phlogisticated air, and on that account had no longer any attraction for phlogiston, or, in other words, any power of supporting combustion. The phlogiston evolved in the burning of combustibles and in the calcination of metals was supposed to unite with the atmosphere or the dephlogisticated air contained therein, and that which was produced by the action on the atmosphere of the phlogiston lost by the metals was the cause of the increased weight of their calces. The opinion that the air given off during the solution of metals in acid was their combustible constituent had been advanced in 1700 by Lémery; and Priestley, guided apparently by the notion suggested by Cavendish's experiments, that to unite with acids metals must part with their phlogiston, considered inflammable air (hydrogen) either as identical with or at least very rich in that principle. In 1788, in order to explain the formation of water from a mixture of inflammable and dephlogisticated air, he put forward the hypothesis that water entered into the composition of these and of fixed and other airs; inflammable air, he thought, might be the principle of alkalinity, dephlogisticated air, as Lavoisier had shown, being the principle of acidity. To the last Priestley was an advocate of the phlogistic philosophy, and though unquestionably one of the fathers of modern chemistry was always, to quote the words of Cuvier, "un père qui ne voulut jamais reconnoître sa fille." Besides nitric oxide and nitrogen, Priestley first made known sulphurous acid gas, gaseous ammonia and hydrochloric acid, and carbon monoxide; and he it was who, by showing that the condition of ammoniacal gas and of common air is altered by the transmission of electric sparks, led to Berthollet's analysis of ammonia, and Cavendish's discovery of the composition of nitric acid.

Henry Cavendish (1731–1810), who, like Priestley, was of the phlogistic school, contributed by his discoveries and carefully conducted investigations, especially as regards gases, scarcely less than that experimenter to the advance in chemical knowledge which before the beginning of the 19th century effected the subversion of the Stahlian philosophy. To him chemists are indebted for the invention of the pneumatic trough, and to him is due the first recognition of the importance of determining the specific gravities of the various gases. He established the radical difference between hydrogen and nitrogen, and discovered in 1781 that hydrogen and dephlogisticated air (oxygen), when exploded in a close vessel in proportions sufficient almost entirely to phlogisticate the burnt air, produced pure water; and that water was also formed when a mixture of common air and inflammable air was exploded, a reduction of one-fifth of the bulk of the former air being then observable. According to Cavendish, water consisted of phlogiston and dephlogisticated air; inflammable air, of phlogiston and water; the action of dephlogisticated upon inflammable air when exploded with it was to unite with its phlogiston to form water, and consequently to set free the water of the inflammable air; thus both airs became water.—(*Trans. Roy. Soc.*, 1784 and 1785.) Lavoisier had shown in 1770 the incorrectness of the notion prevalent among chemists that water by continued boiling and redistillation could be transformed into an earth. Cavendish's discovery deprived it of the rank of an element, to which, according to the vague Aristotelian doctrines of the time, it was entitled, and thus prepared the way for the acceptation of correct and definite views concerning the elementary bodies. Lavoisier, availing himself of the facts ascertained by Cavendish, taught that oxygen, the so-called dephlogisticated air, was an element, and that combined with it was imponderable caloric; inflammable air, or hydrogen, as he termed it, was another element, which had the power of disengaging from caloric a weight equal to its own of oxygen, with which it united to form water. The new doctrine did not, however, meet with very ready acceptance from the phlogistians. "It is inconceivable," writes one of them, "how water, which is absolutely incombustible, should have so combustible a body as inflammable gas is for one of its component parts; whereas, by admitting pure air in its whole substance to be one of the component parts of water, and the other to consist of the base only

of inflammable gas, which being burnt by the passage of the electric spark through it, its phlogiston is converted into light and heat, the whole doctrine of the generation of water becomes plain and easy."—(Hopson, *Chemistry*, 1789.)

Among the most eminent of the contemporaries of Priestley and Cavendish that cherished a belief in the existence of phlogiston was the Swedish chemist Scheele (1742–1786). In experiments made to ascertain the nature of heat and fire, he found that measured quantities of common air, when kept in contact with certain substances, *e. g.*, solution of potassium sulphide or moist iron-filings, contracted in volume, and became incapable of supporting combustion. As the specific gravity of the air had not augmented, the decrease of bulk, Scheele concluded, could not be due, as he had at first conjectured, to the absorption of phlogiston; the atmosphere must, therefore, consist of two distinct bodies. One of these, the residual air, he assumed to be incapable of combining with phlogiston; the other, having a strong attraction for that substance, had united with it, forming heat, which had penetrated through the walls of the vessel containing it—hence the diminution of the original volume of air. Heat, Scheele considered, was decomposed by means of bodies which had a strong attraction for its phlogiston, such as the calces of gold, silver, and mercury, and oil of vitriol mixed with black manganese ore, and consequently the other constituent of heat, empyreal or fire-air (oxygen), became isolated. Heat could be synthetized, for it was produced by the union of the phlogiston of coals with fire-air. Light, like heat, was a compound of fire-air and phlogiston, but was richer in the latter constituent, to the varying proportions of which it owed its differences of color. Subsequently, when it became impossible for Scheele to ignore the consideration of the increase observable in many substances after burning or calcination, he so far modified his views as to regard fire-air as a compound containing, with a very little phlogiston, a saline principle (*principium salinum*) and water, which last gave to fire-air the greater part of its weight. When fire-air formed heat by combining with phlogiston, it gave up its water to the materials it dephlogisticated, and thus it was that they were rendered heavier by ignition. Such, in brief, were the theoretical conceptions of Scheele; it is upon his work as a practical chemist that his fame must rest. Tartaric acid was isolated by him in 1769, and he made the discovery in 1774 of baryta and of dephlogisticated muriatic acid (chlorine), and in 1779 of glycerine, the properties of which he pointed out in 1784; in 1781 he demonstrated the nature of hydrofluoric acid, first obtained by him in 1771, and prepared tungstic acid, before unknown; and between the years 1776 and 1786 he discovered benzoic, molybdic, lactic, mucic, oxalic, malic, and gallic acids, and made important observations on the compounds of arsenious acid.

The advance made during the last part of the 18th century in analytical chemistry is attributable in great measure to the labors of Torbern Bergman of Upsala (1735–1784), who devised systematic methods of examining compounds by the wet way, and by means of the blow-pipe, and first rendered it possible to analyze minerals insoluble in acids by fusing them with an alkali or alkaline carbonate. In 1718 E. F. Geoffroy had published tables in which he exhibited the reciprocal chemical affinities of various substances, and these tables had been improved upon by Gellert in his *Metallurgic Chemistry*, 1751, and by Limbourg, 1761. Bergman, in 1775, gave in a dissertation on *elective attractions*, as he named affinity, an arrangement in 59 columns of all the chemical substances known at the time, in which was shown the order of their decomposition when in solution, and when exposed to a strong heat. The nature of the compounds formed by the mixture of reagents depended, in Bergman's estimation, on the sum of their attractions. Bergman contributed also in some measure to the determination of the constitution of neutral salts—a subject treated of by Homberg in 1699, and, after Bergman and Kirwan, investigated by Wenzel in his *Vorlesungun über die chemische Verwandtschaft der Körper*, published in 1777. From Wenzel's observations the idea of equivalency took its rise. He showed that the products of the mutual decomposition of two neutral salts were themselves neutral, or, in other words, that the same weight of base satisfies definite quantities of two different acids. Thus, according to his experiments, 123 parts of lime and 222 of potash must be considered equivalent to each other, being both competent to neutralize 181·5 parts of sulphuric, or 240 parts of nitric acid.

In England, ten years previously to the publication of Wenzel's treatise, Cavendish described certain quantities of fixed alkali and marble as "equivalent;" and in 1788 he stated that a quantity of oil of vitriol sufficient to produce 100 parts of plumbum ponderosum with sugar of lead would dissolve 33 of marble, since he found by experiment that so much oil of vitriol would saturate as much fixed alkali as a quantity of nitrous acid sufficient to dissolve 33 of marble.—(*Phil. Trans.*, 1767, p. 102; 1788, p. 178.)

In 1792, J. B. Richter (1762–1807) published a work on *Stöchiometrie*, or the Art of Measuring Chemical Elements, in which he gave in two series of tables the weights of different bodies which neutralized 1000 parts of various acids, and the weights of acids that similarly corresponded to 1000 parts in the case of the bases, and pointed out the proportionality that existed between the weights of the bases, as also of the acids, in each series. There was, he remarked, a constant ratio between the quantity of an acid and the quantity of oxygen in the weights of the bases needed for its complete saturation,—a fact afterwards restated by Berzelius, who showed that a simple and uniform relation was observable between the amounts of oxygen in the acid and basic portions of salts of the same class.

Although neither the science of chemistry nor yet a change in its objects can be said to have originated with Lavoisier (1743–1794), the means he introduced of attaining those objects, the ideas he put forth concerning the constitution of bodies, and the explanations he gave of various phenomena were new, and gave to the science in the twenty years preceding his death a completely altered aspect. The mine of chemistry had yielded rich returns long before Lavoisier came to labor in it; he availed himself of the old workings and, extending them, opened the main lode. "He discovered," says Liebig, "no new body, no new property, no natural phenomenon previously unknown; but all the facts established by him were the necessary consequences of the labors of those who preceded him. His merit, his immortal glory consisted in this—that he infused into the body of the science a new spirit; but all the members of that body were already in existence, and rightly joined together."—(*Letters on Chemistry*, ii.) In the first of his papers, in 1765, Lavoisier indicates no doubt of the existence of phlogiston. In 1775 he still spoke of it, but in the following year he expressed his conviction that, for the elucidation of certain phenomena, one must ascribe to phlogiston other qualities than those assigned to it by Stahl. It was in 1775 that he presented to the French Academy a memoir *On the Nature of the Principle which combines with the Metals during their Calcination, and which augments their Weight*, in which he describes the formation of fixed air from charcoal in the reduction of calces, and the preparation and properties of oxygen; but he makes no allusion to the fact that Priestley had in November of the foregoing year made him acquainted with that gas or to the observations of Bayen in the *Journal de Physique*, February and April, 1774, to the effect that the change of a metal into a calx is attributable to the fixation of an aërial fluid, and that the red oxide of mercury is reduced by heat without the addition of anything, and loses in weight by reduction.

In 1776 Lavoisier, by experiments with phosphorus and sulphur, confirmed results already arrived at by him—that the atmosphere contained two gases, azote or nitrogen, and a highly respirable air, the absorption of which by burning substances accounts for their increase in weight. In 1777 he combated the assertion of Priestley that air is rendered irrespirable by becoming loaded with phlogiston, and showed that air in which candles were burnt furnished about two-fifths of its volume of fixed air, and that pure or dephlogisticated air under the same conditions became almost completely transformed into that gas. In a paper received by the Academy in 1778 Lavoisier broached his theory that the dephlogisticated air of Priestley was the universal acidifying or *oxygenizing* principle which by combination with charcoal, sulphur, nitrogen, and phosphorus formed carbonic, vitriolic, nitric, and phosphoric acids, and with metals, calces; all the phenomena of combustion, Lavoisier contended, were explicable without the

supposition of the existence of phlogiston, of which there was no evidence. In 1783, when he had determined to discover by carefully conducted experiments the nature of the product of the combustion of hydrogen, Lavoisier learned that Cavendish had ascertained that body to be water. He therefore repeated Cavendish's experiments, and with the aid of Meusnier proved that water contains hydrogen, by passing steam through a red-hot porcelain tube containing iron wire. Lavoisier had long been unable to hold the doctrine that hydrogen was the phlogiston of metals, seeing that the calces were actually heavier than the metals supposed to contain them, and that the hydrogen supposed to be evolved by the metals, though light, certainly had weight. Lavoisier now explained the production of hydrogen during the solution of metals in acids on the assumption that water was decomposed, its oxygen uniting with the metals, whilst its hydrogen escaped. In the case, however, of nitric acid, oxygen was supposed to be supplied by the acid. The effect of Lavoisier's reasonings upon his contemporaries is illustrated by Priestley's remark (*Phil. Trans.*, 1788, p. 155) that, "the doctrine of the *decomposition of water* being set aside, that of *phlogiston* (which in consequence of the late experiments on water has been almost universally abandoned) will much better stand its ground." But the fate of the Stahlian philosophy was sealed; and in 1792 Klaproth and the Berlin Academy gave in their adhesion to the new doctrines. Gren and Wiegleb in Germany, Delametherie in France, and Kirwan in England endeavored, but in vain, to support the phlogistic theory; and ere long Lavoisier's innovations could be regarded not simply as the anti-phlogistic, but as the universally accepted system of chemistry. "It was the glory of Lavoisier," wrote Davy in 1814, "to lay the foundation of a sound logic in chemistry by showing that the existence of this principle (phlogiston), or of other principles, should not be assumed where they could not be detected." In 1789 was published Lavoisier's *Traité élémentaire de Chimie*, in which the new chemical doctrines were set forth with remarkable clearness and ability. A list of 33 "simple substances" is given in the 2d part of the 1st vol. of this work, wherein light and caloric are included with oxygen, azote, and hydrogen as elements of bodies; but as to whether light was a modification of caloric, or caloric a modification of light, it was impossible, Lavoisier considered, to decide (*Traité élément.*, tom. i. part ii. chap. i.). Under the head of "oxidable or acidifiable substances" he placed sulphur, phosphorus, carbon, and the muriatic, fluoric, and boracic radicals; the "oxidable and acidifiable metals" are antimony, silver, arsenic, bismuth, cobalt, copper, tin, iron, manganese, mercury, molybdenum, nickel, gold, platinum, lead, tungsten, and zinc; and the "simple earthy and salifiable substances" are lime, magnesia, baryta, alumina, and silica. Of metallic oxides, he says (*Traité élément.*, tom. i. part. i. chap. vii.), "they ought not to be considered as completely saturated with oxygen, because their action on that principle is balanced by the force of attraction exercised upon it by caloric. Oxygen, then, in the calcination of metals, obeys really two forces—that exercised by the caloric and that exercised by the metal." Davy, who by his experiments on the effects of friction on ice did much to dispel the belief in the materiality of heat, but who regarded light as a body in a peculiar state of existence, and consisting of minute particles, held the view that light in *phosoxygen* (oxygen gas) was intimately combined with oxygen.—(*Works*, vol. ii. pp. 11–32.)

The table in next column will serve to show the progress that has been made in the knowledge of the elementary bodies from the time of the publication of Lavoisier's *Traité élémentaire;* the second and third columns give the authorities by whom and the dates when these bodies were either first isolated, or were recognized as simple substances.

Uranium.	Klaproth.	1789	Strontium.	Davy.	1808
Titanium.	Klaproth.	1795	Chlorine.	Davy.	1810
Chromium.	Vauquelin.	1797	Fluorine.	Ampère.	1810
Tellurium.	Klaproth.	1798	Iodine.	Courtois.	1811
Tantalum.	Hatchett & Ekeburg.	1801 1802	Lithium.	Arfvedson.	1817
			Selenium.	Berzelius.	1817
Vanadium.	Del Rio and Sefström.	1801 1830	Cadmium.	Hermann & Stromeyer.	1818
			Silicon.	Berzelius.	1823
Cerium.	Berzelius, Hisinger, & Klaproth.	1803	Zirconium.	Berzelius.	1824
			Bromine.	Balard.	1826
Palladium.	Wollaston.	1803	Aluminium.	Wöhler.	1827
Iridium.	Tennant.	1804	Glucinum.		1828
Osmium.	Tennant.	1804	Thorium.	Berzelius.	1828
Rhodium.	Wollaston.	1804	Yttrium.	Wöhler.	1828
Potassium. Sodium.	Davy.	1807	Didymium. Lanthanum.	Mosander.	1841
			Erbium.	Mosander.	1843
Barium.	Davy, and Berzelius & Pontin.	1808	Niobium.	Rose.	1844
			Ruthenium.	Claus.	1844
Boron.	Davy, and Gay-Lussac & Thénard.	1808	Cæsium. Rubidium.	Kirchhoff & Bunsen.	1860 1861
			Thallium.	Crookes and Lamy.	1861 1862
Calcium.	Davy, and Berzelius & Pontin.	1808	Indium.	Reich and Richter.	1863
Magnesium.	Davy.	1808	Gallium.	Boisbaudran.	1875

Lavoisier was assisted in the establishment of his system by Fourcroy (1755–1809), Monge (1746–1818), Guyton de Morveau (1737–1816), and Berthollet (1748–1822); Lavoisier's theory that oxygen was the principle of acidity was not, however, accepted by Berthollet. In 1803 appeared Berthollet's *Chemical Statics*, in which Bergman's conclusions with respect to the laws of the combination of acids and bases were disputed. Affinity, it was argued, could not be simply an attraction, for then no decomposition, but only an addition of constituents would take place when solutions of different compounds were mixed together; affinity might be regarded as an attraction between combining substances probably like that existing between the planetary bodies—an attraction dependent on mass, not on elective force, so that combination between the various kinds of matter could take place in all sorts of proportions. The complete removal of a constituent of a compound by means of a decomposing agent was attributed by Berthollet to its elasticity or insolubility in the free state. Thus, he considered that barium sulphate was precipitated by solution of potassium sulphate because it was insoluble in water, but that a triple compound was formed when solutions of the sulphates of sodium and potassium were mingled. The decomposition of ammonium carbonate by sulphuric acid he asserted to be due to the elasticity of the carbonic acid gas that escaped. Berthollet's hypotheses found an opponent in Proust (1755–1826), who had already written on the constancy of the relations by weight of the component parts of bodies, and had shown that tin and antimony unite with oxygen, and iron with sulphur, in two definite proportions respectively. In a controversy with Berthollet that extended over some years he successfully demonstrated that all compounds are definite, and contain only certain determinate proportions of their constituents.

In August, 1804, Dalton (1766–1844) communicated to Dr. Thomson his theory of the atomic composition of bodies. Dalton's ideas had been vaguely foreshadowed by W. Higgins of Pembroke College, Oxford, in a publication entitled *A Comparative View of the Phlogistic and Antiphlogistic Theories*, where we read that—

"In volatile vitriolic acid a single ultimate particle of sulphur is intimately united only to a single particle of dephlogisticated air; and in perfect vitriolic acid every single particle of sulphur is united to two of dephlogisticated air, being the quantity necessary to saturation. As two cubic inches of light inflammable air require but one of dephlogisticated air to condense them, we must suppose that they contain equal number of divisions, and that the difference of their specific gravity depends chiefly on the size of their ultimate particles; or we must suppose that the ultimate particles of light inflammable air require two or three or more of dephlogisticated air to saturate them. If this latter were the case, we might produce water in an intermediate state, as well as the vitriolic or the nitrous acid, which appears to be impossible; for in whatever proportion we mix our acids, or under whatever circumstance we combine them, the result is invariably the same."—(2d ed., 1791.)

The atomic theory first suggested itself to Dalton during his investigations on marsh-gas, or light carburetted hydrogen, and olefiant gas. He calculated that if the weight of carbon in each of these compounds were reckoned to be the same, then marsh-gas contained exactly twice the weight of hydrogen present in olefiant gas. He further observed that the quantity of oxygen in carbonic acid gas was twice as much as in carbonic oxide gas. These and similar facts he conceived might be explained by assuming the ultimate particles of matter to be incapable of further division, or, in other words, *atoms*, possessing definite weights, the ratios of which could be denoted by numbers, the weight of an atom of hydrogen being taken as unity. The combination of these atoms with one another would account then for the definite proportions in which the elements united. For clearness the atoms were represented by symbols, thus:—

	Relative Weights.
○ Oxygen	6·5
⊙ Hydrogen	1
● Carbon	5
◑ Azote	5

Binary compounds with their weights were denoted thus:—

○ ⊙ Water	7·5
● ⊙ Olefiant gas	6
◑ ⊙ Ammonia	6
○ ● Carbonic oxide	11·5

and ternary compounds in a similar manner:—

○ ● ○ Carbonic acid gas	18
● ⊙ ● Ether	11
⊙ ◉ ⊙ Carburetted hydrogen gas	7

The weight of the smallest particle of a compound was, therefore, according to Dalton's theory, to be obtained by adding together the weights of its constituent atoms; the laws discovered by Wenzel and Richter were thus included within the law of atomic weights.

The new theory was promulgated in Dr. Thomson's *System of Chemistry*, 3d edit., 1807. In the same year Thomson showed that the amount of oxalic acid required to form strontium binoxalate was twice as great as that in the case of the oxalate, supposing the weight of strontium in each salt to be the same; and Dr. Wollaston proved that three potassium oxalates were obtainable, to form which a definite amount of potash needed weights of oxalic acid in the proportion of 1 : 2 : 4.

In 1808, the year of the publication of Dalton's *New System of Chemical Philosophy*, Gay-Lussac made known to the world the laws of the combinations of gases by volume—to which his attention had been directed by the discovery which he and A. Von Humboldt had made, that a definite volume of oxygen combined with exactly twice its bulk of hydrogen. He pointed out that there is a simple relation between the volumes of two gases which unite together, and also between their collective volume in the uncombined and in the combined condition. Thus, three volumes of hydrogen combine with one of nitrogen to form two volumes of ammonia; one volume of chlorine with one of hydrogen produces two volumes of hydrochloric acid gas; and two volumes of nitrogen and one of oxygen give two volumes of protoxide of nitrogen. The law of definite proportions was shown to hold good with respect to the volumes as well as to the weights of combining bodies.

In 1811 Avogadro, remarking that equal variations of temperature and pressure produce in all gases and vapors the same changes of volume, enunciated the hypothesis that equal volumes of any gas or vapor contain the same number of atoms, and the same doctrine was brought forward in 1814 by Ampère. On this hypothesis the density of equal volumes of gases was shown to represent the relative weights of their atoms; and thus, as it had been discovered that gases frequently do not unite volume for volume, a distinction came to be drawn between atomic weights and equivalents. If we say atom for volume, wrote Berzelius, we find in Gay-Lussac's discovery one of the most direct arguments in favor of Dalton's hypothesis.

Berzelius (1779–1848), from considerations based on the law of combination by volume, accounted the atoms of elements distinct from their equivalents. Thus two volumes of hydrogen were recognized as the equivalents of one volume of oxygen, the relative weights of equal volumes of the two gases being those of their atoms. Berzelius adopted 100 parts of oxygen as his standard of atomic weight, the atomic weight of hydrogen was therefore 6·24, its equivalent, 12·48. He considered that the atoms of aluminium, arsenic, antimony, bromine, chlorine, fluorine, hydrogen, iodine, nitrogen, and some other elements had a weight equal to only half that of their equivalents, which latter were double and inseparable atoms. In place of the symbols used by Dalton to denote the proportions in which the elements combine by weight, he employed a notation in which letters were used to indicate the names of the elements. He introduced also an abridged notation, in which the equivalents or double atoms were represented by drawing a bar through the symbol of the element. A dot being used to signify an atom of oxygen, the formula of water was written $\dot{H}$; and $\dot{H}\dot{C}l$ denoted hydrochloric acid, which was viewed as consisting of a double atom of hydrogen united to a double atom of chlorine—an hypothesis which left unexplained the fact that the combination of the so-called double atoms of hydrogen and chlorine resulted always in the formation of two molecules, instead of one, of hydrochloric acid gas. Berzelius constructed a table of atomic weights and equivalents, which the discovery by Dulong and Petit in 1819 of the connection between the specific heats and the atomic weights of the elements, and that of the law of isomorphism by Mitscherlich in 1820, enabled him to modify and improve. The equivalent notation of Berzelius was adopted by Gay-Lussac, and displaced in time that founded upon the atomic weights; but it was not generally applied with strictness to all compounds, molecular and not equivalent formulæ being employed in some cases. It had this objection, that it masked the relative atom-fixing powers of the various acids; thus the formula $AgO.\frac{1}{3}PO_5$ did not express the tribasic character of a molecule of phosphoric acid, and its relations to the molecules of acids of less basicity. Observing the ratio between the oxygen of bases and acids, Berzelius was led to the conception of the dualistic theory, according to which all compounds consist of paired constituents or groups of constituents. This theory was applied to both organic and inorganic substances, and received considerable support from the development of the doctrine of compound radicles, of which Berzelius was the chief supporter.

De Morveau, in a memoir *On the Development of the Principles of Methodical Nomenclature*, had in 1787 given the name of *radicles* to the "acidifiable bases" of acids, and Lavoisier in his *Traité élémentaire* had spoken of the "hydrocarbon radicles" in oils, starch, sugar, and gum. In 1817 Berzelius, following Lavoisier, held the opinion that all inorganic oxides contained simple radicles, and organic oxides compound radicles. In 1832 Liebig and Wöhler discovered the composition of bitter-almond oil, which they showed, on the assumption of the existence of a radicle C_7H_5O, might be compared with the compounds of potassium and other metals. Berzelius at first accepted their explanation of the constitution of benzoyl-compounds, but afterwards rejected it, as his electro-chemical theory did not support the view that oxygen could be a constituent of a radicle. Benzoic acid was represented by him as a compound containing the radicle $C_{14}H_5$, thus:—$C_{14}H_5.O_3+HO$, and alcohol as an oxide of the radicle CH_3, or $2(CH_3).O$.

In 1834 Dumas made known his observations on the substitution of hydrogen by other elements; and Laurent subsequently concluded from numerous experiments that, when hydrogen is substituted by an equivalent of chlorine or bromine, these elements take the place occupied by the hydrogen, performing to a certain extent the functions of the latter in the new compound, which is therefore analogous to that from which it has been produced. Thus was given the first blow to the dualistic theory. The discovery of trichloracetic acid by Dumas gave considerable aid in the establishment of the new doctrine; but Berzelius and others, who were unable to reconcile with the electro-chemical theory the substitution of an electro-positive by an electro-negative element, sought to explain the facts of substitution in accordance with dualistic notions. Berzelius considered that a compound in which oxygen was a fourth element was at once an oxide and a chloride; trichloracetic acid was, in his opinion, a copulated compound of sesquichloride of carbon with sesquioxide of carbon (oxalic acid) $C_2Cl_3+C_2O_3+HO$; acetic acid, on the other hand, was a trioxide of acetyl (C_4H_3) with the formula $C_4H_3.O_3+HO$. The substitution-compounds discovered by Malaguti and Regnault were in like manner represented dualistically; dichloroformic ether, for example, was written $2C_2H.O_3+C_2H.Cl_3+2C_4H_3.O_3+C_4H_3.Cl_3$; such complex formulæ, however, which implied in most cases a widely different constitution for bodies obviously related in properties, were received with but little favor by chemists. At length Melsens, by converting trichloracetic acid into acetic acid, gave decisive evidence as to the truth of the principle of the substitution theory.

Gerhardt, who regarded all compounds as simple molecules, certain atoms of which were displaceable by double decomposition, discarded entirely the conception of radicles. He classified organic substances according to the number of carbon atoms contained in their molecules; hence the recognition of homologous series of organic compounds. What he termed *residues*—molecules deprived of certain

of their constituents—were in many instances identical with the radicles employed by Berzelius, but were not held necessarily to pre-exist in compounds. Gerhardt was the means of reintroducing, in a modified form, the atomic notation of Berzelius. Observing that the smallest quantities by weight of carbonic acid gas and water produced in reactions were expressed by the formulæ C_2O_4 and H_2O_2, he concluded that these must represent the molecules of the two bodies, which might be more conveniently written CO_2 and H_2O, the atom weights of hydrogen, oxygen, and carbon being taken as 1, 16, and 12 respectively. He made the atomic weights of bromine, chlorine, fluorine, hydrogen, iodine, nitrogen, and other of the elements equal to those given by Berzelius, thus enabling the formulæ of water and most volatile compounds to be expressed in agreement with the law of Gay-Lussac; but he halved the old atomic weights of most of the metals, supposing that all metallic oxides were similar in constitution to water, or contained two atoms of metal to one of oxygen. Regnault afterwards proved that, according to the law of Dulong and Petit, this alteration ought to be made in the case only of the atomic weights of the metals lithium, potassium, sodium, and silver; many metals were accordingly to be regarded as having oxides of the general formula RO. Such metals, being compared with the diatomic radicles of organic chemistry, were called diatomic by Cannizzaro in 1858. Thus originated the idea of the polyatomicity of the metals.

The theory of types dates from the time of the discovery of trichloracetic acid by Dumas, who observed that this body and others similarly obtained must be of the same *chemical type* with the hydrogenated substances from which they are derived. The discovery by Wurtz of the compound ammonias, and by Hofmann of diethylamine and triethylamine, led to the creation of the *ammonia type;* and Williamson, by the discovery in 1850 of the mixed ethers, was enabled to refer ether, alcohol, and acids to the *water type*, and to predict the existence of acetic anhydride, which, as well as benzoic anhydride, was discovered in 1852 by Gerhardt. To these types Gerhardt added two others, those of hydrogen and hydrochloric acid, and with the former associated the aldehydes, ketones, and many hydrocarbons, *e.g.*, the radicles discovered by Frankland and Kolbe. The theory of types was still further extended by Williamson, to whom the conception of condensed types is due; by Odling, who first suggested the idea of representing the relations of compounds by the use of mixed types; and by Kekulé and numerous other investigators.

The foundation of electro-chemical science may be said to have been laid by Nicholson and Carlisle, who in 1800 discovered the decomposition of water by the agency of the voltaic pile; but the earliest electro-chemical experiments were those made by Priestley in 1775 upon ammonia gas, and by Deiman and Van Troostwijk in 1789 upon water, by means of frictional electricity. Cruickshank by experiments with the chlorides of magnesium, sodium, and ammonium demonstrated that when those salts are decomposed by the electric current, alkali always appears at the negative, and acid at the positive pole.

In 1803 Berzelius and Hisinger published their observations on the electrical decomposition of salts and some of their bases; oxygen, acids, and oxidized bases, they said, appear at the positive pole; combustible bodies, alkalies, and earths at the negative. Later experimenters, however, showed that it is the metal, not the oxide, that appears at the negative pole when salts are electrolyzed, and that oxides cannot be supposed to exist ready formed in salts. Davy, whose electrical experiments were commenced in 1800, undertook in 1806 a course of investigations which led him to the discovery of the metals of the alkalies and alkaline earths. In 1807 he expressed the opinion that bodies having an affinity for one another are in different states of electricity, and "that chemical and electrical attractions depend upon the same cause, acting in the one case on particles and in the other on masses of matter."

In 1834 Faraday discovered that the decompositions effected by the voltaic current indicate the quantity by weight in which the elements combine, or the weights of the atoms of the atomic theory, thus adding to the probability of the correctness of the supposition that the operations of the same agent are exhibited in both chemical and electrical phenomena. Latterly, the discovery of the action of the copper-zinc couple by Gladstone and Tribe has opened out a new field of electro-chemical research, already productive of important results. To mention, however, the numerous advances that have been made in recent times, whether in chemical physics or in chemistry proper—especially as regards the constitution and synthesis of the compounds of carbon—would be to exceed the scope of the present introductory notice. The reader must, therefore, be referred to the treatises and original memoirs of those whose labors have effected the modern development of chemistry, and have raised it to the high position which it occupies as a science at the present time. (F. H. B.)

The Elements.

The examination of all the various substances met with in nature has led to the discovery of sixty-four different bodies, from which it is impossible by any means *now* at our disposal to separate simpler substances; they are consequently termed "elementary or simple bodies," or "elements." It is not asserted that such substances are absolutely simple, or that they may not be found hereafter to yield more than one kind of matter, but merely that so far as our knowledge extends it is so; indeed, recent spectroscopic researches favor the impression that some at least of the elements are, perhaps, compounds of simpler bodies.

It is the study of the laws which regulate the combination of the elements with one another, and to which their compounds are subject in their mutual actions, and of the properties of the elements and of the compounds formed by their union, which constitutes the science of chemistry.

The majority of the elements are of comparatively rare occurrence, whilst many of them are extremely rare, being met with only in certain localities. Gold and a few others almost always occur as such, and our atmosphere, we know, consists chiefly of the two elements, oxygen and nitrogen, in the free state; also some others, such as carbon, copper, silver, and sulphur, are occasionally met with in the uncombined state, but in general two or more elements are found united. The number of elements of which the materials are made up which principally compose the earth and the plants and animals living upon it is, however, exceedingly small. Thus, plants consist chiefly of carbon, hydrogen, and oxygen, and animals chiefly of these three elements together with nitrogen; water consists entirely of oxygen and hydrogen. The solid earth is mainly composed of substances such as quartz or silica, chalk or limestone, and various silicates like felspar and clay,—the elements which are the chief constituents of these substances being oxygen, silicon, carbon, calcium, magnesium, aluminium, iron, and potassium. The only elements which appear to be absolutely essential to vegetable or animal life are carbon, oxygen, hydrogen, nitrogen, sulphur, phosphorus, calcium, iron, potassium, sodium, magnesium, silicon, and chlorine; and the remainder are to us, so to speak, merely of artificial value.

Four of the elements—chlorine, hydrogen, nitrogen, and oxygen—are gases; and fluorine, which is not known with certainty in the free state, is probably also a gas; two are liquid at ordinary atmospheric temperatures, viz., mercury and bromine; and the element gallium, recently discovered in certain zinc ores, but as yet obtained in only very small quantities, is also said to be a liquid. The remaining elements are solids.

The following is a list of the elements now known, arranged in alphabetical order. The most important elements are distinguished in the table by capitals; whilst those which at present are of slight importance, on account of their rare occurrence, or of our insufficient knowledge of their properties, are printed in italics.

Name of Element.	Symbol.	Atomic Weight.
ALUMINIUM.	Al	27·3
Antimony.	Sb (Stibium)	122
Arsenic.	As	74·9
Barium.	Ba	136·8
Bismuth.	Bi	207·5
Boron.	B	11
BROMINE.	Br	79·75
Cadmium.	Cd	111·6
Cæsium.	Cs	132·7
CALCIUM.	Ca	39·9
CARBON.	C	11·97
Cerium.	Ce	141

Name of Element.	Symbol.	Atomic Weight.
CHLORINE.	Cl	35·36
Chromium.	Cr	52·4
Cobalt.	Co	58·6
COPPER.	Cu	63·3
Didymium.	Di	147
Erbium.	Er	(?)170·5
Fluorine.	F	19·1
Gallium.	Ga	69·8
Glucinum.	G	9·3
Gold.	Au (Aurum)	196·2
HYDROGEN.	H	1
Indium.	In	113·4
IODINE.	I	126·53
Iridium.	Ir	196·7
IRON.	Fe (Ferrum)	55·9
Lanthanum.	La	139
LEAD.	Pb (Plumbum)	206·4
Lithium.	Li	7·01
Magnesium.	Mg	23·94
Manganese.	Mn	54·8
MERCURY.	Hg (Hydrargyrum)	199·8
Molybdenum.	Mo	95·8
Nickel.	Ni	58·6
Niobium.	Nb	94
NITROGEN.	N	14·01
Osmium.	Os	198·6
OXYGEN.	O	15·96
Palladium.	Pd	106·2
PHOSPHORUS.	P	30·96
Platinum.	Pt	196·7
POTASSIUM.	K (Kalium)	39·04
Rhodium.	Ro	104·1
Rubidium.	Rb	85·2
Ruthenium.	Ru	103·5
Selenium.	Se	79
SILICON.	Si	28
SILVER.	Ag (Argentum)	107·66
SODIUM.	Na (Natrium)	23
Strontium.	Sr	87·2
SULPHUR.	S	31·98
Tantalum.	Ta	182
Tellurium.	Te	128
Thallium.	Tl	203·64
Thorium.	Th	(?)178·5
TIN.	Sn (Stannum)	117·8
Titanium.	Ti	48
Tungsten.	W (Wolfram)	184
Uranium.	U	(?)180
Vanadium.	V	51·2
Yttrium.	Y	(?) 89·5
ZINC.	Zn	64·9
Zirconium.	Zr	90

Laws of Combination by Weight and Volume—Their explanation by the Atomic Theory—Determination of the relative Weights of Atoms.

The proportions in which elements unite together are definite and constant, a given compound always consisting of the same elements united in the same proportions. Chloride of silver, for example, in whatever manner it may be prepared, invariably consists of chlorine and silver in the proportions by weight of 35·36 parts of the former and 107·66 of the latter.

But it is often the case that elements combine together in several proportions; whenever this occurs the several proportions in which the one element unites with the other invariably bear a simple relation to one another. Thus, 1 part by weight of hydrogen unites with 8 parts by weight of oxygen, forming water, and with 16 or 8 × 2 parts of oxygen, forming peroxide of hydrogen. Again, in nitrous oxide we have a compound of 8 parts by weight of oxygen and 14 of nitrogen; in nitric oxide a compound of 16 or 8 × 2 parts of oxygen and 14 of nitrogen; in nitrous anhydride, a compound of 24 or 8 × 3 parts of oxygen and 14 of nitrogen; in nitric peroxide a compound of 32 or 8 × 4 parts of oxygen and 14 of nitrogen; and lastly, in nitric anhydride a compound of 40 or 8 × 5 parts of oxygen and 14 of nitrogen. This law is known as the law of combination in multiple proportions.

The proportions in which two elements combine with a third also represent the proportions in which, or in some simple multiple of which, they will themselves combine. For instance, 35·36 parts of chlorine and 79·75 parts of bromine combine with 107·66 parts of silver; and when chlorine and bromine unite it is in the proportion of 35·36 parts of the former to 79·75 parts of the latter. Iodine unites with silver in the proportion of 126·53 parts to 107·66 parts of the latter, but it combines with chlorine in two proportions, viz., in the proportion of 126·53 parts either to 35·36 or to three times 35·36 parts of chlorine. This is known as the law of combination in reciprocal proportions.

In explanation of these three laws deduced entirely from experimental observations, chemists have adopted the atomic or molecular theory which was first introduced into the science by Dalton at the commencement of this century. According to this theory the exceedingly small masses or *molecules* of which it is supposed matter consists are composite, being made up of indivisible particles or *atoms* (see the article ATOM, vol. iii. p. 33). The molecules of the elements are assumed to consist of similar atoms, whereas those of compounds are congeries of dissimilar atoms; and the molecules which constitute a given kind of matter, it is supposed, are alike in weight and general properties, but differ from those of which all other kinds of matter are composed, so that every molecule belongs to one of a definite number of species. The study of the alterations which take place in the composition of molecules under the influence of various forces, and which result from their action upon one another, is the work of the chemist; whilst it is the province of the physicist to study the influences of those forces upon matter which affect entire molecules without in any way altering their composition.

The chemist has no means of ascertaining, nor does he attempt to ascertain, the absolute weights of the atoms or of the molecules of the various elements and their compounds; he concerns himself merely with their relative weights, hydrogen being adopted as the standard of reference, since it is the lightest of all known elements. The relative weight of the atoms of the various elements referred to that of hydrogen regarded as 1 are given in the third column of the table on pp. 404, 405. The determination of the exact atomic weight of an element is an operation of extreme difficulty, and one requiring the greatest analytical skill, so that as yet the atomic weights of only a limited number of elements have been ascertained with more than approximate accuracy. The most accurately determined atomic weights are those of hydrogen, oxygen, nitrogen, chlorine, bromine, iodine, lithium, potassium, sodium, silver, and thallium. Apparently the numbers obtained for these elements are practically perfect.

The manner in which the relative weights of the atoms of the elements are determined will be evident from the following considerations.

If, instead of comparing together the relative weights of the elements which enter into combination, the volumes which they occupy in the state of gas (at the same temperature and under the same pressure) before and after combination are compared, it is found that gases always unite together in very simple proportions, viz., either in equal volumes, or in volumes which bear some simple relation such as 1 : 2, 1 : 3, 1 : 4, 2 : 3, &c. Moreover, whatever the number of volumes before combination, it always is reduced to two on combination. Thus, equal volumes of hydrogen and chlorine gases unite without condensation to form hydrochloric acid gas; in the production of water 2 volumes of hydrogen and 1 of oxygen combine, but form only 2 volumes of water-gas or steam; and if ammonia gas be decomposed by heat or a series of electric sparks, 2 volumes of the gas yield 3 volumes of hydrogen and 1 of nitrogen.

Now, according to the law of Boyle and Mariotte, the volume of a given mass of any gas varies inversely as the pressure, provided that the temperature remains the same; for instance, the quantity of air which is contained in a vessel of the capacity of 1 pint under the pressure of 1 atmosphere, or 15 lb upon the square inch, may be contained in a vessel of half a pint capacity if the pressure be doubled.

According to the law of Charles and Gay-Lussac, on the other hand, all gases expand equally by heat, provided the pressure remains constant,—the rate of expansion being $\frac{1}{273}$ of the volume at 0° C. for each rise of 1° C. in temperature; or, in other words, the volume of a gas varies directly as the absolute temperature.

A gas which strictly conforms to these two laws is said to be a perfect gas, but none of the gases with which we

are acquainted are perfect in this sense. Thus, Andrews's experiments show that carbonic anhydride, which under a pressure of 36 atmospheres at 0° C. is reduced to the liquid state, condenses more than it should according to Boyle's law. Again, the density of chlorine gas referred to air, according to Stas's determination of the atomic weight of this element, should be 2·4501. The following table exhibits its density at various temperatures from 20° to 200° C.,[1] and it is evident that it is higher than it should be at all temperatures below 200° C.:—

Temperature.	Density.	Temperature.	Density.
20°	2·4807	150°	2·4609
50°	2·4783	200°	2·4502
100°	2·4685		

From the few accurate observations which have been made on this subject it appears that, in general, the departure from the laws of Boyle and Charles is greater the more the temperature of the gas approaches to that at which it becomes liquid; and chlorine affords an instructive illustration of this, since it is readily condensed to a liquid under the pressure of 4 atmospheres at 15°·5 C., or by cooling in a bath of solid carbonic anhydride and ether.

The general resemblance in the behavior of gases under the influence of pressure and heat is very great, however, although not in absolute accordance with the laws of Boyle and Charles; by this we are led to the assumption that their physical constitution must be similar, and, therefore, to the acceptance of the proposition, originally stated by Avogadro in 1811, that equal volumes of different gases contain equal numbers of molecules. Obviously, therefore, if the relative weights of equal volumes of different gases are determined under the same conditions as to temperature and pressure, the temperature and pressure chosen being that at which the gases most closely approximate to the requirements of the laws above stated, an estimate of the relative weights of their molecules is obtained. For example, the density of nitrogen referred to hydrogen is 14, since a given volume of nitrogen is found to weigh 14 times as much as an equal volume of hydrogen at the same temperature and under the same pressure; hence, according to Avogadro's hypothesis, the molecules of nitrogen are fourteen times as heavy as the hydrogen molecules.

In the formation of hydrochloric acid gas equal volumes of chlorine and hydrogen unite without condensation. The density of chlorine gas referred to hydrogen is 35·36, and the simplest possible hypothesis of the composition of hydrochloric acid is that it consists of an atom of hydrogen weighing 1, and an atom of chlorine weighing 35·36, so that its molecule, therefore, must weigh 36·36. But since the density of hydrochloric acid gas is ascertained by experiment to be only 18·18 as compared with that of hydrogen, and, according to Avogadro's hypothesis, equal volumes of hydrogen and hydrochloric acid gas contain equal numbers of molecules, it follows that the weight of the hydrogen molecule as compared with that of hydrochloric acid must be 2, or in other words, *that the hydrogen molecule consists of two atoms.* The chlorine molecule in like manner must consist of two atoms, each weighing 35·36, and in the formation of hydrochloric acid from hydrogen and chlorine two molecules of hydrochloric acid are produced from a molecule of hydrogen and a molecule of chlorine: in the one molecule half the hydrogen is displaced by chlorine, in the other half the chlorine is displaced by hydrogen. It may be proved that the assumption is correct that the molecule of hydrochloric acid contains only a single atom of chlorine, weighing 35·36, and that it does not consist, for example, of two atoms of chlorine each weighing 17·68, by comparing the various volatile compounds containing chlorine. In the first place their densities in the state of gas are determined, and a knowledge is thus obtained of the relative weights of their molecules as compared with that of the hydrogen molecule; the percentage of chlorine they contain is then ascertained by careful analysis. The density referred to hydrogen as unity multiplied by 2 gives the molecular weight of the compound; and the percentage of chlorine being known, the amount contained in the quantity expressed by the molecular weight is ascertained by a simple calculation. For example, the density of sulphur chloride is found to be 57·36, and its molecular weight is therefore 57·36 × 2, or 114·72; it contains 61·64 per cent. of chlorine, so that in 114·72 parts there are 70·72 of chlorine. When the numbers thus deduced are compared it is seen that the lowest amongst them is 35·36, and that all the higher numbers are simple multiples of this; 35·36 is accordingly adopted as the number which expresses the weight of the atom of chlorine relatively to that of the hydrogen atom. A number of volatile chlorine compounds are thus compared in the following table:—

Name of Compound.	Molecular Weight.	Weight of Chlorine.
Hydrochloric acid	36·36	35·36
Methyl chloride	50·33	35·36
Carbon oxychloride	98·65	35·36 × 2
Mercuric chloride	270·52	35·36 × 2
Boron chloride	117·08	35·36 × 3
Phosphorus trichloride	137·04	35·36 × 3
Carbon tetrachloride	153·41	35·36 × 4
Silicon tetrachloride	169·44	35·36 × 4
Aluminium chloride	266·76	35·36 × 6
Chlorine	70·72	35·36 × 2

In like manner, on comparing the various volatile compounds which contain oxygen, it is found that the number 16 represents the least weight of oxygen contained in the molecular weight of any of its compounds; 16 is therefore taken as the atomic weight of oxygen.

In all cases in which it is possible to obtain volatile compounds, the atomic weights of elements may be deduced in this manner; unfortunately, however, many of the elements do not furnish stable volatile compounds, so that hitherto the atomic weights of the following elements only have been ascertained by the application of Avogadro's hypothesis:—

Antimony.	Iodine.	Silicon.
Arsenic.	Lead.	Sulphur.
Bismuth.	Mercury.	Tantalum.
Boron.	Molybdenum.	Tellurium.
Bromine.	Niobium.	Tin.
Carbon.	Nitrogen.	Titanium.
Chlorine.	Osmium.	Tungsten.
Chromium.	Oxygen.	Vanadium.
Fluorine.	Phosphorus.	Zinc.
Hydrogen.	Selenium.	Zirconium.

The determination of the density of bodies in the state of gas is thus an operation of fundamental importance. The precise manner in which the determination is effected is described in most of the text-books on chemistry. The methods ordinarily employed in the case of liquids and solids which by the application of heat can be converted into vapor or gas without undergoing decomposition are known respectively as Dumas's and Gay-Lussac's; a modification of the latter method of great value has recently been introduced by Hofmann. By Dumas's method the weight of substance is ascertained which will furnish a certain volume of gas at a certain temperature and pressure; by Gay-Lussac's method, however, and by Hofmann's modification of it, the volume of gas is measured which is furnished by a given weight of the substance at a certain temperature and pressure. By either method we arrive finally at a knowledge of the weight (w) of a certain volume (v) of the gas at a temperature t and pressure p; and its density (D) referred to hydrogen is then found by dividing the weight w by the weight (w') of an equal volume of hydrogen at the same temperature t and pressure p—

$$D = \frac{w}{w'}$$

Or the density referred to air may be calculated in a similar manner, and then converted into the density referred to hydrogen by multiplication by 14·43,—the number which expresses the density of air referred to hydrogen. Both methods require that the substance be heated to the temperature at which its vapor most closely approximates to the laws of Boyle and Charles, which is readily ascertained by experiment; this temperature, however, is often very considerably above the boiling point of the substance, and acetic acid may be cited as an illustration of this. Thus, although this acid boils at 119° C., its vapor does not exhibit the required density until it is heated to 250° C., as will be evident from the following table—the theoretical

[1] Ludwig, *Berichte der deutschen chemischen Gesellschaft*, 1868, 232.

vapor density of acetic acid vapor referred to hydrogen being about 30:—

Temperature.....	125°	130°	140°	160°	190°	250°	300°
Vapor Density....	46·1	45·0	41·8	35·7	33·1	30·01	30·01

Owing to unavoidable experimental errors, and, in many cases, probably to the circumstance that the vapors of solid and liquid bodies are very imperfect gases at temperatures not much above their boiling points, the determination of the vapor density of a substance does not, as a rule, furnish a result of more than approximate accuracy,—the result being the more accurate, however, the more rarefied the vapor and the higher the temperature at which the density is determined, provided always that the temperature be not so high as to cause decomposition. But the relative proportions in which the elements combine, and the composition of compounds may usually be ascertained with very great—in many cases with almost absolute—accuracy by chemical analysis; and the determination of the density in the state of gas simply serves to prove which of the several multiple proportions, in which it is found that the elements combine together, is the true atomic weight. For instance, analysis shows that marsh gas is a compound of carbon and hydrogen exactly in the proportions of 1 part of the latter with 3 of the former; that carbonic anhydride consists of carbon and oxygen in the proportion of 16 parts or an atom of the latter and 6 or 3×2 parts of carbon; and carbonic oxide of the same elements, in the proportion, however, of 16 of oxygen and 12 or 3×4 of carbon. The question, therefore, is, Which of the numbers, 3, 6, or 12, represents the relative weight of the carbon atom; that is to say, is marsh gas a compound of an atom of hydrogen and an atom of carbon weighing 3, of two atoms of hydrogen and an atom of carbon weighing 6, or of four atoms of hydrogen and an atom of carbon weighing 12? The molecular weights of three such compounds would be respectively 3+1 or 4, 6+2 or 8, and 12+4 or 16; and the corresponding theoretical densities referred to hydrogen 2, 4, and 8. Finding, however, by experiment that the density of marsh gas is, say, 7·5, we at once conclude that the atomic weight of carbon is 12 and not 6 or 3, because the observed density of marsh gas most closely accords with that required on this assumption. The difference between theory and experiment is practically seldom, if ever, so large as in this case, which is merely given as an illustration of the principle involved.

The equivalent of an element—that is to say, the amount of it which is capable of combining with or displacing one part by weight, or one atom, of hydrogen—being known, its atomic weight is not absolutely fixed by the determination of the density in the state of gas of its compounds with other elements; we are at most enabled to say from this that the atomic weight cannot exceed a certain value,—for instance, that the atomic weight of chlorine cannot exceed 35·36, because all its compounds contain either this amount or some simple multiple of it in their molecules. It is nevertheless *possible* that 35·36 is not the weight of one but of several atoms of chlorine; the probability that 35·36 is the true atomic weight is enormously increased, however, as compound after compound is examined and found to contain 35·36 or some simple multiple of 35·36 parts of chlorine in its molecule.

In the case of those elements of which stable volatile compounds have not been obtained, the study of their specific heats is of great importance, and moreover furnishes most important confirmation of the atomic weights deduced by the aid of Avogadro's hypothesis. To raise the temperature of equal weights of different substances the same number of degrees, from 0° to 1° C. for instance, very different amounts of heat are required; and on the other hand very different amounts of heat are given out when equal weights of different substances are cooled from the initial temperature $t°$ to a lower temperature $t'°$. Of all bodies except hydrogen water has the greatest capacity for heat, and is, therefore, adopted as the standard of reference,—the number which expresses the amount of heat necessary to raise the temperature of a given weight of a body a certain number of degrees, or which is given out by it in cooling through a certain number of degrees, as compared with that required to raise the temperature of an equal weight of water the same number of degrees, being termed its specific heat. Thus, the specific heat of lithium is ·9408: that is to say, to raise the temperature of a given weight of lithium—1 gramme, for example—from 0° to 1° C. only requires ·9408 of the heat necessary to raise the temperature of 1 gramme of water from 0° to 1° C. The specific heats in the solid state of the various elements of which the atomic weights have been determined by Avogadro's hypothesis are given in the second column of the following table:—

Name of Element.	Specific Heat.	Atomic Weight.	Specific Heat Multiplied by Atomic Weight.
Antimony	·0508	122	6·19
Arsenic	·0814	74·9	6·10
Bismuth	·0308	207·5	6·39
Boron	·5	11	5·5
Bromine	·0843	79·75	6·72
Carbon	·4589	11·97	5·49
Iodine	·0541	126·53	6·84
Lead	·0314	206·4	6·48
Mercury	·0317	199·8	6·33
Molybdenum	·0722	95·8	6·92
Osmium	·0311	198·6	6·17
Phosphorus	·174	30·96	5·39
Selenium	·0745	79	5·86
Silicon	·2029	28	5·68
Sulphur	·171	31·98	5·47
Tellurium	·0474	128	6·07
Tin	·0562	117·8	6·62
Tungsten	·0334	184	6·14
Zinc	·0955	64·9	6·19

On comparing the numbers in the fourth column of this table it will be seen that they vary within comparatively narrow limits; and if certain of the elements are excepted, viz., boron, carbon, phosphorus, sulphur, silicon, and selenium, the agreement becomes much closer, the average product obtained by multiplying specific heat into atomic weight being about 6·3. From this it would appear that the specific heats of these elements are, at least approximately, inversely proportional to their atomic weights. From the observation of this relation in the case of only a small number of elements Dulong and Petit, in 1811, were led to infer that the atoms of all simple bodies have the same capacity for heat. The specific heat of a body varies, however, with the temperature; an extreme instance of this is afforded by the elements carbon, boron, and silicon, as will be evident on inspecting the following table of the specific heat of carbon in the form of diamond at various temperatures:—

Temperature.....	0°	50°	100°	150°	200°	606°	806°	985°
Specific Heat.....	·095	·144	·191	·236	·279	·440	·448	·458
Product of Atomic Wt. and Specific Heat.....	1·12	1·72	2·28	2·81	3·33	5·26	5·36	5·48

Hence, owing to the circumstance that the determinations of specific heat have not been made at temperatures which are comparable for the different elements, there is no doubt that many of the results which have been obtained are defective; but from Weber's recent researches it appears that in the case of the solid elements there is a point for each element, after which the increase in specific heat with increase of temperature is insignificant, and when this point is reached the product of specific heat into atomic weight—the so-called atomic heat—varies within comparatively narrow limits. These limits, according to Weber, are from 5·5 to 6·5, but it appears probable that the superior limit is slightly greater than this, and as a matter of fact the atomic heats of nearly all the elements are nearer 6·5 than 5·5,—the latter number being characteristic of the so-called non-metallic elements, the atomic weights of which can be determined by the aid of Avogadro's hypothesis.

In consequence of this relation between the specific heat of an element and its atomic weight, we can readily determine the atomic weights of elements which do not furnish volatile compounds, it being merely necessary to ascertain the equivalent of the element by analyzing its compounds, and to multiply the equivalent by such a number that the product when multiplied by the specific heat of the element will furnish a number not less than 5·5, and not much greater than 6·5. As an instance of the application of the method, the metal indium, one of the most recently discovered elements may be cited. Analysis showed that

the equivalent of indium was 37·8, but this number was doubled on account of the many points in which indium resembles zinc,—the latter metal having the equivalent 32·45, but the atomic weight 64·9. For some time, until Bunsen determined its specific heat, 75·6 was accepted as the atomic weight of indium, but he found that it was necessary to multiply the equivalent by 3 in order that the product of specific heat into atomic weight should correspond to that ordinarily observed, thus raising the atomic weight to 113·4.

The following table is a list of the elements whose atomic weights have been determined from the observation of their specific heats alone:—

Name of Element.	Specific Heat.	Atomic Weight.	Atomic Heat.
Aluminium	·214	27·3	5·8
Cadmium	·0567	111·6	6·3
Calcium	·170	39·9	6·8
Cerium	·0447	141	6·2
Chromium	·100	52·4	5·2[1]
Cobalt	·107	58·6	6·3
Copper	·0952	63·3	6·0
Didymium	·0456	147	6·7
Glucinum	·64	9·3	5·9
Gold	·0324	196·2	6·4
Indium	·0570	113·4	6·5
Iridium	·0326	196·7	6·4
Iron	·114	55·9	6·4
Lanthanum	·0448	139	6·2
Lithium	·9408	7·01	6·6
Magnesium	·250	23·94	6·0
Manganese	·122	54·8	6·7
Nickel	·109	58·6	6·4
Palladium	·0593	106·2	6·3
Platinum	·0324	196·7	6·4
Potassium	·166	39·04	6·5
Rhodium	·0588	104·1	6·1
Ruthenium	·0611	103·5	6·3
Silver	·0570	107·66	6·1
Sodium	·293	23	6·7
Thallium	·0335	203·64	6·8

The only elements of which at present the atomic weights have not been ascertained, either by the vapor-density or specific heat method, are erbium, thorium, uranium, and yttrium. Even the equivalent of gallium is not yet known.

Often, also, information which is of service in determining the atomic weights of elements may be obtained by observing the manner in which their compounds crystallize, for it is found that in many instances a given element in a compound may be displaced by another without altering the crystalline form; for example, in ordinary alum, which is a double sulphate of potassium and aluminium, the potassium may readily be displaced by sodium, or the aluminium by chromium, and yet the resulting compounds crystallize in precisely the same manner as the alum. Substances which thus agree in crystalline form are said to be *isomorphous*. A great number of isomorphous substances have been examined by chemists; and they have been led to infer that, as a rule, when two compounds containing similar elements agree in crystalline form they contain the same number of atoms; and hence the quantity of an element which is capable of displacing an atom of another element in a compound without altering its crystalline form is regarded as its atomic weight. This is by no means always the case, however, and the occurrence of isomorphism cannot alone be taken as a proof of the atomic weight of an element; it is of service rather as a check on the determinations made in other ways, and as a stimulus to investigation in the case of elements which have not been sufficiently examined. For instance, certain phosphorus and arsenic minerals of similar composition were known to be isomorphous with a vanadium mineral, vanadinite, the composition of which, according to the received atomic weight of vanadium, exhibited no analogy with them. Roscoe was led by this to investigate anew the compounds of vanadium and to determine its atomic weight, and he found that what had hitherto been regarded as vanadium was really an oxide of the element, and that when the composition of the mineral vanadinite was calculated from the true atomic weight of vanadium, it was precisely similar to that of the minerals with which it was known to be isomorphous.

[1] This number is known to be too low.

Molecular Weights.

We have pointed out (p. 406) that it is to be supposed that the molecule of hydrogen consists of two atoms; hence, if the atomic weight of hydrogen be taken as 1 its molecular weight is 2. In order to ascertain the molecular weights of other elements—that is to say, the relative weights of their molecules referred to that of hydrogen—it is merely necessary to determine their densities referred to hydrogen as unity, and then to multiply the densities by 2. Unfortunately, owing to the high temperature at which most of the elements are converted into vapor, the densities of only very few of them are as yet known.

When, however, the molecular weights of the elements are compared with their atomic weights it is found that they are not always, as in the case of hydrogen, double their atomic weights; hence it is inferred that the molecules of elements do not all contain two atoms. In a few cases the atomic weight and molecular weight agree, which necessitates the conclusion that the molecules are monatomic or consist of a single atom; in a few other cases the molecular weight is either 4 or 6 times the atomic weight, and the molecules are therefore regarded as tetratomic or hexatomic.

The following table includes all the elements of which the molecular weights have been determined:—

Name.	Atomic Weight.	Molecular Weight.	No. of Atoms in Molecule.
Hydrogen	1	2	2
Chlorine	35·36	70·74	2
Bromine	79·75	159·50	2
Iodine	126·53	253·06	2
Nitrogen	14·01	28·02	2
Oxygen	15·96	31·92	2
Selenium	79	158	2
Tellurium	128	256	2
Mercury	199·8	199·8	1
Cadmium	111·6	111·6	1
Phosphorus	30·94	123·76	4
Arsenic	74·9	299·6	4
Sulphur	31·98	63·96	2
		191·88	6

It will be seen that two numbers are given for sulphur This is because at temperatures above 800° C. the density of sulphur vapor is such as to indicate that the sulphur molecule consists of 2 atoms, whereas its density at about 500° C. is three times as great, and, consequently, it is to be supposed that the molecules are hexatomic. Selenium, which is closely allied to sulphur, exhibits a very similar behavior, its vapor at about 1400° C. containing only diatomic molecules, but as the temperature sinks its density rapidly increases. These two elements, in fact, afford striking examples of the resolution of complex molecules into simpler molecules by heat; and it is by no means improbable that the tetratomic phosphorous and arsenic molecules will be found to behave similarly if sufficiently heated.

No method is known by which it is possible to determine the molecular weights of elements or compounds in any other state than that of gas, and the behavior of sulphur is alone sufficient to prove that we are not justified in assuming that the molecular weights of liquid or solid elements or compounds are identical with their molecular weights as gases. Indeed it is in the highest degree probable that the molecules of solid and liquid bodies are very frequently far more complex than the molecules of the same bodies in the state of gas.

Chemical Notation—Valency of Elements—Rational Formulæ.

Opposite the name of each element in the second column of the table on pp. 404, 405, the symbol is given which is always employed to represent it. This symbol, however, not only represents the particular element, but a certain definite quantity of it. Thus, the letter H always stands for 1 atom or 1 part by weight of hydrogen, the letter N for 1 atom or 14 parts of nitrogen, and the symbol Cl for 1 atom or 35·36 parts of chlorine. Compounds are in like manner represented by writing the symbols of their constituent elements side by side, and if more than one atom of each element be present, the number is indicated by a numeral

placed on the right of the symbol of the element either below or above the line. Thus, hydrochloric acid is represented by the formula HCl, that is to say, it is a compound of an atom of hydrogen with an atom of chlorine, or of 1 part by weight of hydrogen with 35·36 parts by weight of chlorine; again, sulphuric acid is represented by the formula H_2SO_4, which is a statement that it consists of 2 atoms of hydrogen, 1 of sulphur, and 4 of oxygen, and consequently of certain relative weights of these elements. A figure placed on the right of a symbol only affects the symbol to which it is attached, but when figures are placed in front of several symbols all are affected by it, thus $2H_2SO_4$ means H_2SO_4 taken twice.

The distribution of weight in chemical change is readily expressed in the form of equations by the aid of these symbols; the equation

$$2HCl + Zn = ZnCl_2 + H_2,$$

for example, is to be read as meaning that from certain definite weights of hydrochloric acid and zinc certain definite weights of two different bodies, zinc chloride and hydrogen, are produced. The + sign is invariably employed in this way either to express combination or action upon, the meaning usually attached to the use of the sign = being that from such and such bodies such and such other bodies are formed.

Usually, when the symbols of the elements are written or printed with a figure to the right, it is understood that this indicates a molecule of the element, the symbol alone representing an atom. Thus, the symbols H_2 and P_4 indicate that the molecules of hydrogen and phosphorus respectively contain 2 and 4 atoms. Since, according to the molecular theory, in all cases of chemical change the action is between molecules, such symbols as these ought always to be employed. Thus, the formation of hydrochloric acid from hydrogen and chlorine is correctly represented by the equation

$$H_2 + Cl_2 = 2HCl;$$

that is to say, a molecule of hydrogen and a molecule of chlorine give rise to two molecules of hydrochloric acid; whilst the following equation merely represents the relative weights of the elements which enter into reaction, and is not a complete expression of what is supposed to take place:—

$$H + Cl = HCl.$$

As the molecular weights of comparatively few of the elements have been determined, however, it is possible only in a limited number of cases to employ such symbols. The molecular weights of the larger number of compounds are also unknown, but in all cases it is usual to represent them by formulæ which to the best of our knowledge express their molecular composition in the state of gas, and not merely the relative number of atoms which they contain; thus, acetic acid consists of carbon, hydrogen, and oxygen in the proportion of one atom of carbon, two of hydrogen, and one of oxygen, but the determination of its vapor density shows that it has a molecular weight corresponding to the formula $C_2H_4O_2$, which therefore is always employed to represent acetic acid. When chemical change is expressed with the aid of molecular formulæ, not only is the distribution of weight represented, but from mere inspection of the symbols it is possible to deduce the relative volumes which the agents and resultants occupy in the state of gas if measured at the same temperature and under the same pressure. Thus, the equation

$$2H_2 + O_2 = 2H_2O$$

not only represents that certain definite weights of hydrogen and oxygen furnish a certain definite weight of the compound which we term water, but that if the water in the state of gas, the hydrogen, and the oxygen are all measured at the same temperature and pressure, the volume occupied by the oxygen is only half that occupied by the hydrogen, whilst the resulting water-gas will only occupy the same volume as the hydrogen. In other words, 2 volumes of oxygen and 4 volumes of hydrogen furnish 4 volumes of water gas. A simple equation like this, therefore, when properly interpreted, affords a large amount of information. One other instance may be given; the equation

$$2NH_3 = N_2 + 3H_2,$$

represents the decomposition of ammonia gas into nitrogen and hydrogen gases by the electric spark, and it not only conveys the information that a certain relative weight of ammonia consisting of certain relative weights of hydrogen and nitrogen is broken up into certain relative weights of hydrogen and nitrogen, but also that the nitrogen will be contained in half the space which contained the ammonia, and that the volume of the hydrogen will be one and a half times as great as that of the original ammonia, so that in the decomposition of ammonia the volume becomes doubled.

Formulæ which merely express the relative number of atoms of the different elements present in a compound are termed empirical formulæ, and the formulæ of all compounds whose molecular weights are undetermined are necessarily empirical. The molecular formula of a compound, however, is always a simple multiple of the empirical formula, if not identical with it; thus, the empirical formula of acetic acid is CH_2O, and its molecular formula is $C_2H_4O_2$, or twice CH_2O. If the vapor density of a compound cannot be ascertained, its molecular formula can only be ascertained, with more or less approximation to truth, by considering its properties, and especially its relations to allied compounds of known molecular weight. For example, chromic anhydride is represented as CrO_3, and, although it cannot be vaporized, this is held to be its molecular formula chiefly on account of the formation from chromic anhydride of a volatile chromium oxychloride, the molecular weight of which is found to accord with the formula CrO_2Cl_2.

But in addition to empirical and molecular formulæ, chemists are in the habit of employing various kinds of rational formulæ, called constitutional formulæ, graphic formulæ, &c., which not only express the molecular composition of the compounds to which they apply, but also embody certain assumptions as to the manner in which the constituent atoms are arranged, and convey more or less information with regard to the nature of the compound itself, viz., the class to which it belongs, the manner in which it is formed, and the behavior it will exhibit under various circumstances. Before explaining these formulæ it will be necessary, however, to consider the differences in combining power exhibited by the various elements.

It is found that the number of atoms of a given element, of chlorine, for example, which unite with an atom of each of the other elements is very variable. Thus, hydrogen unites with but a single atom of chlorine, zinc with two, boron with three, silicon with four, and phosphorus with five. Those elements which are equivalent in combining or displacing power to a single atom of hydrogen are said to be *univalent* or *monad* elements; whilst those which are equivalent to two atoms of hydrogen are termed bivalent or dyad elements; and those equivalent to three, four, five, or six atoms of hydrogen triad, tetrad, pentad, or hexad elements. But not only is the combining power or valency (atomicity) of the elements different, it is also observed that one element may combine with another in several proportions, or that its valency may vary; for example, phosphorus forms two chlorides represented by the formulæ PCl_3 and PCl_5, and nitrogen the series of oxides represented by the formulæ

$$N_2O,\ NO,\ N_2O_3,\ N_2O_4,\ N_2O_5.$$

In explanation of these facts it is supposed that each element has a certain number of "units of affinity," which may be entirely, or only in part, engaged when it enters into combination with other elements; and in those cases in which the entire number of units of affinity are not engaged by other elements, it is supposed that those which are thus disengaged neutralize each other, as it were. For example, in pentachloride of phosphorus the five units of affinity possessed by the phosphorus atom are satisfied by the five monad atoms of chlorine, but in the trichloride two are disengaged, and, it may be supposed, satisfy each other. Compounds in which all the units of affinity of the contained elements are engaged are said to be *saturated*, whilst those in which the affinities of the contained elements are not all engaged by other elements, are said to be *unsaturated*. According to this view, it is necessary to assume that, in all unsaturated compounds, two, or some even number of affinities are disengaged; and also that all elements which combine with an even number of monad atoms cannot combine with an odd number, and *vice versa*,

—in other words, that the number of units of affinity active in the case of any given element must be always either an even or an odd number, and that it cannot be at one time an even and at another an odd number. There are, however, a few remarkable exceptions to this "law." Thus, it must be supposed that in nitric oxide, NO, an odd number of affinities are disengaged, since a single atom of dyad oxygen is united with a single atom of nitrogen, which in all its compounds with other elements acts either as a triad or pentad. When nitric peroxide, N_2O_4, is converted into gas, it decomposes, and at about 180°C. its vapor entirely consists of molecules of the composition NO_2; while at temperatures between this and 0° C. it consists of a mixture in different proportions of the two kinds of molecules, N_2O_4 and NO_2. The oxide NO_2 must be regarded as another instance of a compound in which an odd number of affinities of one of the contained elements are disengaged, since it contains two atoms of dyad oxygen united with a single atom of triad or pentad nitrogen. Again, when hexachloride of tungsten is converted into vapor it is decomposed into chlorine and a pentachloride, having a normal vapor density, but as in the majority of its compounds tungsten acts as a hexad, we apparently must regard its pentachloride as a compound in which an odd number of free affinities are disengaged. Hitherto no explanation has been given of these exceptions to what appears to be a law of almost universal application, viz., that the sum of the units of affinity of all the atoms in a compound is an even number.

The number of units of affinity active in the case of any particular element is largely dependent, however, upon the nature of the element or elements with which it is associated. Thus, an atom of iodine only combines with one of hydrogen, but may unite with three of chlorine, which never combines with more than a single atom of hydrogen; an atom of phosphorus unites with only three atoms of hydrogen, but with five of chlorine, or with four of hydrogen and one of iodine; and the chlorides corresponding to the higher oxides of lead, nickel, manganese, and arsenic, PbO_2, Ni_2O_3, MnO_2, and As_2O_5 do not exist as stable compounds, but only the lower chlorides, $PbCl_2$, $NiCl_2$, $MnCl_2$, and $AsCl_3$, are known.

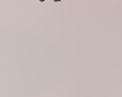
It is difficult, therefore, to classify the elements according to their valencies; indeed, an absolute classification is scarcely possible. In the following table a number of the elements are arranged mostly according to their apparent maximum valencies:—

Monads.	*Dyads.*	*Triads.*
Hydrogen.	Oxygen.	Boron.
Fluorine.	Barium.	Gold.
Chlorine.	Strontium.	
Bromine.	Calcium.	
Iodine.	Magnesium.	
	Zinc.	
Potassium.	Cadmium.	
Sodium.	Copper.	
Lithium.	Mercury.	
Silver.		

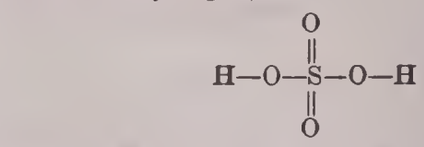
Tetrads.	*Pentads.*	*Hexads.*
Carbon.	Nitrogen.	Sulphur.
Silicon.	Phosphorus.	Selenium.
Tin.	Arsenic.	Tellurium.
Lead.		
Aluminium.	Antimony.	Tungsten.
Indium.	Bismuth.	Molybdenum.
Thallium.		
Iron.		
Chromium.		
Manganese.		
Cobalt.		
Nickel.		
Platinum.		
Palladium.		

The valency of an element is usually expressed by dashes or Roman numerals placed on the right of its symbol, thus: H', O'', B''', C^{iv}, P^{v}, Mo^{vi}; but in constructing graphic formulæ the symbols of the elements are written with as many lines attached to each symbol as the element which it represents has units of affinity.

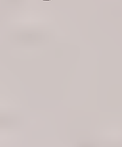
Graphic formulæ are employed to express the manner in which it is assumed that the constituent atoms of compounds are associated together; for example, the trioxide of sulphur is usually regarded as a compound of an atom of hexad sulphur with three atoms of dyad oxygen, and this hypothesis is illustrated by the graphic formula



When this oxide is brought into contact with water it combines with it forming sulphuric acid, H_2SO_4, and it is supposed that in this compound only two of the oxygen atoms are wholly associated with the sulphur atom, each of the remaining oxygen atoms being united by one of its affinities to the sulphur atom, and by the remaining affinity to an atom of hydrogen; thus—



Again, the reactions of acetic acid, $C_2H_4O_2$, show that the four atoms of hydrogen which it contains have not all the same function, and also that the two atoms of oxygen have different functions; the graphic formula which we are led to assign to acetic acid, viz.,—



serves in a measure to express this, three of the atoms of hydrogen being represented as associated with one of the atoms of carbon, whilst the fourth atom is associated with an atom of oxygen which is united by a single affinity to the second atom of carbon, to which, however, the second atom of oxygen is united by both of its affinities. It is not to be supposed that there are any actual *bonds* of union between the atoms; graphic formulæ such as these merely express the hypothesis that certain of the atoms in a compound come directly within the sphere of attraction of certain other atoms, and only indirectly within the sphere of attraction of others,—an hypothesis to which chemists are led by observing that it is often possible to separate a group of elements from a compound, and to displace it by other elements or groups of elements.

Rational formulæ of a much simpler description than these graphic formulæ are generally employed. For instance, sulphuric acid is usually represented by the formula $SO_2(OH)_2$, which indicates that it may be regarded as a compound of the group SO_2 with twice the group OH. Each of these OH groups is equivalent in combining or displacing power to a monad element, since it consists of an atom of dyad oxygen associated with a single atom of monad hydrogen, so that in this case the SO_2 group is equivalent to an atom of a dyad element. This formula for sulphuric acid, however, merely represents such facts as that it is possible to displace an atom of hydrogen and an atom of oxygen in sulphuric acid by a single atom of chlorine, thus forming the compound SO_3HCl; and that by the action of water on the compound SO_2Cl_2 twice the group OH, or water minus an atom of hydrogen, is introduced in place of the two monad atoms of chlorine—

$$\underset{}{SO_2Cl_2} + \underset{\text{Water.}}{2HOH} = \underset{\text{Sulphuric acid.}}{SO_2(OH)_2} + 2HCl\,.$$

Constitutional formulæ like these, in fact, are nothing more than symbolic expressions of the character of the compounds which they represent, the arrangement of symbols in a certain definite manner being understood to convey certain information with regard to the compounds represented.

Groups of two or more atoms like SO_2 and OH, which are capable of playing the part of elementary atoms (that is to say, which can be transferred from compound to compound), are termed compound radicles, the elementary atoms being simple radicles. Thus the atom of hydrogen is a monad simple radicle, the atom of oxygen a dyad simple radicle, whilst the group OH is a monad compound radicle.

It is often convenient to regard compounds as formed upon certain types; alcohol, for example, may be said to be a compound formed upon the water type that is to

say, a compound formed from water by displacing one of the atoms of hydrogen by the group of elements C_2H_5, thus

$O\{^{H}_{H}$ $O\{^{C_2H_5}_{H}$

Water. Alcohol.

Chemical Action.

Chemical change or chemical action may be said to take place whenever changes occur which involve an alteration in the composition of molecules, and may be the result of the action of agents such as heat, electricity, or light, or of two or more elements or compounds upon each other.

Three kinds of changes are to be distinguished, viz., changes which involve combination, changes which involve decomposition or separation, and changes which involve at the same time both decomposition and combination. Changes of the first and second kind, according to our present views of the constitution of molecules, are probably of very rare occurrence; in fact, chemical action appears almost always to involve the occurrence of both these kinds of change, for, as already pointed out, we must assume that the molecules of hydrogen, oxygen, and several other elements are diatomic, or that they consist of two atoms. Indeed, it appears probable that with few exceptions the elements are all compounds of similar atoms united together by one or more units of affinity, according to their valencies. If this be the case, however, it is evident that there is no real distinction between the reactions which take place when two elements combine together and when an element in a compound is displaced by another. The combination, as it is ordinarily termed, of chlorine with hydrogen, and the displacement of iodine in potassium iodide by the action of chlorine, may be cited as examples; if these reactions are represented, as such reactions very commonly are, by equations which merely express the relative weights of the bodies which enter into reaction, and of the products, thus—

H + Cl = HCl

Hydrogen. Chlorine. Hydrochloric acid.

KI + Cl = KCl + I

Potassium iodide. Chlorine. Potassium chloride. Iodine.

they appear to differ in character; but if they are correctly represented by molecular equations, or equations which express the relative number of molecules which enter into reaction and which result from the reaction, it will be obvious that the character of the reaction is substantially the same in both cases, and that both are instances of the occurrence of what is ordinarily termed double decomposition—

H_2 + Cl_2 = 2HCl

Hydrogen. Chlorine. Hydrochloric acid.

2KI + Cl_2 = 2KCl + I_2.

Potassium iodide. Chlorine. Potassium chloride. Iodine.

For chemical action to take place between two bodies it is necessary that they should be in contact, and, therefore, generally speaking, that one of them should be in the state of liquid or gas.

In all cases of chemical change energy in the form of heat is either developed or absorbed, and the amount of heat developed or absorbed in a given reaction is as definite as are the weights of the substance engaged in the reaction. Thus, in the production of hydrochloric acid from hydrogen and chlorine 22,000 units of heat[1] are developed; in the production of hydrobromic acid from hydrogen and bromine, however, only 8440 units of heat are developed; and in the formation of hydriodic acid from hydrogen and iodine 6040 units of heat are absorbed.

This difference in behavior of the three elements, chlorine, bromine, and iodine, which in many respects exhibit considerable resemblance, may be explained in the following manner. We may suppose that in the formation of gaseous hydrochloric acid from gaseous chlorine and hydrogen, according to the equation

$$H_2+Cl_2=HCl+HCl,$$

a certain amount of energy is expended in separating the atoms of hydrogen in the hydrogen molecule, and the atoms of chlorine in the chlorine molecule, from each other; but that heat is developed by the combination of the hydrogen atoms with the chlorine atoms, and that, as more energy is developed by the union of the atoms of hydrogen and chlorine than is expended in separating the hydrogen atoms from each other and the chlorine atoms from one another, the result of the action of the two elements upon each other is the development of heat,—the amount finally developed in the reaction being the difference between that absorbed in decomposing the elementary molecules and that developed by the combination of the atoms of chlorine and hydrogen. In the formation of gaseous hydrobromic acid from liquid bromine and gaseous hydrogen—

$$H_2+Br_2=HBr+HBr,$$

in addition to the energy expended in decomposing the hydrogen and bromine molecules, energy is also expended in converting the liquid bromine into the gaseous condition, and probably less heat is developed by the combination of bromine and hydrogen than by the combination of chlorine and hydrogen, so that the amount of heat finally developed is much less than is developed in the formation of hydrochloric acid. Lastly, in the production of gaseous hydriodic acid from hydrogen and solid iodine—

$$H_2+I_2=HI+HI,$$

so much energy is expended in the decomposition of the hydrogen and iodine molecules and in the conversion of the iodine into the gaseous condition, that the heat which it may be supposed is developed by the combination of the hydrogen and iodine atoms is insufficient to balance the expenditure, and the final result is therefore negative; hence it is necessary in forming hydriodic acid from its elements to apply heat continuously.

These compounds also afford examples of the fact that, generally speaking, those compounds are most readily formed, and are most stable, in the formation of which the most heat is developed. Thus, chlorine enters into reaction with hydrogen, and removes hydrogen from hydrogenized bodies, far more readily than bromine; and hydrochloric acid is a far more stable substance than hydrobromic acid, hydriodic acid being greatly inferior even to hydrobromic acid in stability.

When two substances which by their action upon each other develop much heat enter into reaction, the reaction is usually complete without the employment of an excess of either; for example, when a mixture of hydrogen and oxygen, in the proportions to form water—

$$2H_2+O_2=2OH_2,$$

is exploded, it is entirely converted into water. This is also the case if two substances are brought together in solution, by the action of which upon each other a third body is formed which is insoluble in the solvent employed, and which also does not tend to react upon any of the substances present; for instance, when a solution of a chloride is added to a solution of a silver salt, insoluble silver chloride is precipitated, and almost the whole of the silver is removed from solution, even if the amount of the chloride employed be not in excess of that theoretically required.

But if there be no tendency to form an insoluble compound, or one which is not liable to react upon any of the other substances present, this is no longer the case. For example, when a solution of a per-salt of iron is added to a solution of potassium thiocyanate, a deep red coloration is produced, owing to the formation of thiocyanate of iron. Theoretically the reaction takes place in the case of the per-nitrate of iron in the manner represented by the equation

$Fe_2(NO_3)_6$ + 6KCNS = $Fe_2(CNS)_6$ + $6KNO_3$;

Ferric nitrate. Potassium thiocyanate. Ferric thiocyanate. Potassium nitrate.

but it is found that even when more than sixty times the amount of potassium thiocyanate required by this equation is added, a portion of the ferric nitrate still remains unconverted, doubtless owing to the occurrence of the reverse change—

$$Fe_2(CNS)_6+6KNO_3=Fe_2(NO_3)_6+6KCNS.$$

[1] A unit of heat is the quantity of heat necessary to raise the temperature of 1 gramme of water 1° C., and whenever in this article it is stated that a certain amount of heat is developed in the production of a certain body, the production of a quantity of it equal to its molecular weight in grammes is to be understood. Thus, in the above case, the production of hydrochloric, hydrobromic, and hydriodic acids means the production respectively of 36·36, 81·75, and 127.53 grammes of these bodies.

In this, as in most other cases in which substances act upon one another under such circumstances that the resulting compounds are free to react, the extent to which the different kinds of action which may occur take place is dependent upon the mass of the substance present in the mixture. As another instance of this kind, the decomposition of bismuth chloride by water may be cited. If a very large quantity of water be added, the chloride is entirely decomposed in the manner represented by the equation—

$$\underset{\text{Bismuth chloride.}}{BiCl_3} + OH_2 = \underset{\text{Bismuth oxychloride.}}{BiOCl} + 2HCl,$$

the oxychloride being precipitated; but if smaller quantities of water be added the decomposition is incomplete, and it is found that the extent to which decomposition takes place is proportional to the quantity of water employed, the decomposition being incomplete, except in presence of large quantities of water, because of the occurrence of the reverse action—

$$BiOCl + 2HCl = BiCl_3 + OH_2.$$

Chemical change which merely involves simple decomposition is also influenced by the presence of the products of decomposition. Thus when calcium carbonate is strongly heated in an open vessel, it is entirely decomposed into carbon dioxide gas and calcium oxide—

$$\underset{\text{Calcium carbonate.}}{CaCO_3} = \underset{\text{Carbon dioxide.}}{CO_2} + \underset{\text{Calcium oxide.}}{CaO}$$

When it is heated in a confined space, the decomposition only goes on until the liberated gas has attained a certain tension, and as long as the temperature does not vary, the tension remains the same, and is independent of the proportion of the compound decomposed, that is to say, of the amount of calcium oxide present; but the tension increases if the temperature is raised, and diminishes if it is lowered, owing to the recombination of a portion of the carbon dioxide with the calcium oxide; for example, at 800° C. the tension is equivalent to a column of mercury 85 millimetres high, but at 1040° C. it is equivalent to a column of 520 mm. Deville applies the term dissociation to changes which occur in this manner; the term only applies to those cases of decomposition in which products are obtained which under the conditions of the experiment are capable of reuniting to form the original substance. When such substances are heated in a confined space, not only does decomposition take place, but a certain proportion of the decomposition products recombine, and for each degree of temperature a definite relation exists between the number of molecules broken up and the number of molecules reconstituted; an equilibrium is thus maintained, and the tension remains constant. But as the temperature rises, a larger number of molecules are decomposed and a proportionally smaller number reformed than at the lower temperature, so that the tension rises with the temperature. When, however, a substance like calcium carbonate is heated in an open vessel, the carbon dioxide escapes as it is formed, and therefore it is impossible for recomposition to occur, and ultimately the whole of the carbonate is decomposed. Apparently whenever solid substances undergo dissociation and furnish a solid and a gaseous product, the tension of dissociation is always independent of the amount of the solid decomposition product present.

The Elements and their Compounds.

The elements are usually divided into two great classes, the metallic and the non-metallic elements, the following being classed as non-metals, and the remainder as metals:—

Hydrogen.	Selenium.
Chlorine.	Tellurium.
Bromine.	Nitrogen.
Iodine.	Boron.
Fluorine.	Carbon.
Oxygen.	Silicon.
Sulphur.	Phosphorus.

The metals are mostly bodies of high specific gravity; they exhibit, when polished, a peculiar brilliancy or metallic lustre, and they are good conductors of heat and electricity; whereas the non-metals are mostly bodies of low specific gravity, and bad conductors of heat and electricity, and do not exhibit metallic lustre. The non-metallic elements are also sometimes termed metalloids, but this appellation, which signifies metal-like substances, strictly belongs to certain elements which do not possess the properties of the true metals although they more closely resemble them than the non-metals in many respects; thus, selenium and tellurium, which are closely allied to sulphur in their chemical properties, although bad conductors of heat and electricity, exhibit metallic lustre and have relatively high specific gravities.

But when the properties of the elements are carefully contrasted together it is obvious that no strict line of demarcation can be drawn dividing them into two classes; and if they are arranged in a series, those which are most closely allied in properties being placed next to each other, it is evident that there is a more or less regular alteration in properties from term to term in the series.

When binary compounds, or compounds of two elements, are decomposed by an electric current, the two elements make their appearance at opposite poles. Those elements which are disengaged at the negative pole are termed electro-positive, or positive, or basylous elements, whilst those disengaged at the positive pole are termed electro-negative, or negative, or chlorous elements. But the difference between these two classes of elements is one of degree only, and they gradually merge into each other; moreover the electric relations of elements are not absolute, but vary according to the state of combination in which they exist, so that it is just as impossible to divide the elements into two classes according to this property as it is to separate them into two distinct classes of metals and non-metals. The following, however, are negative towards the remaining elements which are more or less positive:—

Fluorine.	Oxygen.
Chlorine.	Sulphur.
Bromine.	Selenium.
Iodine.	Tellurium.

Elements which readily enter into reaction with each other, and which develop a large amount of heat on combination, are said to have a powerful affinity for each other. The tendency of positive elements to unite with positive elements, or of negative elements to unite with negative elements, is much less than that of positive elements to unite with negative elements, and the greater the difference in properties between two elements the more powerful is their affinity for each other. Thus, the affinity of hydrogen and oxygen for each other is extremely powerful, much heat being developed by the combination of these two elements; when binary compounds of oxygen are decomposed by the electric current, the oxygen invariably appears at the positive pole, being negative to all other elements, but the hydrogen of hydrogen compounds is always disengaged at the negative pole. Hydrogen and oxygen are, therefore, of very opposite natures, and this is well illustrated by the circumstance that oxygen combines, with very few exceptions, with all the remaining elements, whilst compounds of only a very limited number with hydrogen have been obtained.

Hydrides.—The only elements which are known to form binary compounds with hydrogen are fluorine, chlorine, bromine, iodine, oxygen, sulphur, selenium, tellurium, carbon, silicon, nitrogen, phosphorus, arsenic, antimony, and copper. Palladium has the property of absorbing a large volume of hydrogen gas, and it is supposed forms a definite compound with it; sodium and potassium, when heated to 350° to 400° C., also absorb hydrogen and appear to form definite compounds. With the exception of carbon, which furnishes an enormous number of compounds with hydrogen, the above-named elements unite with hydrogen only in one proportion, or at most in two or three different proportions. Excepting oxygen, fluorine, chlorine, and bromine, they do not readily enter into reaction with hydrogen, so that in most cases, in order to obtain their compounds with hydrogen, it is necessary to resort to indirect methods of preparation. The compounds of the elements with hydrogen may all be included under the general title of hydrides, but usually they possess specific names; thus, the hydride of oxygen is known as water, and the hydride of nitrogen as ammonia. Some of the hydrides of carbon are gases, but the majority are either liquids or solids; the two known hydrides of oxygen, water and the so-called peroxide of hydrogen, are

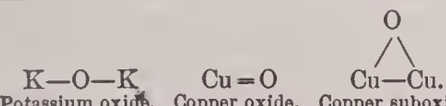
liquids; a gaseous and a liquid hydride of sulphur are known; three hydrides of phosphorus are said to exist, one of which is liquid, one solid, and one gaseous; hydride of copper is a solid; and the hydrides of the remaining elements are gases. Excepting the hydride of copper, all are colorless substances. The following is a list of the known hydrides, including, however, only the first or simplest hydride of carbon:—

Name.	Formula.	
Hydrogen hydride, or hydrogen	H_2	gas.
" fluoride, or hydrofluoric acid	HF	"
" chloride, or hydrochloric acid	HCl	"
" bromide, or hydrobromic acid	HBr	"
" iodide, or hydriodic acid	HI	"
" oxide, or water	H_2O	liquid.
" dioxide	H_2O_2	"
" sulphide, or sulphuretted hydrogen	H_2S	gas.
" persulphide	H_2S_5 (?)	liquid.
Selenium hydride	H_2Se	gas.
Tellurium hydride	H_2Te	"
Nitrogen hydride, or ammonia	H_3N	"
Phosphorus hydride, or phosphine	H_3P	"
" "	H_4P_2	liquid.
" "	H_2P_4 (?)	solid.
Arsenic hydride, or arsine	H_3As	gas.
Antimony hydride, or stibine	H_3Sb	"
Carbon hydride, methane, or marsh-gas	H_4C	"
Silicon hydride	H_4Si	"
Copper hydride	H_2Cu_2 (?)	solid.

Oxides.—The element oxygen is known to form compounds with all the elements excepting fluorine, but the affinity of the various elements for oxygen, and consequently the stability of the compounds resulting from their union with oxygen, varies within very wide limits; the oxides of many elements which have but a weak affinity for oxygen can only be obtained by indirect means.

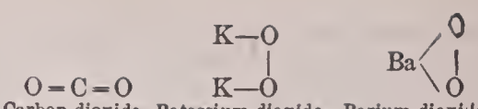
Although many of the elements unite with oxygen in several proportions, none are known to furnish more than five distinct oxides, and these belong to a certain limited number of forms, since they contain one, two, three, four, or five atoms of oxygen in the molecule. But as the same number of atoms of oxygen may unite with a given element in more than one proportion, each of these five classes includes sub-classes. The composition of the oxides may be best illustrated and their behavior explained by regarding them as formed on the type of the two oxides of hydrogen, hydrogen monoxide or water, OH_2, and hydrogen dioxide, O_2H_2.

The *monoxides* are formed on the type of a single molecule of water, that is to say, they may be regarded as derived from a single molecule of water by the displacement of the two atoms of hydrogen by the equivalent amount of other elements. If two atoms of a monad element, or a single atom of a dyad element, or of a polyad element which functions as a dyad, displace the two atoms of hydrogen, normal monoxides result, examples of which are potassium monoxide, K'_2O, and copper oxide, $Cu''O$. But monoxides are known in which two atoms of a dyad or it may be polyad element displace the two atoms of hydrogen in water; it is supposed that in this case the two atoms of polyad metal are united together and therefore function as a dyad compound radicle. Monoxides of this kind are usually termed suboxides; the suboxide of copper, $(Cu_2)''O$, and the suboxide of palladium, $(Pd_2)''O$, may be cited as examples. The supposed constitution of the three classes of monoxides is represented by the following graphic formulæ:—



Potassium oxide. Copper oxide. Copper suboxide.

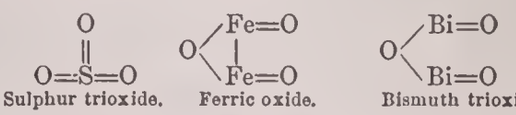
Two classes of *dioxides* may be distinguished:—the one formed from two molecules of water by the displacement of the four atoms of hydrogen by a single tetrad atom, such as carbon dioxide, $C^{IV}O_2$, and tin dioxide, $Sn^{IV}O_2$; the other formed from a single molecule of hydrogen dioxide by the displacement of the two atoms of hydrogen either by two monad atoms, or by a single dyad atom, such as potassium dioxide, K'_2O_2, barium dioxide, $Ba''O_2$, and manganese dioxide, $Mn''O_2$. These two kinds of dioxides differ enormously in chemical properties; their supposed constitution is represented by the following graphic formulæ:—



Carbon dioxide. Potassium dioxide. Barium dioxide.

The dioxides derived from hydrogen dioxide are usually termed peroxides.

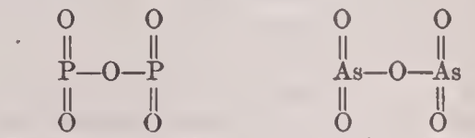
The *trioxides* are divisible into three classes, but all may be regarded as derived from three molecules of water In the one class the six atoms of hydrogen are displaced by a single hexad atom, as in sulphur trioxide, $S^{VI}O_3$, and tungsten trioxide, $W^{VI}O_3$; in the second class the six atoms of hydrogen are displaced by two polyad (tetrad?) elements, which together function as a hexad compound radicle, as in ferric oxide, $(Fe_2)^{VI}O_3$, and chromic oxide, $(Cr_2)^{VI}O_3$. A third class may be regarded as formed by the displacement of the six atoms of hydrogen by two triad atoms, and includes boron trioxide, B'''_2O_3, and bismuth trioxide, Bi'''_2O_3. There are considerable differences in properties between these three classes of trioxides; their graphic formulæ are as follows:—



Sulphur trioxide. Ferric oxide. Bismuth trioxide.

As examples of *tetroxides*, osmium tetroxide, OsO_4, antimony tetroxide, Sb_2O_4, the so-called magnetic oxide of iron, Fe_3O_4, and lead tetroxide, Pb_3O_4, may be quoted. These oxides undoubtedly belong to different classes, but too little is known of them for their relations to each other to be defined.

Lastly, the few *pentoxides* which are known may, with scarcely an exception, be regarded as derived from five molecules of water, the ten atoms of hydrogen being displaced by two pentad atoms. This is illustrated by the following graphic formulæ of phosphorus and arsenic pentoxides:—



Phosphorus pentoxide. Arsenic pentoxide.

Several of the oxides of chlorine and of nitrogen, and one of the oxides of sulphur, are gases; the oxides of hydrogen, and the oxides of chlorine and of nitrogen which are not gaseous, are liquid; and the remaining oxides are solid bodies.

Acids—Bases—Salts.—Many oxides have an extremely powerful affinity for water, and readily combine with it; but the compounds formed in this manner by different oxides differ remarkably in properties. For example, when sulphur trioxide, SO_3, is added to water, a solution is obtained which has the property of changing the color of blue vegetable coloring matters, such as litmus, to red, and possesses a sharp sour taste; but when the oxide of a highly positive metal, such as barium oxide, is added to water, a solution capable of restoring the blue color to reddened litmus is obtained. In both cases the water combines with the oxide, the sulphur trioxide being converted into *sulphuric acid*:—

$$SO_3 + OH_2 = SO_4H_2,$$

and the barium oxide into *barium hydroxide*:—

$$BaO + OH_2 = BaO_2H_2.$$

Sulphuric acid and barium hydroxide are representatives of two most important classes of compounds, the *acids* and *bases;* the oxides which furnish acids when combined with water are conveniently termed *acid oxides*, whilst those which furnish bases may be termed *basic oxides*.

The acid oxides, however, unite with the basic oxides to form a third class of compounds called *salts*, which are usually neutral bodies, that is to say, they have no action either on red or on blue litmus; thus, sulphur trioxide and barium oxide unite to form the salt barium sulphate:—

$$SO_3 + BaO = SO_4Ba.$$

The term acid is applied by some chemists to what are here called acid oxides, and what we have called basic oxides are frequently spoken of as bases, the acids being regarded as salts of hydrogen; this view of the constitu-

tion of acids is adopted because they are formed by the union of oxides of negative elements with the oxide of the positive element hydrogen, just as what are ordinarily termed salts are formed by the union of oxides of negative with oxides of positive elements. In this article, however, the term acid is restricted to compounds containing hydrogen.

The acids formed from the oxides of the various elements in the manner above explained all enter into reaction with bases, and with especial readiness with those derived from the highly positive elements, in such a manner that salts are produced, the hydrogen of the acid being displaced by the metal of the base, and water formed; for example,

$$\underset{\text{Sulphuric acid.}}{H_2SO_4} + \underset{\text{Barium hydroxide.}}{Ba''O_2H_2} = \underset{\text{Barium sulphate.}}{BaSO_4} + 2OH_2.$$

We may therefore define an acid to be a compound containing one or more atoms of hydrogen which may be displaced by a metal by the action of a base; but, as will be evident later on, although applicable to all acids, this definition is of rather too wide a character.

The hydrides of fluorine, chlorine, bromine, and iodine also readily enter into reaction with bases, exchanging their hydrogen for other elements; and as they also possess an acid taste and redden blue litmus, they are universally regarded as acids. The fact that these compounds are powerful acids is of considerable importance, as showing that it is the association of hydrogen with a negative radicle which renders it subject to displacement by positive elements—that is to say, a compound in which hydrogen is associated with a negative radicle will have the properties of an acid, and the more negative the radicle the more readily can the hydrogen be displaced. The composition of all known acids is entirely in accordance with this view; thus, in nitric acid a single atom of hydrogen is associated with the negative compound radicle NO_3, in sulphuric acid two atoms of hydrogen are combined with the negative compound radicle SO_4, and in phosphoric acid three atoms of hydrogen are associated with the negative compound radicle PO_4.

The oxides of the most negative and most positive elements most readily combine with water to form acids or bases, whilst the oxides of the feebly negative or feebly positive elements either do not unite with water or form extremely unstable combinations. Similarly, the oxides of the most negative and most positive elements unite together to form stable salts, much heat being developed by their combination, whereas the oxides of feebly negative and feebly positive elements either do not unite or form very unstable salts. The several oxides of an element often differ remarkably in properties, however, one oxide exhibiting acid characters, whilst another has basic properties.

The oxides of most of the so-called metallic elements are acted upon by acids, such as sulphuric, nitric, and hydrochloric acids, a salt of the metal being formed in all cases in which corresponding salts exist, and the hydrogen of the acid being eliminated in combination with the oxygen of the oxide as water; for example:—

$$\underset{\text{Manganese oxide.}}{MnO} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Manganese sulphate.}}{MnSO_4} + \underset{\text{Water.}}{OH_2}.$$

If corresponding salts do not exist, however, and action take place, then other products are obtained. Thus, no stable sulphate corresponding with manganese dioxide exists, and when this body is decomposed with sulphuric acid oxygen is evolved:—

$$\underset{\text{Manganese dioxide.}}{2MnO_2} + \underset{\text{Sulphuric acid.}}{2H_2SO_4} = \underset{\text{Manganese sulphate.}}{2MnSO_4} + \underset{\text{Water.}}{2OH_2} + \underset{\text{Oxygen.}}{O_2}.$$

Actions of this kind invariably occur with the oxides which may be regarded as formed on the type of hydrogen dioxide.

Sulphides.—Sulphur enters into union with most of the elements forming compounds analogous to the oxides in composition and general properties; in fact, we may distinguish acid and basic sulphides, corresponding to the acid and basic oxides, and salts formed by the union of these two classes of sulphides. With very few exceptions the sulphides are solid bodies. Selenium and tellurium, which are closely allied to sulphur, also form compounds with many elements more or less closely resembling the sulphides, but they are of little importance.

Chlorides — Bromides — Iodides — Fluorides.—With very few exceptions compounds of all the elements with chlorine have been obtained, and, especially from a theoretical point of view, the chlorides are a class of bodies of the highest importance. The affinity of bromine and iodine for other elements being much lower than that of chlorine, and their compounds much less stable than the corresponding chlorides, comparatively few bromides and iodides are known. Fluorides of many of the elements have also been obtained.

Chlorine unites with many of the elements in two or more proportions, but at most six atoms of chlorine unite with a single atom of another element. The majority of the chlorides are either liquids or solid bodies which may be more or less readily volatilized.

Nitrides—Phosphides.—Nitrogen has but a slight affinity for other elements; its most important compounds are ammonia, NH_3, cyanogen, C_2N_2, and the oxides of nitrogen. The only elements which combine with it readily are tantalum, titanium, tungsten, and vanadium, and most of its compounds can be prepared only by indirect methods.

Phosphorus readily combines wtth chlorine, bromine, iodine, oxygen, and sulphur, and with most of the metals; its compounds with the non-metallic elements are of considerable importance to the chemist; but its compounds with the metals have been little studied.

Scarcely any of the remaining elements form compounds of importance with elements other than those which have already been considered.

We now proceed to the description of the elements and their more important compounds, commencing with hydrogen, and then passing to the so-called non-metallic elements, which will be considered in the following order:—Hydrogen, oxygen, chlorine, bromine, iodine, fluorine, sulphur, selenium, tellurium, nitrogen, phosphorus, boron, carbon, and silicon; after which the remaining elements will be briefly described as much as possible in the order of their relationship to each other. Hydrogen is placed at the head of the list, because it is the unit or standard of comparison both for the atomic weights and valencies of the remaining elements, and it is now usual also to refer the densities in the state of gas of all compounds to hydrogen. On account of the number and variety of their compounds with other elements the non-metallic elements are by far the most important, and therefore are naturally considered before the metals.

Hydrogen.

Symbol, H; Atomic wt., 1; Molecular wt., 2; Valency, '.

This element was discovered by Cavendish in 1766, and was called by him *inflammable air;* the name of Hydrogen is derived from ὕδωρ, water, and γεννάω, to generate, on account of its forming water when burnt. It occurs in the free state in the gases of volcanoes, and by the aid of the spectroscope has been detected in the sun, stars, and nebulæ; it chiefly exists in combination with oxygen as water, and is an important constituent of all vegetable and animal substances.

Hydrogen is obtained by the decomposition of water in various ways. Thus, when two platinum plates, connected with the poles of a voltaic battery, are plunged into water acidulated with a few drops of sulphuric acid, hydrogen is evolved from the plate in connection with the negative pole, oxygen being disengaged from the positive pole. Water is also resolved into its elements when its vapor is heated by passing through an intensely ignited platinum tube, or by discharging electric sparks in an atmosphere of steam; but under these circumstances, owing to the recombination of much of the hydrogen and oxygen, only a small quantity of the mixed gases is obtained.

Hydrogen may also be obtained from water by the action of the highly positive metals, cæsium, rubidium, potassium, sodium, and lithium, at ordinary temperatures; in each case a solution of the metallic hydroxide is obtained, and hydrogen evolved, thus:—

$$\underset{\text{Sodium.}}{2Na} + \underset{\text{Water.}}{2OH_2} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Sodium hydroxide.}}{2NaOH}.$$

Barium, strontium, and calcium also decompose water in the cold, and hydrogen is evolved when magnesium is heated with water at temperatures below the boiling point of the latter. Many other metals, such as iron, manganese,

zinc, cadmium, cobalt, nickel, tin, and antimony evolve hydrogen from water when its vapor is passed over the metal heated to redness, the oxide of the metal being formed thus:—

$$\underset{\text{Iron}}{3Fe} + \underset{\text{Water.}}{4OH_2} = \underset{\text{Hydrogen.}}{4H_2} + \underset{\text{Ferroso-ferric oxide.}}{Fe_3O_4}.$$

Aluminium also decomposes water at a red heat, but owing to the formation of an impermeable coating of aluminium oxid on the surface of the metal the action soon stops. Metals like copper, mercury, silver, gold, and platinum are without action even at a bright red heat. Many metals, however, which do not decompose water unless heated with it, if placed in contact with a more negative element cause the evolution of hydrogen at ordinary atmospheric temperatures; for example, if a plate of zinc, coated with spongy copper, by immersion in a solution of copper sulphate, be placed in water, hydrogen is gradually evolved, the reaction which occurs being as follows:—

$$\underset{\text{Zinc.}}{Zn} + \underset{\text{Water.}}{2OH_2} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc hydroxide.}}{Zn(OH)_2}.$$

Hydrogen is usually prepared by the action of zinc or iron on a solution of hydrochloric or sulphuric acid. The change which occurs is represented in the following equations:—

$$\underset{\text{Zinc.}}{Zn} + \underset{\text{Hydrochloric acid.}}{2HCl} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc chloride.}}{ZnCl_2}.$$

$$\underset{\text{Zinc.}}{Zn} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc sulphate.}}{ZnSO_4}.$$

All metals which readily decompose water when heated readily furnish hydrogen on treatment with hydrochloric and sulphuric acid, and many other metals enter more or less readily (although none so readily) into reaction with these acids; also many other acids may be used in place of hydrochloric or sulphuric acid, but none act more readily. In all cases the action consists in the displacement of the hydrogen of the acid by the metal employed, and if the acid is not one which can enter into reaction with the displaced hydrogen, the latter is evolved as gas. If pure hydrogen is required, it is necessary to employ pure zinc or iron; the impurities in the ordinary metal communicate an extremely disagreeable odor to the gas.

On the large scale nearly pure hydrogen may be prepared by passing steam over charcoal or coke heated to dull redness. If the temperature be kept sufficiently low, hydrogen and carbon dioxide are the sole products:—

$$C + 2H_2O = 2H_2 + CO_2,$$

and the latter may be removed by causing the gas to traverse a vessel filled with slaked lime; but if the temperature be allowed to rise too high carbon monoxide is also produced, and cannot be removed from the mixture.

Pure hydrogen is a colorless, transparent, odorless, and tasteless gas. It has never been liquefied,[1] and is very slightly soluble in water, 100 volumes of water dissolving 1·93 volumes of the gas at all temperatures between 0° and 24° C. It is the lightest of all known bodies, its specific gravity being ·0693, that of air being unity; one litre of hydrogen at 0° C., and under the pressure of 760 mm. of mercury, weighs ·0896 gramme, and it is important to remember this number, since the weight of a litre of any other gas may be at once found by multiplying ·0896 by half the molecular weight of the gas, the specific gravity of a gas referred to hydrogen being always half its molecular weight (p. 408).

Pure hydrogen is not poisonous, though it cannot support life; and if mixed with a certain proportion of oxygen, it may be breathed for some time without inconvenience. It is extremely inflammable, and burns in the air with a colorless non-luminous flame forming water; a burning taper is extinguished when plunged into hydrogen, and all bodies which burn in the air are incapable of burning in hydrogen.

Hydrogen does not spontaneously enter into reaction with any of the elements, although it has a powerful affinity for several of them. Thus, when hydrogen and oxygen are mixed nothing occurs, but if a burning taper or a heated wire is applied, a violent explosion ensues, water being produced. Similarly, chlorine and hydrogen are without action upon each other in the dark, but if the mixture is exposed to a bright light or is heated by the passage of an electric spark, the gases at once combine with explosive violence, forming hydrochloric acid. It has already been pointed out that we must suppose that the molecules which constitute free hydrogen, chlorine, and oxygen gases are diatomic, and that hydrogen and chlorine, for example, do not directly combine to form hydrochloric acid, but that an action occurs such as is represented by the equation—

$$H_2 + Cl_2 = HCl + HCl,$$

and that, therefore, the combination of the atoms of chlorine and hydrogen is preceded by the separation of the two atoms of chlorine in the chlorine molecules, and of the two atoms of hydrogen in the hydrogen molecules, from each other, which necessarily involves an expenditure of energy. The application of heat, we may assume, serves to effect this decomposition of some of the molecules of hydrogen, oxygen, and chlorine into their constituent atoms, and since much heat is evolved by the subsequent combination of the atoms of hydrogen and chlorine, or of hydrogen and oxygen, it is only necessary to apply heat to start the reaction, because the remaining molecules are decomposed by the heat developed in the formation of the first portions of water or hydrochloric acid.

Compounds of hydrogen with bromine, iodine, sulphur, and nitrogen may also be obtained directly from these elements and hydrogen, although only with difficulty and in small quantity.

Oxygen.

Symbol, O; Atomic wt., 15·96; Molecular wt., 31·92; Valency, ″.

Oxygen was first isolated by Priestley in 1774; its name is derived from *ὀξύς*, sour, and *γεννάω*, to generate, in allusion to the circumstance that many of the bodies formed by combining it with other elements dissolve in water, producing sour or acid solutions. It was long believed, in fact, that oxygen was a constituent of all acids.

Oxygen is the most abundant and the most important of all the elements. About one-fifth of the atmosphere consists of free oxygen; it is the chief constituent by weight of water; it is an important constituent of all animal and vegetable substances, and is contained in greater or less proportion in most mineral substances.

Oxygen may be obtained from water in the manner already mentioned under hydrogen, by decomposing it by an electric current, and also by transmitting chlorine gas and steam through a porcelain tube heated to bright redness—

$$\underset{\text{Chlorine.}}{2Cl_2} + \underset{\text{Water.}}{2OH_2} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Hydrochloric acid.}}{4HCl};$$

the oxygen is freed from hydrochloric acid and any excess of chlorine by passing it through a solution of sodium hydroxide.

The most interesting method of obtaining oxygen, although it is not a usual method of preparing it, is that by which it was first isolated by Priestley. When mercury is heated in contact with air to a temperature just below its boiling point, it gradually becomes covered with a red scale of mercuric oxide, HgO, and when this red scale is exposed to a considerably higher temperature it is broken up into oxygen and metallic mercury.

The oxides of gold, platinum, and other metals which have but a slight affinity for oxygen, are very readily decomposed when heated, oxygen being evolved and the metal remaining. Many other metallic oxides, and especially those which may be regarded as formed on the type of hydrogen dioxide, which readily breaks up into water and oxygen, when more or less strongly heated, are resolved into oxygen and a lower oxide:—lead dioxide, PbO_2, barium dioxide, BaO_2, and manganese dioxide, MnO_2, for example. In the case of manganese dioxide, $3MnO_2$ give Mn_3O_4, the decomposition taking place at a red heat. Barium dioxide when strongly heated gives up one-half of its oxygen to produce barium monoxide, $2BaO_2 = O_2 + 2BaO$; and by passing moist air over less heated barium monoxide it may be reconverted into the dioxide, which may be decomposed by a stronger heat. By repetitions of these processes it is possible to procure large quantities of oxygen with the aid of a small quantity of barium dioxide, and it has been proposed to employ this method for the preparation of oxygen on the large scale, but in practice there have been found difficulties attending its use.

Ordinarily when pure oxygen is required it is prepared by heating potassium chlorate, which ultimately furnishes

[1] [But it has. See Vol. XII, a 449.—Am. Ed.]

potassium chloride and oxygen: $2KClO_3 = 3O_2 + 2KCl$. This decomposition requires a high temperature, and can only be effected in vessels of *hard* glass, but when the chlorate is mixed with about one-eighth of its weight of a metallic oxide, such as copper oxide, ferric oxide, or manganese dioxide, the oxygen is given off at a considerably lower temperature, and with great rapidity; in this case, however, it is impure, being always contaminated with small quantities of chlorine.

When potassium chlorate is heated alone the salt fuses, but after a considerable evolution of oxygen has taken place the fused mass becomes pasty, and on examination it is found to consist of a mixture of potassium chloride and potassium perchlorate, $KClO_4$, so that the first stage in the decomposition may be represented by the equation—

$$\underset{\text{Potassium chlorate.}}{2KClO_3} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Potassium perchlorate.}}{KClO_4} + \underset{\text{Potassium chloride.}}{KCl};$$

the potassium perchlorate is resolved on further heating into oxygen and potassium chloride. When a metallic oxide is mixed with the chloride, however, and heat applied, the latter does not fuse, and the formation of potassium perchlorate cannot be detected at any stage of the decomposition. It is difficult to explain the manner in which the metallic oxide acts in promoting the decomposition of the chlorate, since it is found to be unchanged at the conclusion of the reaction; but it is a well-known fact that many bodies which, under ordinary circumstances, do not yield oxygen, readily part with this element when another substance having a tendency to combine or enter into reaction with oxygen is introduced into the sphere of action. Thus, when potassium dichromate is heated with concentrated sulphuric acid, oxygen is evolved, the yellow solution becoming green owing to the formation of chromium sulphate—

$$\underset{\text{Potassium dichromate.}}{2K_2Cr_2O_7} + \underset{\text{Sulphuric acid.}}{10H_2SO_4} =$$

$$\underset{\text{Oxygen.}}{3O_2} + \underset{\text{Chromium sulphate.}}{2Cr_2(SO_4)_3} + \underset{\text{Hydrogen potassium sulphate.}}{4KHSO_4} + \underset{\text{Water.}}{8OH_2}.$$

But if the dichromate is dissolved in a considerable quantity of water no change of this kind takes place even after prolonged heating; when, however, a body like sulphurous acid, H_2SO_3, which has a tendency to unite with oxygen to form sulphuric acid, is added to the solution, it at once becomes green,—the dichromate being decomposed as represented in the above equation, and the oxygen being fixed by the sulphurous acid. Hence it is not improbable that the metallic oxide acts in virtue of a tendency to form a higher oxide, which higher oxide is no sooner produced, however, than it is broken up into oxygen and the lower oxide. The lower oxide may again undergo conversion into the higher oxide and the latter be broken up into oxygen and lower oxide, so that a relatively small quantity of the metallic oxide may suffice to promote the decomposition of a relatively large quantity of chlorate.

When a small quantity of cobalt sesquioxide, or a few drops of a solution of a cobalt salt, is added to a clear concentrated aqueous solution of bleaching powder, which is then gently heated, oxygen is evolved with great regularity, and the bleaching powder is completely resolved into oxygen and calcium chloride—

$$\underset{\text{Bleaching powder.}}{2CaCl_2O} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Calcium chloride.}}{2CaCl_2},$$

The bleaching powder solution is not decomposed in this manner when heated alone, and there is no doubt that the cobalt oxide induces the decomposition by acting as a carrier of oxygen; that is to say, it first takes oxygen away and passes to a higher state of oxidation, and then gives it up again, the higher oxide being an extremely unstable body.

When silver oxide is added to a solution of hydrogen dioxide in water, metallic silver, water, and oxygen are produced—

$$\underset{\text{Silver oxide.}}{Ag_2O} + \underset{\text{Hydrogen dioxide.}}{H_2O_2} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Silver.}}{2Ag} + \underset{\text{Water.}}{OH_2}.$$

This reaction is especially interesting, as it affords experimental evidence in favor of the assumption that the molecule of oxygen consists of two atoms; moreover, a very considerable quantity of heat is developed in the reaction, and since there is every reason for believing that the separation of an atom of oxygen from silver oxide, and of an atom of oxygen from hydrogen dioxide. are both operations which involve an expenditure of energy, there can be little doubt that the heat developed is due to the combination of the atoms of oxygen to form molecules. In other words, this reaction affords evidence that oxygen atoms have a powerful affinity for each other.

The green leaves of plants with the aid of sunlight are enabled to decompose water and carbon dioxide, and evolve oxygen from them.

No method has yet been devised of directly separating pure oxygen from air, but Graham has shown that it is possible to obtain an "air" containing about 41·6 per cent. by volume of oxygen instead of about 20·8 per cent., which is the amount present in ordinary air, by *dialyzing* air through india-rubber. For this purpose a bag composed of the thinnest india-rubber supported on cloth is connected with a Sprengel air-pump; if the pump is kept in action, after the air is exhausted from the bag, it is found that it continues slowly to deliver "air" which, however, is richer in oxygen than ordinary air in about the proportions above mentioned. The gases do not pass through actual pores, but apparently they are dissolved by the rubber, which is thus *wetted through* by the liquefied gases, and evaporate into the vacuum on the other side of the membrane, the increased amount of oxygen being doubtless due to the greater solubility of oxygen in rubber.

Many other methods of obtaining oxygen are known, but the above given are sufficient to illustrate the nature of the changes by which it is produced.

Oxygen is a colorless, odorless, and tasteless gas, which has hitherto resisted all attempts to liquefy it;[1] it is only slightly soluble in water, 100 volumes of which at ordinary atmospheric temperatures dissolve about three volumes of oxygen. All bodies which burn in the air burn with greatly increased brilliancy and rapidity in oxygen; thus, a glowing splinter of wood bursts into flame when plunged into oxygen, and burns with great brilliancy; and even iron, if heated to redness before it is introduced into the gas, readily burns in it. In all cases in which bodies burn in oxygen the substances burnt combine with the oxygen to form new substances, and the heat and light developed are a consequence of their union. The weight of the products corresponds exactly with the weight of the body burned *plus* the weight of the oxygen consumed. The combination of two or more bodies when thus accompanied by the development of heat *and light* is termed combustion, the body burnt being the combustible, and the body in which the burning takes place the supporter of combustion. Thus, hydrogen is a combustible since it burns in oxygen, but oxygen is a supporter of combustion. These terms are merely relative, however, since oxygen may just as readily be burnt in hydrogen as hydrogen in oxygen; and, similarly, air may be burnt in coal gas.

The combination of oxygen with other elements is termed oxidation. In all cases of oxidation heat is developed, but it depends entirely upon the rapidity with which the oxidation is effected whether light is also produced, that is to say, whether what is ordinarily termed combustion takes place. Thus, when iron is burnt in oxygen, the combination of the two elements is effected with great rapidity, and a large amount of heat is developed within a very short space of time, and hence the product of combustion is intensely heated and becomes incandescent; when, however, iron slowly oxidizes or rusts, no light is produced, although actually more heat is developed than when the same weight of iron is burnt in oxygen, the oxide Fe_3O_4 being formed in the latter and the oxide Fe_2O_3 in the former case.

The various elements enter into reaction with oxygen with very various degrees of readiness, but as in the case of hydrogen and oxygen it is mostly necessary at least to start the reaction by the application of heat; and if the combination of the two elements can give rise to the development of only a moderate amount of heat, it is usually necessary to continue the application of heat until the oxidation is complete. Phosphorus slowly absorbs oxygen, but the remaining non-metallic elements are not affected by it at ordinary temperatures. The highly positive metals readily absorb it; the majority of the metals, however, when in the massive state are unacted upon in dry oxygen, but undergo oxidation more or less readily in moist oxygen or air. The coating of oxide first formed frequently pro-

[1] [It yielded in 1878. See Vol. XII. p. 449.—AM. ED.]

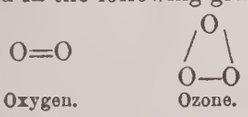
tects the metal from more than a superficial oxidation. Some of the metals when in a state of very fine division, for instance, lead as obtained by the ignition of its tartrate, undergo oxidation so readily, however, that spontaneous combustion results from their mere exposure to air or oxygen. The spontaneous combustion of substances such as woollen refuse, greasy tow, and hay is a precisely similar phenomenon,—the heat developed by their slow oxidation being to a great extent retained, as they are bad conductors of heat, until finally it becomes sufficient to inflame them. Most animal and vegetable substances when exposed to the air decay, and it is generally supposed that they simply undergo slow oxidation. Pasteur has shown, however, that the oxidizing power of atmospheric oxygen is much exaggerated, and that the decay of animal and vegetable substances exposed to air is not simply the result of the action of the atmospheric oxygen, but of the action of oxygen assisted by microscopic organisms, the decay taking place at an extremely slow and almost imperceptible rate when these organisms are entirely excluded.

When the colorless gas nitric oxide is mixed with oxygen, red fumes of higher oxides of nitrogen are formed, and by this reaction oxygen may with facility be detected and distinguished from other gases. A solution of potassium hydroxide and pyrogallol, or pyrogallic acid, or an ammoniacal solution of cuprous chloride, absorbs oxygen with avidity, and may be employed to remove it from a mixture of gases.

Ozone.

Symbol, O_3; Molecular wt., 47·88.

When exposed to the action of electricity, and especially under the influence of what is termed the silent discharge, oxygen undergoes a contraction of volume and acquires remarkably different properties, its chemical activity being greatly enhanced. It has been shown that the change consists in the conversion of the oxygen into an allotropic modification which has received the name of ozone ($\delta\zeta\omega$) in allusion to its peculiar odor; and from Sir Benjamin Brodie's experiments (*R. Soc. Trans.*, 1872, p. 435) there can be no doubt that ozone differs from ordinary oxygen merely in that its molecule contains three atoms; this difference is expressed in the following graphic formulæ:—



Oxygen. Ozone.

Various forms of apparatus are employed in ozonizing oxygen, but all are constructed on the principle of the Siemens's induction tube. This consists of two wide tubes of nearly equal diameter placed one within the other and coated on their exterior surfaces with tinfoil; the coatings of tinfoil are connected with the terminals of a powerful induction coil, and a current of oxygen is passed through the narrow space between the two tubes, and is thus submitted to the action of the electric discharge. In the apparatus employed by Brodie the coatings of tinfoil are dispensed with, but the inner tube is filled with water in which is placed one of the terminal wires of the induction coil, and the outer tube is immersed in a vessel of water in connection with the other terminal wire of the coil.

It is essential that the oxygen submitted to the electric action be pure and in a very dry condition; and it is especially desirable to prevent the elevation of temperature consequent on the electric action, which may be done by placing fragments of ice in the interior of the tube and also in the water contained in the external cylinder in which the induction tube is immersed.

But it is not possible in this manner to convert more than about 15 per cent. of the oxygen into ozone, and Brodie's experiments prove that there is a fixed limit prescribed by the conditions of experiment, beyond which the formation of ozone cannot pass. The explanation of this appears to be that the formation of ozone belongs to the class of actions termed dissociation phenomena; that is to say, not only is oxygen converted into ozone by the electrical action, but ozone is also reconverted into oxygen, the amount of ozone actually obtained under given conditions of experiment being dependent upon the extent to which these two opposite kinds of change take place. We may therefore expect that the amount of oxygen finally obtained in the form of ozone will be greater the less the ozone is exposed to the electric action; and that this is actually the case is proved by the fact that no advantage is gained by submitting the oxygen more than once to the electric action or by passing it slowly through the induction tube, and also by the behavior of carbon dioxide. When this gas is submitted to the action of the electric discharge, it is partially resolved into carbon monoxide and oxygen, and the latter is in part transformed into ozone. Brodie has shown that it is not difficult, by passing a rapid current of carbon dioxide through the induction tube, to convert 75 per cent. of the oxygen eliminated from the carbon dioxide into ozone, and has even succeeded in converting as much as 85 per cent.

Pure ozone has never yet been obtained, however. Ozone is also formed in small quantity when water is decomposed by the electric current, employing plates of platinum or gold as electrodes; the amount produced is greater the smaller the electrodes. The slow oxidation of phosphorus in moist air is said to be attended with the production of small quantities of ozone, and it is probable that ozone is formed in other slow oxidations; it appears that in all such cases the formation of ozone is accompanied by that of hydrogen dioxide, a fact which is also true of electrolytic ozone.

Traces of ozone are usually present in the atmosphere, especially in the open country; and it no doubt plays an important part in the removal of organic impurities from the atmosphere.

Ozone is a colorless gas of peculiar unpleasant odor; 100 volumes of water at 0° C. only absorb about ·5 volume. so that it is considerably less soluble than oxygen. Air charged with ozone exerts an irritating action upon the respiratory organs. Ozone is chiefly remarkable, however, on account of its oxidizing power. Thus, dry mercury, which is not in the least affected by ordinary oxygen, unless heated to near its boiling point, is at once oxidized by ozone, and dry iodine absorbs ozone and is oxidized by it. It bleaches a solution of indigo, which is oxidized by it. It also rapidly corrodes organic substances, such as cork and caoutchouc, which therefore cannot be employed in experiments with ozone. Paraffin, however, is not attacked by it, and an excellent air-tight joint between two glass tubes may be made by means of it. A piece of glass tube, into which they exactly fit, is slipped over the two tubes, which are placed close together, and a fragment of pure paraffin is placed at the external junction of the tubes; on gently heating the paraffin it melts, and the liquid being extremely limpid runs into and fills up the narrow space between the tubes.

In the conversion of oxygen into ozone the volume contracts by one-third, three molecules of oxygen furnishing two molecules of ozone.

$$\underset{\text{Oxygen.}}{3O_2} = \underset{\text{Ozone.}}{2O_3};$$

but when ozone is reconverted into oxygen the volume increases to the same extent that it diminishes when oxygen is converted into ozone, since

$$\underset{\text{Ozone.}}{2O_3} = \underset{\text{Oxygen.}}{3O_2}.$$

The conversion of ozone into oxygen may be effected by heat. Thus, when ozonized oxygen is passed through a glass tube heated to 110° C. slight decomposition of the ozone takes place; at 200° C. the decomposition is very rapid, about 97 per cent. being converted into oxygen; and below 300° C. decomposition is complete.

Similarly, ozone is decomposed to an unlimited extent by contact with metallic silver, and by manganese dioxide, lead dioxide, and copper oxide, without the substances undergoing more than an excessively minute increase of weight in the reaction. These decompositions afford instances of recurrent action, the active substance being alternately oxidized and reduced by the ozone; in the case of silver, supposing silver monoxide is formed, although the oxide produced is probably a higher oxide, the reaction may be represented in the following manner:—

$$\underset{\text{Silver.}}{2Ag} + \underset{\text{Ozone.}}{O_3} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Silver oxide.}}{Ag_2O};$$

$$\underset{\text{Silver oxide.}}{Ag_2O} + \underset{\text{Ozone.}}{O_3} = \underset{\text{Oxygen.}}{2O_2} + \underset{\text{Silver.}}{2Ag}.$$

Many reactions are known which prove that ozone has

this power of effecting deoxidation, although itself a most powerful oxidizing agent; thus, by its action on a solution of sodium dioxide, sodium monoxide and oxygen are obtained:—

$$\underset{\text{Sodium dioxide.}}{Na_2O_2} + \underset{\text{Ozone.}}{O_3} = \underset{\text{Oxygen.}}{2O_2} + \underset{\text{Sodium oxide.}}{Na_2O}.$$

The decomposition of ozone in this manner by silver, &c., is accompanied by the development of a considerable amount of heat; thus, according to Berthelot, no less than 29,600 units of heat are evolved in the reaction

$$2O_3 = 3O_2.$$

A corresponding amount of energy must therefore be expended in the formation of ozone from ordinary oxygen. But the conversion of ozone into ordinary oxygen is to be regarded as occurring in two stages,—in the first the molecule is resolved into O_2+O, and in the second two atoms of oxygen from two molecules of ozone unite forming a molecule of ordinary oxygen. The splitting up of the ozone molecule into O_2+O probably requires an expenditure of energy, so that the energy developed in the reaction in the form of heat is due to the combination of the atoms of oxygen to form molecules, but is less than that actually developed by their combination by the amount expended in the decomposition of the ozone molecules. As already pointed out, the fact that so large an amount of heat is developed by the combination of oxygen with oxygen indicates that the affinity of the oxygen atoms for each other is very considerable. This being the case, we are enabled also to understand how it is that ozone has such superior power as an oxidizing agent as compared with ordinary oxygen, for it is evident that, in reactions into which oxygen enters, for every 32 grammes employed an amount of energy corresponding to at least 29,600 heat units must be expended in order to separate the two atoms forming the oxygen molecules from each other; whereas, mostly, when ozone is employed, the amount of energy to be expended is only that required to effect the decomposition of the ozone molecules into O_2+O, which is probably very small.

The amount of oxidation effected by the same amount of ozone varies, however, according to the nature of the body oxidized, and Brodie's experiments show that four classes of oxidations may be effected by ozone:—

In the first class of reactions one-third of the molecule is active in effecting oxidation, the remaining two-thirds being obtained as oxygen, so that the volume of oxygen obtained is the same as the volume of ozone operated upon. If the number of atoms of oxygen active in effecting oxidation are placed within brackets, this class of oxidations is expressed by the equation—

$$O_3 = O_2 + (O) \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{I.}$$

The action of ozone on a solution of sodium dioxide, quoted above, and its action on a solution of potassium iodide—

$$\underset{\text{Potassium iodide.}}{2KI} + \underset{\text{Water.}}{OH_2} + \underset{\text{Ozone.}}{O_3} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Iodine.}}{I_2} + \underset{\text{Potassium hydroxide.}}{2KHO},$$

on ferrous chloride and sulphate, on an acid solution of potassium ferrocyanide, and on sodium arsenite, are special cases of this class of oxidations.

In the second class of reactions, four atoms of oxygen from two molecules of ozone are active, the remaining two atoms being obtained as oxygen; or

$$2O_3 = O_2 + 4(O) \quad . \quad . \quad . \quad . \quad . \quad \text{II.}$$

The oxidation of strongly alkaline solutions of sodium hyposulphite, the oxidation of hydriodic acid, and the oxidation of barium pentasulphide are included in this class.

In a third class of reactions, ten atoms of oxygen from four molecules of ozone are active in promoting oxidation, a single molecule of oxygen being obtained; or

$$4O_3 = O_2 + 10(O) \quad . \quad . \quad . \quad . \quad \text{III.}$$

The oxidation of sodium sulphydrate and of hydriodic acid at 0° C. are to be referred to this class.

Lastly, in a fourth class of reactions, the entire molecule is active in effecting oxidation; or

$$O_3 = 3(O) \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{IV.}$$

Examples of this class are afforded by the oxidation of tin dichloride, oil of turpentine, and neutral and slightly alkaline solutions of sodium hyposulphite.

That ozone can thus enter into reaction in so many different ways affords the most conclusive evidence of its compound nature, and by these reactions it may be distinguished from all known gases, and estimated.

The reaction with potassium iodide is usually employed for the detection of ozone, the liberation of iodine being rendered evident by the addition of starch paste, which with iodine furnishes a beautiful blue color. The liberation of iodine from potassium iodide is not alone sufficient proof, however, of the presence of ozone. By comparing at different times the depth of color produced on exposing slips of paper moistened with starch paste and potassium iodide solution to the air, for the same length of time, an estimate of the relative amounts of ozone present may be obtained.

Compounds of Hydrogen with Oxygen.

Water.

Symbol, OH_2; Molecular wt., 17·96.

Hydrogen and oxygen when mixed do not enter into reaction at the ordinary temperature; but the contact of flame or of any other red-hot body, the passage of the electric spark, and the contact of platinum cause reaction to take place with explosion. The flame and the electric spark act by their intense heat, and the nature of the influence which, perhaps, heat exercises in inducing the combination of hydrogen and oxygen has already been pointed out; but the action of platinum is more obscure. Spongy platinum and the fine powder of that metal called platinum black, although cold, cause the mixed gases to explode as readily as flame does. Even polished slips of platinum, if perfectly clean, will cause the reaction to take place, although more slowly. It appears that at first the absorption of the gases on the surface of the cold metal, and the consequent approximation of their particles, is sufficient to induce the combination of a part of the gases; this being accompanied by the development of heat, the metal becomes warmed and acts more vigorously, and the combination of further quantities of the gases takes place, by which more heat is developed, so that by degrees the metal becomes red-hot, and if any of the mixed gases be still uncombined it causes them to explode. In the case of the powder or the sponge, especially the former, all this takes place so rapidly from the enormous surface of the metal, that it becomes red-hot as soon as it is introduced, and fires the mixture as rapidly as a flame. Now, it is well known that metallic platinum, and especially spongy platinum or platinum black, readily condenses gases upon its surface; but the condensation is attended by the development of heat, and it seems not improbable, therefore, that its action in causing the combination of hydrogen with oxygen is of the same character as the action of flame,—that the platinum, in fact, does not itself induce the combination, but that the heat resulting from the condensation of the gases by the platinum is the direct cause of the reaction. Graham's researches have shown also that heated platinum absorbs hydrogen, and the absorption is doubtless accompanied by the development of heat; this is an additional reason for the action of platinum becoming more vigorous as it becomes warmer.

A series of experiments by Von Meyer (*Journal für praktische Chemie*, 1876, p. 121) may here be referred to, as illustrating in a remarkable manner the influence of finely-divided platinum in causing the combination of gases. It was first shown by Bunsen that when a mixture of hydrogen and carbon monoxide is exploded with insufficient oxygen to convert these two gases respectively into water and carbon dioxide, whatever the proportions employed, the quantities oxidized are always in a simple molecular ratio. From Von Myer's experiments it appears that, when a similar mixture is placed in contact with finely-divided platinum, although the oxidation is effected very slowly, the same law obtains. Whereas, however, when the mixture of the three gases is exploded, always relatively more hydrogen than carbon monoxide is oxidized, the proportion in which the two gases are burnt being on the average about as 3 to 1, the reverse is the case when their oxidation is slowly effected with the aid of platinum; in the latter case the number of molecules of carbon monoxide oxidized to the dioxide is from 7 to 8 times as great as the number of hydrogen atoms oxidized to water.

When oxygen and hydrogen, from whatever cause, enter

into reaction, it is always in the proportions to form water,—that is, invariably in the proportion of 2 volumes of hydrogen gas to 1 volume of oxygen gas. Any excess of either is left uncombined. If the water which is formed be measured as steam or gas, and its volume compared with the volume of the mixed gases at the same temperature before combination, it is found that condensation has taken place, 2 volumes of water gas being obtained from 2 volumes of hydrogen and 1 volume of oxygen gas; hence—

$$\underset{\text{Hydrogen.}}{2H_2} + \underset{\text{Oxygen.}}{O_2} = \underset{\text{Water.}}{2H_2O}.$$

In the liquid state, however, the volume of the water formed is so small as compared with the volume occupied by the mixed gases that it may be neglected, so that if the contraction in volume which occurs on explosion is measured at the ordinary temperature, two-thirds of the contraction represents the hydrogen, and one-third the oxygen, which has disappeared. This enables us to use hydrogen to determine the amount of free oxygen in air, or in any gaseous mixture, one-third of the contraction which occurs when a measured quantity of the gas is exploded with a measured excess of hydrogen representing the amount of oxygen present.

The affinity of oxygen for hydrogen, as measured by the heat developed by their combination, is very great, 68,376 units of heat, according to Thomsen, being evolved in the combination of 16 grammes of oxygen with 2·005 grammes of hydrogen, the product being liquid water at 18° C. By burning the two gases together from a jet the most intense artificial heat that is known, except that of the discharge of a powerful galvanic battery, is produced.

It is well here to call attention to the circumstance that the equations ordinarily employed to express the formation of water from its elements, and *vice versa* the resolution of water into its elements, viz:—

$$2H_2 + O_2 = 2H_2O,$$

and

$$2H_2O = O_2 + 2H_2,$$

do not take into account that in the one case a large amount of heat is developed, and that in the other case a corresponding amount of energy is expended. These equations merely represent, in fact, the distribution of weight in the changes, and therefore are but imperfect expressions of what really occurs, since the development of heat in the formation of water, and the absorption of heat, or the expenditure of a corresponding amount of some other form of energy in its decomposition, are integral parts of the changes, the amount of heat developed or absorbed, under given conditions, being as definite and constant as the weights of the substances which enter into reaction and are produced. The same may be said of all equations employed to represent chemical change.

The composition of water may be determined by burning a known weight of hydrogen in an excess of oxygen, and weighing the water produced; then the difference between the weight of the hydrogen burnt and of the water produced is the amount of oxygen combined with the hydrogen. Or hydrogen is passed over a weighed quantity of copper oxide in a tube heated to redness; the hydrogen then *reduces* the oxide or removes the oxygen from it, forming water, which is carefully collected and weighed, and the loss of weight which the tube of copper oxide suffers is carefully determined. The loss of weight of the copper oxide gives the amount of oxygen, and the difference between this and the amount of water produced is the amount of hydrogen combined with this amount of oxygen.

The amount of oxygen combined with 2 parts by weight, or 2 atoms, of hydrogen is usually stated to be 16 parts, and 16 is generally regarded as the atomic weight of oxygen. But from the examination of the determinations which have been made by various elements of the composition of water, Stas, to whom we are indebted for the most exact determinations of atomic weights yet made, arrives at the conclusion that this number is too high, and that the atomic weight of oxygen is certainly not higher than 15·96. Thomsen has recently determined the amount of water produced by burning 2 litres of hydrogen in an excess of oxygen, and taking Regnault's numbers for the specific gravities of oxygen and hydrogen, he obtains a number for the atomic weight of oxygen which is in complete accordance with that given by Stas.

At the ordinary temperature of the air water is a clear, transparent, tasteless, and odorless liquid; it appears colorless when seen in small quantity, but that it really has a pale blue color is apparent when a shining white object is viewed through a column several feet in thickness.

Water is solid at temperatures below 0° C., 0° C. being the temperature at which frozen water or ice melts; the melting point is diminished by increase of pressure to the slight extent of 0·00757° C. for each additional atmosphere. Water expands in freezing, its density compared with water at 0° C. being ·92. The conversion of liquid water at 0° C. into solid water or ice is accompanied by the liberation of heat, and heat is rendered latent or absorbed to the same extent in the melting of ice,—the quantity of heat absorbed or liberated in the melting of ice or freezing of water being sufficient to raise the temperature of 79 times its weight of water from 0° to 1° C.

Water evaporates at all temperatures when in contact with atmospheric air or other gases, and the vapor given off has a density and tension determined by the temperature; the tension of the vapor rapidly rises with the temperature, until at 100° C. it is equal to the ordinary atmospheric pressure (760mm.), and the water boils. The boiling point, however, rapidly rises with increase of pressure, and sinks when the pressure is diminished; thus under the pressure of two atmospheres water boils at 121° C., and under the pressure of twelve atmospheres at 190° C. When water boils under the ordinary atmospheric temperature it is converted into 1698 times its volume of vapor. The conversion into vapor is attended with the absorption of a large amount of heat,—the quantity of heat absorbed or rendered latent in the conversion of water at 100° C. into steam of the same temperature being sufficient to raise the temperature of 536 times the weight of water converted into steam from 0° to 1° C.

Water, chemically speaking, is a remarkably neutral substance, and hence its great value to the chemist as a solvent. There are very few substances which are not to some extent dissolved by it, but the solubility of different substances is very unequal. Heat generally increases its solvent power, whilst cold diminishes it; there are many exceptions to this rule, however. The dissolution of substances which may again be separated from the solution undecomposed is accompanied, in the majority of cases, with an absorption of heat, as will be evident on inspection of the table on p. 420. In the first column the name of the substance is given, and in the second its formula; the third exhibits the number of molecules of water (in grammes) in which one molecule (in grammes) of the substance is dissolved at about 18° C.; the fourth column shows the number of units of heat developed or absorbed, the − sign indicating that heat is absorbed, and the + sign that it is developed.

It is extremely difficult to interpret the meaning of numbers such as are contained in the table, especially as we are almost entirely ignorant of the condition of substances in solution in water. But there is no doubt that the heat developed or absorbed on dissolving a solid substance is the mean result of several distinct operations, which partly, perhaps, involve an absorption, and partly a development of heat. Thus, in the first place, there is a change of state from the solid to the liquid, which in most if not all cases involves an expenditure of energy; then, many substances on dissolving in water combine with it, the combination probably being always attended with development of heat. Contraction also generally takes place in the dissolution of salts in water, and is accompanied by a considerable development of heat, arising from the great resistance which water offers to compression. Chemists, moreover, are inclined to the belief that very many if not all substances, even those which are ordinarily regarded as stable in presence of water, enter to a greater or less extent into reaction with water when dissolved in it; a solution of sodium chloride, for example, may be regarded as containing a certain amount of sodium hydroxide and hydrochloric acid formed by the reaction—

$$\underset{\text{Sodium chloride.}}{NaCl} + \underset{\text{Water.}}{OH_2} = \underset{\text{Hydrochloric acid.}}{HCl} + \underset{\text{Sodium hydroxide.}}{NaOH}.$$

Table of Phenomena attending Solution of Salts in Water.

Name.	Formula.	No. of mols. of water taken.	No. of units of heat developed or absorbed per molecule.
1. *Crystalline Chlorine, Bromine, and Iodine compounds.*			
Lithium chloride.....	LiCl	200	+ 8,440
Sodium chloride.....	NaCl	200	— 1,180
Potassium chloride...	KCl	200	— 4,440
		100	— 4,410
Sodium bromide.....	NaBr	200	— 150
Potassium bromide...	KBr	200	— 5,080
Sodium iodide.....	NaI	200	+ 1,220
Potassium iodide.....	KI	200	— 5,110
Magnesium chloride..	$MgCl_2$	800	+ 35,920
Aluminium chloride..	Al_2Cl_6	700	+153,690
2. *Nitrates.*			
Sodium nitrate.....	$NaNO_3$	200	— 5,060
Potassium nitrate.....	KNO_3	200	— 8,520
Silver nitrate.....	$AgNO_3$	200	— 5,440
Thallium nitrate.....	$TlNO_3$	300	— 9,970
Barium nitrate.....	$Ba(NO_3)_2$	400	— 9,400
Strontium nitrate.....	$Sr(NO_3)_2$	400	— 4,620
Lead nitrate.....	$Pb(NO_3)_2$	400	— 7,600
3. *Sulphates.*			
Sodium sulphate...	Na_2SO_4	400	— 60
	$Na_2SO_4 + 10H_2O$	50	— 17,460
		100	— 18,130
		200	— 18,550
		400	— 18,760
		600	— 18,810
Potassium sulphate...	K_2SO_4	400	— 6,380
Magnesium sulphate.	$MgSO_4 + 7H_2O$	400	— 3,910
Zinc sulphate.....	$ZnSO_4 + 7H_2O$	400	— 4,240
Iron sulphate.....	$FeSO_4 + 7H_2O$	400	— 4,510
Nickel sulphate.....	$NiSO_4 + 7H_2O$	800	— 4,250
Cobalt sulphate.....	$CoSO_4 + 7H_2O$	800	— 3,570

The occurrence of reactions of this kind would in many cases involve an absorption, but in others a development of heat. The only two substances mentioned in the above table which develop heat to any extent when dissolved in water, it will be seen, are magnesium and aluminium chlorides. Both of these, however, are known to form compounds with water, and both probably enter to a very considerable extent into reaction with it in the manner above pointed out. It is even probable that the latter cannot exist as such when dissolved in water; the development of so large an amount of heat is therefore readily understood. But at present we are unable satisfactorily to account for the difference observed between salts such as potassium and sodium iodides, which so closely resemble each other in most respects, one of which, it will be noticed, absorbs 5110 units, whilst the other develops 1220 units of heat when dissolved in water.

From this it will be obvious that the study of the condition of salts in solution is beset with difficulties; the thermochemical method of investigation appears in most cases to be the only one which is applicable, since the introduction of new substances at once introduces a new set of conditions, but on account of the complexity of the phenomena attending dissolution, even the results obtained by this method possess only a limited value, and at present only general conclusions can be drawn from them.

Water, as we have already stated, enters into combination with oxides of many of the elements, forming two classes of compounds,—the acids, and the metallic hydroxides or hydrates. The general properties and relations of these two classes of compounds may with advantage now be discussed.

The monoxides of the highly positive monad elements cæsium, rubidium, potassium, sodium, and lithium form with water easily soluble hydroxides, which cannot be decomposed by heat; their solutions are soapy to the touch, and restore the blue color to vegetable infusions which have been reddened by an acid. These hydroxides are usually termed alkalies,—a solution which has the power of restoring the blue color to reddened litmus being said to exhibit an alkaline reaction. The term *alkali* is of Arabic origin, and was at first given to the crude sodium carbonate obtained from the ashes of sea-weed, a solution of which is soapy to the touch and restores the blue color to reddened litmus, and like the above-mentioned hydroxides also has powerful cleansing properties.

The hydroxides derived from the monoxides of barium, strontium, and calcium, which are less positive elements, also exhibit an alkaline reaction, but they are not nearly so soluble in water; and, with the exception of barium hydroxide, they are decomposed on ignition, yielding the oxide and water. None of the remaining positive elements, except thallium, furnish soluble hydroxides which exhibit an alkaline reaction.

Similar differences may be observed between the oxides of negative elements, which furnish acids when combined with water. Thus, the monoxide of the highly negative element chlorine readily dissolves in water, but the acid produced is exceedingly unstable; similarly, the acids derived from the oxides of nitrogen are soluble, but of low stability. The oxides of the less negative elements, sulphur and phosphorus, however, furnish very soluble acids, which exhibit considerable stability, being with difficulty resolved into the oxide and water.

The lower oxides of the most positive elements enter into combination with water in such proportions as to produce compounds containing an equal number of atoms of hydrogen and oxygen; for example, sodium monoxide and water furnish sodium hydroxide—

$$\underset{\text{Sodium monoxide.}}{Na_2O} + \underset{\text{Water.}}{OH_2} = \underset{\text{Sodium hydroxide.}}{2NaOH};$$

and barium oxide and water yield barium hydroxide—

$$\underset{\text{Barium oxide.}}{BaO} + \underset{\text{Water.}}{OH_2} = \underset{\text{Barium hydroxide.}}{BaO_2H_2 \text{ or } Ba(OH)_2}.$$

Hence these hydroxides may be looked upon as combinations of the respective elements with the monad compound radicle $(OH)'$ or hydroxyl; and the various compounds obtained from the oxides of the remaining elements by the action of water may either be regarded as similarly constituted, or may be viewed as combinations of one or more OH groups with compound radicles formed by the union of the elements with oxygen. Thus, we may regard nitric acid, HNO_3, as a compound of the two monad radicles, $(NO_2)'$ and $(OH)'$; sulphuric acid, H_2SO_4, as a combination of the dyad radicle (SO_2) with two OH groups; and phosphoric acid, H_3PO_4, as a combination of the triad radicle (PO) with three monad hydroxyl groups.

The number of OH groups which may be associated with a single atom of a given simple radicle or element, or with a compound radicle, entirely depends upon the nature of the radicle, but does not appear ever to exceed four; the stability of the compound also varies with the radicle, the tendency to form stable compounds with OH being the greater the more positive the radicle. In the case of compounds of feebly positive radicles with several OH groups, there is always a tendency for the elements of one or more molecules of water to separate from the compound, thus producing a body which is to be regarded as a combination of one or more OH groups with an oxygenated radicle. For instance, ferric hydroxide, $Fe_2(OH)_6$, very readily loses water, forming compounds such as $Fe_2O(OH)_4$ and $Fe_2O_2(OH)_2$.

Nearly all the bodies produced by the action of water on the oxides of the non-metals are to be regarded as compounds of oxygenated radicles with hydroxyl, and are more or less acid in character. As a rule, the more negative the radicle with which OH is associated the more powerful will be the acid, and since the addition of oxygen to the radicle renders it more negative, the acid furnished by the higher oxide of an element is usually more stable, and also a more powerful acid, than that furnished by the lower oxide; thus, sulphurous acid, H_2SO_3, is extremely unstable as compared with sulphuric acid, H_2SO_4, and a much less powerful acid, but the former may be regarded as a combination of the dyad radicle (SO), and the latter as a combination of the dyad radicle (SO_2), with twice the monad radicle (OH). The behavior of the positive elements is exactly complementary of this, since the greater the amount of the negative element oxygen associated with them the less is the tendency to furnish corresponding hydroxides when combined with water, and the less the stability of the resulting hydroxides; and, as a rule, also

the basic properties both of the oxides and of the hydroxides corresponding to them become much less pronounced as the relative proportion of oxygen increases.

In all cases in which oxides unite with water to produce stable combinations, much heat is developed; the stability of the compounds formed by the combination of water with oxides, in fact, appears to be directly in proportion to the amount of heat developed in their formation, and it has been shown that the formation of many of the most unstable hydroxides from their elements would be accompanied by an absorption of heat; hence their instability is readily understood.

When the hydroxides are added in sufficient quantity to solutions of the acids, mostly neutral solutions are produced,—that is to say, solutions which do not affect either blue or red litmus. The acid is then said to be neutralized by the hydroxide, or *vice versa*. The basic oxides which furnish hydroxides, and indeed the basic oxides generally, behave in a similar manner with acids. In these cases a *salt* is produced; thus, by the addition of sodium hydroxide to sulphuric acid the salt sodium sulphate is obtained—

$$\underset{\text{Sodium hydroxide.}}{2NaOH} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Sodium sulphate.}}{Na_2SO_4} + \underset{\text{Water.}}{2H_2O}.$$

Obviously, we may regard the salts produced in this manner as formed by the displacement of the hydrogen of the acid by more or less positive elements or simple radicles, and they may actually in many cases be prepared by the action of the metals on the acids; for example—

$$\underset{\text{Zinc.}}{Zn} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc sulphate.}}{ZnSO_4}.$$

They are also obtained, as we have seen, by the union of a more or less basic with a more or less acid oxide. But a large number of salts are known derived from the acids by the displacement of hydrogen by compound radicles; thus, many of the salts of the element vanadium are formed by the introduction of the group $(V_2O_2)^{IV}$, which functions as a tetrad element, in place of the hydrogen of acids, vanadyl sulphate being $(V_2O_2)^{IV}(SO_4)_2$. The ammonium salts are formed in a similar manner by the displacement of hydrogen in acids by the monad compound radicle $(N^vH_4)'$. But the hydrogen of many hydroxides may also be displaced by positive elements or radicles; for example, zinc hydroxide, although insoluble in water, dissolves in solutions of the alkalies, and on heating metallic zinc with a concentrated solution of potassium hydroxide, it dissolves with evolution of hydrogen—

$$Zn + 2HOK = Zn''(OK)_2 + H_2.$$

Zinc hydroxide and similar compounds, therefore, display both basic and acid functions; and it is difficult to deny the compounds formed from them by introducing positive elements in place of hydrogen the title of salts.

Another class of oxy-salts are formed by the union of two different oxides of the same element; the compounds of fluorine, chlorine, bromine, and iodine with positive elements, and of acid with basic sulphides, are also termed salts, the compounds of sulphur being distinguished as sulpho-salts or thio-salts, whilst those of the four other elements are distinguished as haloid salts.

From this it will be obvious that the term *salt* is of very wide application, and that it is almost impossible to define it in a few words. It is also extremely difficult strictly to define an acid, for although the very greatest difference is observable between the compounds of the oxides of highly negative and of highly positive elements with water, the differences become less and less marked as we pass from one end of the series to the other. The only definition which really separates bodies which are usually regarded as true acids from hydroxides possessing acid properties is afforded by the fact that, whilst the hydrogen in all hydroxides which exhibit basic properties may be displaced by negative and also in some instances by positive radicles, the hydrogen in acids can only be displaced by positive radicles. For example, the hydrogen in zinc hydroxide may be displaced by the positive radicle potassium and by the negative radicle NO_2, but it is only possible to displace the hydrogen in sulphuric acid by positive radicles. This definition is not applicable, however, to organic acids.

The extent to which hydrogen may be displaced in an acid by positive radicles is termed its *basicity*, an acid which contains a single atom of displaceable hydrogen being termed monobasic, and acids containing two or three atoms of displaceable hydrogen, dibasic or tribasic. On the other hand, the hydroxides and basic oxides are frequently spoken of as monacid, diacid, or triacid, &c., according as they are capable of neutralizing a single molecule, two, or three molecules of a monobasic acid; thus, sodium hydroxide is monacid since a single molecule neutralizes a single molecule of monobasic nitric acid, forming the salt sodium nitrate—

$$\underset{\text{Sodium hydroxide.}}{NaOH} + \underset{\text{Nitric acid.}}{HNO_3} = \underset{\text{Sodium nitrate.}}{NaNO_3} + \underset{\text{Water.}}{OH_2},$$

and barium hydroxide is a diacid base since it neutralizes two molecules of nitric acid—

$$\underset{\text{Barium hydroxide.}}{BaO_2H_2} + \underset{\text{Nitric acid.}}{2HNO_3} = \underset{\text{Barium nitrate.}}{Ba(NO_3)_2} + \underset{\text{Water.}}{2OH_2}.$$

But we may also regard the salts formed by the action of acids on hydroxides as derived from the latter by the displacement of hydrogen by negative compound radicles,—sodium nitrate, for example, as sodium hydroxide in which the atom of hydrogen has been displaced by the monad compound radicle NO_2; hence we may define the acidity of hydroxides to be the extent to which hydrogen may be displaced in them by negative radicles.

In polybasic acids, that is to say, in acids containing two or more atoms of displaceable hydrogen, it is possible to displace the hydrogen step by step; thus, by the addition of a single molecule of sodium hydroxide to a single molecule of sulphuric acid, only one-half the hydrogen in the acid is displaced—

$$\underset{\text{Sodium hydroxide.}}{NaOH} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Sodium hydrogen sulphate.}}{NaHSO_4} + \underset{\text{Water.}}{OH_2},$$

but by the addition of a second molecule of the hydroxide the second atom of hydrogen is also displaced—

$$\underset{\text{Sodium hydroxide.}}{NaOH} + \underset{\text{Sodium hydrogen sulphate.}}{NaHSO_4} = \underset{\text{Sodium sulphate.}}{Na_2SO_4} + \underset{\text{Water.}}{OH_2}.$$

Salts derived from acids by the partial displacement of their hydrogen are termed *acid* salts, those in which the hydrogen displaceable by metals is entirely displaced being termed *normal* salts. Similarly, when the hydrogen in polyacid hydroxides is entirely displaced by negative radicles, normal salts are obtained, but when it is only partially displaced the so-called *basic salts* are produced, which bear precisely the same relation to the hydroxides that the acid salts bear to the acids. Thus, from the triacid hydroxide, bismuth hydroxide, $Bi'''(OH)_3$, and the monobasic acid, nitric acid, we obtain normal bismuth nitrate and two basic bismuth nitrates:—

$$\underset{\text{Normal salt.}}{Bi\begin{Bmatrix}NO_3\\NO_3\\NO_3\end{Bmatrix}} \qquad \underset{\text{Basic salts.}}{Bi\begin{Bmatrix}NO_3\\NO_3\\OH\end{Bmatrix}} \qquad Bi\begin{Bmatrix}NO_3\\OH\\OH\end{Bmatrix}.$$

These salts are strictly comparable with the normal and two acid salts produced from the tribasic acid, phosphoric acid, and the monacid hydroxide, sodium hydroxide:—

$$\underset{\text{Normal salts.}}{PO\begin{Bmatrix}ONa\\ONa\\ONa\end{Bmatrix}} \qquad \underset{\text{Acid salts.}}{PO\begin{Bmatrix}ONa\\ONa\\OH\end{Bmatrix}} \qquad PO\begin{Bmatrix}ONa\\OH\\OH\end{Bmatrix}.$$

Two explanations may be given of the constitution of the salts formed by displacing the hydrogen in polybasic acids by polyad elements; the formula of barium sulphate, for example, may be represented by either of the following formulæ:—

$$SO_2\begin{Bmatrix}O\\O\end{Bmatrix}Ba, \qquad SO_2\begin{Bmatrix}O.Ba.O\\O.Ba.O\end{Bmatrix}SO_2,$$

according as it is supposed that two atoms of hydrogen in a single molecule of the acid are displaced, or that two molecules of the acid are concerned in the formation of the salt, one atom of hydrogen in each being displaced by each of the barium atoms. There is not at present sufficient evidence to enable us to decide definitively in favor of one or the other of these views, but the great tendency which the polybasic acids exhibit to form double salts appears to render the latter the more probable.

The formation of salts by the action of acids on metallic

oxides and hydroxides is in all cases attended with a development of heat. This subject has been very carefully studied by several chemists, especially by Thomsen, whose results for a number of acids are given in the following tables. The amount of heat developed in the reaction—

$$a\text{NaOHAq}, Q\,\text{Aq},$$

that is to say, on adding a solution of a molecules (in grammes) of sodium hydroxide to a solution of one molecule (in grammes) of the acid, represented by Q,—is given for a number of acids in the first of the following tables. The second table exhibits the amount of heat developed in the reaction—

$$\text{NaOHAq}, a\text{QAq};$$

i.e., on adding a solution of one molecule of sodium hydroxide to a solution of a molecules of the acid Q. Each molecule (in grammes) of sodium hydroxide was dissolved in 200 molecules (in grammes) of water, and the solutions of the acids were of equivalent strength; that is to say, the number of grammes of acid required to form a normal salt with 23+16+1 or 40 grammes of sodium hydroxide were dissolved in 18×200 or 3600 grammes of water. The temperature at which the two solutions were mixed in all the experiments was about 18° C. The results are expressed in hundreds of heat-units, and according to Thomsen they may all be relied on within 1 per cent.

(aNaOHAq, QAq).

Q = 1 molecule.		a					
Name of Acid.	Formula.	½	1	2	3	4	6
Monobasic Acids.							
Hydrochloric	H.Cl	68·5	137	137			
Hydrobromic	H.Br	68·5	137	137			
Hydriodic	H.I	68	137	137			
Hydrofluoric	H.F	80	163	163			
Hydrosulphuric	H.SH	39	77	78			
Hydrocyanic	H.CN	14	28	27			
Hypochlorous	H.OCl	49	96	96			
Nitric	$H.NO_3$	68	137	137			
Hypophosphorous	$H.PH_2O_2$	77	152	153			
Metaphosphoric	$H.PO_3$	71	144				
Formic	$H.CHO_2$	...	132				
Acetic	$H.C_2H_3O_2$	66	132	133			
Dibasic Acids.							
Hydrofluosilicic	$H_2.SiF_6$	...	138	266			
Hydrochloroplatinic	$H_2.PtCl_6$	...	136	272	.....	272	273
Sulphuric	$H_2.SO_4$	71	146	310	.. ..	310	
Selenic	$H_2.SeO_4$	...	148	304	.....	304	
Chromic	$H_2.CrO_4$	...	131	247	.....	292	
Sulphurous	$H_2.SO_3$	...	159	290	.....	293	
Selenious	$H_2.SeO_3$	...	148	270	.....	275	
Dithionic	$H_2.S_2O_6$	...	.....	271			
Phosphorous	$H_2.PHO_3$	74	148	284	289		
Carbonic	$H_2.CO_3$	...	110	202	.....	206	
Boric	$H_2.B_2O_4$	64	111	200	205	.....	206
Silicic	$H_2.SiO_3$	32	43	52	.....	54	
Stannic	$H_2.SnO_3$	...	.....	.....	.....	96	
Oxalic	$H_2.C_2O_4$	69	138	283	.....	285	
Succinic	$H_2.C_4H_4O_4$	...	124	242	.....	244	
Tartaric	$H_2.C_4H_4O_6$	...	124	253	258		
Tribasic Acids.							
Citric	$H_3.C_6H_5O_7$	...	.....	250	382	.....	416
Phosphoric	$H_3.PO_4$	73	.....	271	340	.....	353
Arsenic	$H_3.AsO_4$	74	.....	276	359	.....	374
Tetrabasic Acids.							
Pyrophosphoric	$H_4.P_2O_7$	...	144	286	.....	527	554

(NaOHAq, aQAq).

Q = 1 molecule.		a					
Name of Acid.	Formula.	2	1	½	¼	⅛	⅛
Monobasic Acids.							
Hydrochloric	H.Cl	137	137	68·5			
Hydrobromic	H.Br	137	137	68·5			
Hydriodic	H.I	136	137	68·5			
Hydrofluoric	H.F	160	163	82			
Hydrosulphuric	H.SH	77	77	39			
Hydrocyanic	H.CN	28	28	14			
Nitric	$H.NO_3$	136	137	68			

Q = 1 molecule.		a					
Name of Acid.	Formula.	2	1	½	¼	⅛	a
Monobasic Acids.							
Hypophosphorous	$H.PH_2O_2$	154	152	76			
Metaphosphoric	$H.PO_3$	142	144				
Formic	$H.CHO_2$	.....	132				
Acetic	$H.C_2H_3O_2$	132	132	66			
Dibasic Acids.							
Hydrofluosilicic	$H_2.SiF_6$	.....	133	133			
Hydrochloroplatinic	$H_2.PtCl_6$	.....	136	136	.....	68	46
Sulphuric	$H_2.SO_4$	142	146	155	.....	78	
Selenic	$H_2.SeO_4$	.....	148	152	.....	76	
Chromic	$H_2.CrO_4$	.....	131	124	.....	63	
Sulphurous	$H_2.SO_3$	.....	159	145	.....	73	
Selenious	$H_2.SeO_3$	.....	148	135	.....	69	
Dithionic	$H_2.S_2O_6$	.....	.....	135			
Phosphorous	$H_2.PHO_3$	149	148	142	96		
Carbonic	$H_2.CO_3$	.....	110	101	.....	51	
Boric	$H_2.B_2O_4$	129	111	100	68	.....	34
Silicic	$H_2.SiO_3$	65	43	26	.....	135	
Stannic	$H_2.SnO_3$	.....	.....	.....	.....	24	
Oxalic	$H_2.C_2O_4$	138	138	141	.....	71	
Succinic	$H_2.C_4H_4O_4$	.....	124	121	.....	61	
Tartaric	$H_2.C_4H_4O_6$	.....	124	127	86		
Tribasic Acids.							
Citric	$H_3.C_6H_5O_7$	.....	124	125	127	.....	69
Phosphoric	$H_3.PO_4$	147	148	135	113	.....	59
Arsenic	$H_3.AsO_4$	147	150	138	120	.....	62
Tetrabasic Acids.							
Pyrophosphoric	$H_4.P_2O_7$	.....	144	143	.....	132	91

To facilitate comparison between the various acids they are arranged in the following table almost in accordance with the amounts of heat developed on the addition of sodium hydroxide to equivalent quantities.

Q		Units of heat developed in the reaction (2NaOHAq, QAq).
Name of Acid.	Formula.	
Hydrofluoric	2H.Fl	32,540
Sulphuric	$H_2.SO_4$	31,380
Selenic	$H_2.SeO_4$	30,390
Hypophosphorous	$2(H.PH_2O_2)$	30,320
Sulphurous	$H_2.SO_3$	28,970
Metaphosphoric	$2(H.PO_3)$	28,750
Phosphorous	$H_2.PHO_3$	28,370
Oxalic	$H_2.C_2O_4$	28,280
Hydrochloric	2H.Cl	27,480
Hydrobromic	2H.Br	27,500
Hydriodic	2H.I	27,350
Chloric	$2H.ClO_3$	27,520
Nitric	$2H.NO_3$	27,360
Dithionic	$H_2.S_2O_6$	27,070
Selenious	$H_2.SeO_3$	27,020
Chloroplatinic	$H_2.PtCl_6$	27,220
Fluosilicic	$H_2.SiF_6$	26,620
Sulphovinic	$2(H.SO_4C_2H_5)$	26,930
Formic	$2(H.CHO_2)$	26,400
Acetic	$2(H.C_2H_3O_2)$	26,310
Pyrophosphoric	$\frac{1}{2}(H_4.P_2O_7)$	26,370
Phosphoric	$H_2.PO_4H$	27,080
Arsenic	$H_2.AsO_4H$	27,580
Citric	$\frac{2}{3}(H_3.C_6H_5O_7)$	25,470
Tartaric	$H_2.C_4H_4O_6$	25,310
Succinic	$H_2.C_4H_4O_4$	24,160
Chromic	$H_2.CrO_4$	24,720
Carbonic	$H_2.CO_3$	20,180
Boric	$H_2.B_2O_4$	20,010
Hypochlorous	2(H.OCl)	19,370
Hydrosulphuric	2(H.SH)	15,480
Hydrocyanic	2(H.CN)	5,530
Stannic	$\frac{1}{2}(H_4.SnO_4)$	4,780
Silicic	$\frac{1}{2}(H_4.SiO_4)$	2,710

From these tables it will be evident—(1), that when a molecule of sodium hydroxide in aqueous solution enters

into reaction with an acid, the heat developed is very nearly proportional to the quantity of acid present until this amounts to 1, ½, ⅓, or ¼ molecule, according as the acid is mono-, di-, tri-, or tetrabasic; but that when the amount of acid added exceeds that requisite to form the normal salt, the different acids behave differently, heat being in some cases developed, and in others absorbed, according to the constitution of the acid; and (2), that mostly when a molecule of an acid in aqueous solution enters into reaction with sodium hydroxide, the amount of heat developed increases almost in proportion to the amount of the latter, and until 1, 2, 3, or 4 molecules are added, according as the acid is mono-, di-, tri-, or tetrabasic; the further addition of sodium hydroxide is not then attended with any considerable development of heat.

Very different amounts of heat, it will be observed, are developed on neutralizing the different acids, but there is mostly a remarkable similarity in the results obtained in the case of acids which from chemical evidence are known to be closely allied. Thus, hydrochloric, hydrobromic, and hydriodic acids exhibit the same heat of neutralization; and the numbers for sulphuric and selenic acids, and for phosphoric and arsenic acids, are very similar. Hydrofluoric acid, it will be seen, differs considerably from the allied monobasic acids since the addition of the first half molecule of sodium hydroxide produces less heat than the second, which is not improbably owing to the formation of the acid salt HF_2Na; it differs also by its high heat of neutralization.

The tables show also that the dibasic acids may be divided into several groups, according to the amounts of heat developed on the addition of the first and second molecules of sodium hydroxide. The first group includes hydrofluosilicic and hydrochloroplatinic acids, the amount of heat developed by the second molecule of hydroxide being equal to that developed on the addition of the first molecule. The second group includes sulphuric, selenic, oxalic, and tartaric acids; with these acids less heat is developed by the first than by the second molecule; thus:—

Sodium hydroxide.	Sulphuric acid.	Selenic acid.	Oxalic acid.	Tartaric acid.
1st Molecule.....	146	148	138	124
2d "	164	156	145	129

In the third group, which includes sulphurous, selenious, carbonic, and boric acids, and probably also chromic, phosphorous, and succinic acids, the contrary is the case:—

Sodium hydroxide.	Sulphurous acid.	Selenious acid.	Carbonic acid.	Boric acid.
1st Molecule.....	159	148	110	111
2d "	131	122	92	89

The tribasic acids exhibit similar differences; thus:—

Sodium hydroxide.	Citric acid.	Arsenic acid.	Phosphoric acid.
1st Molecule.....	124	150	148
2d "	126	126	123
3d "	132	83	69

These differences which acids of the same basicity exhibit when submitted to thermochemical investigation correspond to differences in their chemical behavior. For example, when a solution of citric acid is neutralized with sodium carbonate and evaporated to crystallization, the trisodium salt $Na_3C_6H_5O_7$ is readily obtained, but when a solution of phosphoric or arsenic acid is similarly treated, the disodium salt Na_2HPO_4 or Na_2HAsO_4 is formed; the trisodium salts of these acids can only be procured by adding sodium hydroxide. Apparently the trisodium salts of phosphoric and arsenic acids are partially decomposed by water, as their solutions are strongly alkaline; hence the third molecule of hydroxide does not effect the complete conversion of the di- into the tri-sodium salt. The behavior of sulphuric acid will be discussed later on.

All soluble hydroxides when in solution appear to have nearly the same heat of neutralization, as will be seen from the following table, which exhibits the number of units of heat developed on neutralizing solutions of equivalent quantities of various hydroxides with a solution of one molecule (in grammes) of sulphuric acid, or of the equivalent quantities (2 molecules) of hydrochloric or nitric acid at 18° C.:—

Name of hydroxide.	Sulphuric acid.	Hydrochloric acid.	Nitric acid.
Lithium hydroxide.....	31,290	27,700	.....
Sodium "	31,380	27,490	27,360
Potassium "	31,290	27,500	27,540
Thallium "	31,130	27,520	27,380
Barium "	.....	27,780	28,360
Strontium "	30,710	27,630	.....
Calcium "	31,140	27,900	.....

But very different amounts of heat are developed on dissolving the hydroxides which are insoluble in water in acids. The following numbers represent the heat of neutralization of various hydroxides insoluble in water by a molecule of sulphuric acid:—

Magnesium hydroxide.....		31,220
Manganese	"	26,480
Nickel	"	26,110
Cobalt	"	24,670
Iron	"	24,920
Cadmium	"	23,820
Zinc	"	23,410
Copper	"	18,440

Thomsen, however, considers that the differences between the amounts of heat developed when these hydroxides are dissolved in acids, and when soluble hydroxides are neutralized, are due to the heat absorbed in rendering them soluble; or in other words, that solutions of these hydroxides would have the same heat of neutralization as solutions of soluble hydroxides.

One of the most interesting results of the thermochemical investigation of the behavior of acids with metallic hydroxides is the proof that when sodium hydroxide, for example, is added to a mixture of two acids in insufficient quantity to neutralize both, the sodium salts of the two acids are seldom formed in the proportions in which the two acids are mixed. Thus, when a solution of two molecules of sodium hydroxide is mixed with a solution containing two molecules of monobasic nitric acid and one molecule of dibasic sulphuric acid, two-thirds of the sodium hydroxide enter into reaction with the nitric acid and one-third with the sulphuric acid. The avidity, as it is termed by Thomsen, of nitric acid to enter into reaction with sodium hydroxide is thus twice as great as that of sulphuric acid. The avidity of hydrochloric acid for sodium hydroxide is equal to that of nitric acid, but the avidities of hydrobromic, hydriodic, and hydrofluoric acids are less than that of hydrochloric acid in the proportion HCl : HBr : HI : HF = 100 : 89 : 79 : 5.

In concluding this brief account of the thermochemical behavior of some of the acids and hydroxides, we may observe that the interpretation of most of the remarkable results to which we have alluded has not been given. The study of this branch of chemistry is yet in its infancy, and is beset with difficulties, but its importance can scarcely be exaggerated. At present we scarcely know more than that in the formation of a given substance a certain amount of heat is finally developed or absorbed, but in most cases we are ignorant of the value of one or more of the several distinct operations which we believe are involved in the reaction by which it is produced, so that the results given by different substances cannot as a rule be satisfactorily compared.

Many substances belonging to all classes of chemical compounds unite with water, forming combinations from which it may be again expelled by the application of a greater or less degree of heat, and from the circumstance that many of these combinations are crystalline, the water is said to be present in the form of *water of crystallization*. Thus, potassium hydroxide crystallizes with 2 molecules of water, as $KHO + 2H_2O$; copper sulphate with 5 molecules, as $CuSO_4 + 5H_2O$; and sodium sulphate with 7 and with 10 molecules. The water may usually be expelled from these compounds by the application of a gentle heat, and many salts part with their water of crystallization on exposure to the air; but others are not deprived of it or more than a part, unless very strongly heated. Copper sulphate, for

example, readily loses 4 of the 5 molecules of water with which it combines, but the remaining molecule is only expelled by heating to about 200° C.; 5 of the 7 molecules of water in crystallized magnesium sulphate are readily removed, and the sixth is expelled at about 150° C., but the seventh is retained at 200° C.

The compounds containing water of crystallization are usually denied the title of *atomic* compounds ordinarily applied to combinations of two or more elements in which it is supposed the constituent atoms are all associated in a single molecule under the influence of the force which has received the name of chemical affinity, and in contradistinction are termed *molecular* compounds, being regarded as combinations of two or more separate molecules. This, although perhaps true of many of the compounds containing water of crystallization, is certainly not true of all, and notably of the sulphates, which are only deprived of their water by heating to high temperatures.

Hydrogen Dioxide, $H_2O_2 = 33{\cdot}92$.

This compound cannot be obtained directly from its elements, but there appears to be little doubt that it may be formed by the combination of oxygen with water, since it is produced in many cases of slow oxidation in presence of water, and particularly in processes where ozone is formed. It is produced in small quantity when water is decomposed by an electric current, especially when small electrodes are employed. Its formation in this manner may be regarded as an oxidation of water, but it has been suggested that it is the direct product of electrolysis, and that the oxygen evolved is a secondary product derived from the decomposition of the hydrogen dioxide; thus—

$$2H_2O = H_2 + H_2O_2;$$
$$2H_2O_2 = O_2 + 2H_2O.$$

It is usually prepared from barium dioxide by double decomposition with hydrochloric or carbonic acid:—

$$BaO_2 + 2HCl = H_2O_2 + BaCl_2.$$
Barium dioxide. Hydrogen chloride. Hydrogen dioxide. Barium chloride.

Hydrogen dioxide or peroxide is an exceedingly unstable substance, and readily decomposes even in aqueous solution into water and oxygen, especially on heating. The solution is more stable if slightly acid. A dilute solution may be concentrated by evaporation in vacuo over sulphuric acid, and hydrogen dioxide was obtained in this manner by its discoverer Thénard as a colorless transparent liquid, of specific gravity 1·452, which did not freeze at −30° C.; it is doubtful, however, whether it has ever been prepared quite free from water. It did not redden litmus, but had a harsh bitter taste; when placed upon the hand it instantly turned the cuticle white.

Hydrogen dioxide exhibits the closest resemblance to ozone. Thus, it is decomposed by mere contact with finely-divided metals, such as silver, gold, and platinum, with evolution of oxygen. Like ozone it is a powerful reducing agent, entering into reaction with silver oxide, for example, to form water, oxygen, and metallic silver:—

$$H_2O_2 + Ag_2O = H_2O + 2Ag + O_2.$$

According to Fairley, about 37,000 units of heat are developed in the production of 32 grammes of oxygen by this reaction, which thus affords further proof of the strength of the affinity of oxygen for oxygen, as probably the heat developed is chiefly, if not entirely, due to the combination of the oxygen atoms. Many other oxides are reduced by it, either to the metallic state or to lower oxides, oxygen being evolved and water produced.

But hydrogen dioxide is also a powerful oxidizing agent. Thus, it decolorizes a solution of indigo; it converts sulphurous acid, H_2SO_3, into sulphuric acid, H_2SO_4; lead sulphide, PbS, into lead sulphate, $PbSO_4$; and many oxides into higher oxides. It decomposes a solution of hydriodic acid with separation of iodine:—

$$H_2O_2 + 2HI = 2H_2O + I_2.$$

With the aid of this reaction an important series of experiments to ascertain the connection between the conditions of a chemical change and its amount have been made by Harcourt and Esson. The experiments consisted in adding successive equal portions of sodium hyposulphite to a solution containing hydrogen dioxide, hydriodic acid, and a little starch. By this reagent the iodine which is continually being liberated by the action of the dioxide on the hydriodic acid is instantly reconverted into iodide, so that the liquid, though it contain starch, and though iodine is being formed in it, remains quite colorless as long as any hyposulphite is present. But when the last trace of hyposulphite has been removed by the action of the iodine, the portion of iodine next formed remains free, and the liquid becomes suddenly blue. The addition of another small portion of hyposulphite again removes the color, and until all the hyposulphite is decomposed the solution remains colorless, and then again becomes suddenly blue. The intervals at which the blue color appeared were carefully noted, and the amount of hydrogen dioxide decomposed being known from the amount of hyposulphite employed, the quantity of dioxide decomposed in a given time was thus determined. The observed results are given in the following table:—

Amount of Dioxide.	Time from the beginning in minutes.	Chemical change in each interval.	Interval in minutes.
20·95	0·00		
19·95	4·57	1	4·57
18·95	9·37	1	4·80
17·95	14·50	1	5·13
16·95	19·87	1	5·37
15·95	25·57	1	5·70
14·95	31·68	1	6·11
13·95	38·20	1	6·52
12·95	45·23	1	7·03
11·95	52·82	1	7·59
10·95	61·12	1	8·30
9·95	70·15	1	9·03
8·95	80·08	1	9·93
7·95	91·27	1	11·19
6·95	103·88	1	12·61
5·95	118·50	1	14·62
4·95	135·85	1	17·35
3·95	157·00	1	21·15
2·95	181·53	1	27·53
1·95	223·45	1	38·92
·95	291·13	1	66·73

The general conclusion deducible from these experiments is, that the amount of change at any moment varies directly with the amount of dioxide present in the solution; in accordance with this law, the quantities of dioxide at the end of a series of times taken in arithmetical progression are themselves in geometrical progression. This law of chemical action has been corroborated by the investigation of other reactions, and it is probably of very general application.

When hydrogen dioxide solution is mixed with a concentrated solution of barium hydroxide, crystalline hydrated barium dioxide, $BaO_2 + 6H_2O$, separates—

$$H_2O_2 + Ba(OH)_2 = BaO_2 + 2H_2O.$$
Hydrogen dioxide. Barium hydroxide. Barium dioxide. Water.

In a similar manner, peroxides of many metals are precipitated on the addition of their salts to a solution of hydrogen dioxide.

Hydrogen dioxide, it will be evident, differs remarkably from hydrogen monoxide or water. Its instability, and its tendency to enter into reaction with other bodies with separation of oxygen, appear to be explained by the fact that its decomposition into water and oxygen is attended with the development of a very considerable amount of heat. The behavior of ozone and hydrogen dioxide, in fact, strikingly illustrates one of the most important laws of chemical action, viz., that those decompositions and reactions which are attended with the development of heat always take place more readily than those which require an absorption of heat, and they take place the more readily the greater the amount of heat which is liberated. The heat developed by the decomposition of ozone and hydrogen dioxide, we have seen, is to be traced to the same cause, being due, it can scarcely be doubted, to the combination of the oxygen atoms.

Fluorine—Chlorine—Bromine—Iodine.

Fluorine,	Symbol,	F;	Atomic wt.,	19·1;	Molecular wt.,	(?)
Chlorine,	"	Cl;	"	35·36;	"	70·72.
Bromine,	"	Br;	"	79·75;	"	159·50.
Iodine,	"	I;	"	126·53;	"	353·07.

These four elements form with metals compounds anal-

ogous to sea-salt, and from this circumstance the name halogens, or salt-producers (from ἁλς, sea-salt), has been applied to them, their compounds with other radicles being frequently termed haloid compounds. They are always classed together on account of their close analogy in properties, but there are numerous and very important distinctions between them.

The element fluorine is not known in the free state, all attempts to isolate it having failed on account of the impossibility of obtaining vessels which can withstand its action. Chlorine is a gas of a greenish yellow color, whilst bromine, at ordinary atmospheric temperatures, is a mobile red liquid, so deep in color as to be almost opaque, and iodine is a black, crystalline, and very brittle solid, which exhibits metallic lustre.

None of these elements are ever met with in the free state, but their compounds are very widely distributed, and they are to be detected in most rocks and soils, in spring and sea-water, and in the ashes of plants and animals. Fluorine occurs most abundantly in combination with calcium as fluor-spar, and chlorine in combination with sodium as ordinary salt, large deposits of which exist in various parts of the globe; considerable deposits of bromine in combination with potassium have within recent years been discovered in Stassfurt, but no abundant source of iodine has hitherto been discovered.

Chlorine was discovered by Scheele in 1774, and was so named on account of its color (from χλωρός, green), but its elementary nature was first established by Davy in 1810. Bromine was first described in 1826 by Balard, who obtained it from *bittern*, the mother liquor of sea-water, after the less soluble salts have been extracted by evaporation and crystallization; it was named on account of its irritating odor (from βρώμος, a stench). Iodine was discovered by Courtois in 1811, in the waste liquors from the manufacture of sodium carbonate from the ashes of sea-weed; it received its name from the beautiful violet color of its vapor (ἰοειδής, violet-colored).

Chlorine is usually prepared, both in the laboratory and on the large scale, by gently heating a concentrated solution of hydrochloric acid with manganese dioxide; the reaction appears to take place in two stages,—the first consisting in the formation of the manganese chloride corresponding to manganese dioxide—

$$\underset{\text{Manganese dioxide.}}{MnO_2} + \underset{\text{Hydrochloric acid.}}{4HCl} = \underset{\text{Manganese tetrachloride.}}{MnCl_4} + \underset{\text{Water.}}{2H_2O};$$

but this compound is so unstable that it breaks up into chlorine and a lower chloride of manganese—

$$\underset{\text{Manganese tetrachloride.}}{MnCl_4} = \underset{\text{Chlorine.}}{Cl_2} + \underset{\text{Manganese dichloride.}}{MnCl_2}.$$

It may be procured directly from salt by acting on a mixture of salt and manganese dioxide with sulphuric acid, but in this case hydrochloric acid is first produced by the action of the sulphuric acid on the salt—

$$NaCl + H_2SO_4 = HCl + NaHSO_4.$$

The hydrochloric acid then enters into reaction with the manganese dioxide, as explained above, but the manganese dichloride is converted into manganese sulphate and hydrochloric acid by the sulphuric acid. The following equation therefore expresses the final result, but does not take into account that there are several stages in the reaction—

$$\underset{\text{Sodium chloride.}}{2NaCl} + \underset{\text{Sulphuric acid.}}{3H_2SO_4} + \underset{\text{Manganese dioxide.}}{MnO_2}$$

$$= \underset{\text{Chlorine.}}{Cl_2} + \underset{\text{Water.}}{2OH_2} + \underset{\text{Manganese sulphate.}}{MnSO_4} + \underset{\text{Sodium hydrogen sulphate.}}{2NaHSO_4}.$$

Bromine and iodine are obtained in a precisely similar manner by treating the liquid containing the bromide or iodide with manganese dioxide and sulphuric acid.

Another process for the manufacture of chlorine has been recently introduced by Deacon, which consists in passing a mixture of hydrochloric acid gas and air through a heated brickwork chamber filled with pieces of firebrick or marble which have been soaked in a solution of copper sulphate and dried. The hydrogen of the hydrochloric acid forms water with the oxygen of the air, and chlorine as liberated, but the precise nature of the changes by which this is effected is not known. The reaction is at its maximum at a temperature of about 500° C., which is much below that at which oxygen alone acts upon hydrochloric acid to form water and chlorine; the copper sulphate is but little affected, although a certain amount is always transformed into chloride. There can be no doubt, however, that the decomposition is the result of recurrent action, and another somewhat similar method of obtaining chlorine may be quoted in illustration. Thus when a mixture of silica and sodium chloride is heated to redness in a current of oxygen, chlorine is evolved, and the chloride is converted into silicate—

$$\underset{\text{Silica.}}{2SiO_2} + \underset{\text{Sodium chloride.}}{4NaCl} + \underset{\text{Oxygen.}}{O_2} = \underset{\text{Sodium silicate.}}{2Na_2SiO_3} + \underset{\text{Chlorine.}}{2Cl_2};$$

but on passing hydrochloric acid gas over the silicate it is re-converted into the chloride and silica—

$$\underset{\text{Sodium silicate.}}{Na_2SiO_3} + \underset{\text{Hydrochloric acid.}}{2HCl} = \underset{\text{Silica.}}{SiO_2} + \underset{\text{Sodium chloride.}}{2NaCl} + \underset{\text{Water.}}{OH_2}.$$

Hence, by passing hydrochloric acid together with air over the mixture of silica and chloride, a continuous evolution of chlorine is obtained, reaction in the one direction having no sooner taken place than reaction in the opposite direction sets in. There can be little doubt that the production of chlorine by Deacon's process is, in a similar manner, the result of a series of changes in opposite directions, the nature of which, however, remains to be discovered.

Chlorine is very readily condensed by a pressure of about 4 atmospheres at 15° C., or by cold alone at about —50° C., into a yellow mobile liquid of specific gravity about 1·33, but it has not been solidified. Bromine has at 0° C. the specific gravity 3·188; it boils at 59°·5 C., yielding a dense red vapor, and solidifies at—24°·5 C. Iodine melts at 107° C., and boils at about 175° C., yielding a magnificent purple vapor. Chlorine gas and the vapor of bromine and iodine have a pungent, irritating, disagreeable odor, and are irrespirable. Water at 10° C. dissolves about 2·5 times its bulk of chlorine, and about 3 per cent. of bromine, but iodine is very sparingly soluble in water. When chlorine is passed into a mixture of crushed ice and water a crystalline hydrate, $Cl_2 + 10H_2O$, is produced, and a similar compound of bromine, $Br_2 + 10H_2O$, may be obtained, but iodine does not furnish a hydrate.

The halogens furnish with hydrogen compounds in which a single atom of hydrogen is united with a single atom of the halogen, viz.:—

Hydrogen	fluoride	or hydrofluoric acid,	HF
"	chloride	" hydrochloric "	HCl
"	bromide	" hydrobromic "	HBr
"	iodide	" hydriodic "	HI

The conditions under which hydrogen and chlorine, enter into reaction have already been described, and we have seen that no change of volume occurs in the formation of hydrogen chloride from its elements. A mixture of hydrogen and bromine vapor does not explode on the application of flame, but hydrobromic acid is slowly formed when the mixture is heated; hydriodic acid is also produced when iodine is heated in hydrogen. Gore has shown that hydrofluoric acid may be prepared by heating silver fluoride in an atmosphere of hydrogen—

$$\underset{\text{Silver fluoride.}}{2AgF} + \underset{\text{Hydrogen.}}{H_2} = \underset{\text{Hydrofluoric acid.}}{2HF} + \underset{\text{Silver.}}{2Ag};$$

and he finds that one volume of hydrogen in uniting with fluorine produces two volumes of hydrofluoric acid gas, thus proving that the constitution of hydrogen fluoride is similar to that of hydrogen chloride, bromide, and iodide. Hydrogen chloride or hydrochloric acid is usually prepared by gently heating a mixture of sodium chloride or common salt and concentrated sulphuric acid, diluted with a small quantity of water—

$$\underset{\text{Sodium chloride.}}{NaCl} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen chloride.}}{HCl} + \underset{\text{Sodium hydrogen sulphate.}}{NaHSO_4}.$$

Hydrogen bromide and iodide cannot be prepared in this manner from metallic bromides and iodides, as they are partially decomposed by concentrated sulphuric acid, bromine or iodine being liberated; this decomposition takes place much more readily with hydriodic acid than with hydrobromic acid—

$$\underset{\text{Hydrogen iodide.}}{2HI} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Iodine.}}{I_2} + \underset{\text{Sulphur dioxide.}}{SO_2} + \underset{\text{Water}}{2OH_2}$$

Hydrobromic and hydriodic acid are therefore usually prepared by the action of water on the compounds of phosphorus with bromine and iodine; thus—

$$\underset{\text{Phosphorus tribromide.}}{PBr_3} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Hydrogen bromide.}}{3HBr} + \underset{\text{Phosphorous acid.}}{PH_3O_3}$$

$$\underset{\text{Phosphorus triiodide.}}{PI_3} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Hydrogen iodide.}}{3HI} + \underset{\text{Phosphorous acid.}}{PH_3O_3}.$$

Hydrogen fluoride is procured by gently heating finely powdered calcium fluoride or fluor-spar with concentrated sulphuric acid in leaden or platinum vessels, or by strongly heating potassium hydrogen fluoride in a platinum retort—

$$\underset{\text{Calcium fluoride.}}{CaF_2} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen fluoride.}}{2HF} + \underset{\text{Calcium sulphate.}}{CaSO_4}$$

$$\underset{\text{Potassium hydrogen fluoride.}}{HKF_2} = \underset{\text{Hydrogen fluoride.}}{HF} + \underset{\text{Potassium fluoride.}}{KF}.$$

The compounds of hydrogen with the halogens, or, as they are frequently termed, the haloid acids, are not only similar in composition, but they resemble each other very closely in properties. Thus, hydrogen chloride, bromide, and iodide at ordinary atmospheric temperatures are colorless transparent gases, which fume strongly in moist air, whilst hydrogen fluoride is a highly volatile colorless liquid, of specific gravity ·988 at 12°·7 C., which boils at 19°·4 C.; its vapor fumes strongly in moist air. At a temperature of 10° C., under a pressure of 40 atmospheres, hydrogen chloride is condensed to a colorless liquid of specific gravity 1·27, but it has never been solidified; hydrogen bromide and iodide are still more readily liquefied, and both may be caused to solidify, the former at −73° C., and the latter at −51° C.

The circumstances which attend the formation of hydrogen chloride, bromide, and iodide from their elements, and their general behavior, show that the affinity of chlorine for hydrogen is much greater than that of bromine, whilst that of bromine is greater than that of iodine; and as already pointed out (p. 411), a considerable amount of heat is developed in the formation of hydrogen chloride, but a less amount in the formation of hydrogen bromide, and the production of hydrogen iodide from its elements involves the absorption of heat. We have seen, however, that the heat developed or absorbed in the formation of these compounds cannot be regarded as an absolute measure of the affinity of chlorine, bromine, and iodine for hydrogen, since there is an expenditure of energy due to the change of state, the three compounds being gases, but one being formed from two gases, the second from a gas and a liquid, and the third from a gas and a solid. Moreover, as we believe that the molecules which enter into reaction consist each of two atoms, the combination of the dissimilar atoms to form molecules of hydrogen chloride, bromide, and iodide must be preceded by the separation of the similar atoms which constitute the molecules of hydrogen, and of chlorine, bromine, and iodine, and there must be an expenditure of energy to effect this separation; it appears probable that different amounts of energy are expended in separating the atoms of chlorine, of bromine, and of iodine from each other, and we may further assume as probable that the amount of energy expended in the separation of the atoms is greater in the case of chlorine than of bromine, and greater in the case of bromine than of iodine, although at present there is scarcely any experimental evidence which enables us to draw conclusions of any value in proof of this.

Hydrogen fluoride is miscible with water in all proportions, and much heat is developed on mixing the two substances; hydrogen chloride, bromide, and iodide are also extremely soluble in water, forming colorless strongly acid solutions. Water at 0° C. absorbs ·825 of its own weight, or about 492 times its bulk, of hydrogen chloride gas, increasing in volume about one-third, and acquiring a density of about 1·23. This saturated solution consists of hydrogen chloride and water in about the proportions indicated by the formula $HCl+3H_2O$; it fumes strongly, and when heated it gives off hydrogen chloride until at 112° C. a more dilute solution distils over, corresponding approximately in composition with the formula $HCl+8H_2O$. A weaker solution when heated parts with water until it acquires this composition, and then distils unchanged. In like manner, a solution containing about 48 per cent. of hydrogen bromide distils unchanged at 125° C., and a solution containing about 57 per cent. of hydrogen iodide boils constantly at 127° C.; these solutions correspond approximately in composition with the formulæ $HBr+5H_2O$ and $2HI+11H_2O$. A solution of hydrogen fluoride approximately of the composition $HF+2H_2O$ distils unchanged at 120° C. Roscoe's experiments have shown, however, that the composition of these solutions varies with the pressure, and that there exists for each pressure a solution of corresponding strength which undergoes no change in composition when distilled under this pressure, and therefore has a constant boiling point. Hence, the apparent constancy of composition cannot be regarded as proof of the existence of a definite hydrate corresponding in composition to that of the solutions obtained on distilling under a given pressure. There is no evidence, however, to invalidate, but much to support the conclusion that the haloid acids do not dissolve water as such, but that they form definite hydrates; and if it be admitted that their solutions contain definite hydrates, their behavior is precisely similar to that of other compounds which decompose when heated, but furnish products which can reunite to form the parent compound.

According to Thomsen's determinations, the amounts of heat developed when gaseous hydrochloric, hydrobromic, and hydriodic acids are dissolved in water, in the proportion of 1 molecule of the acid to 400 molecules of water, are as follows—

In the dissolution of hydrogen	chloride,	17,314	heat-units.
" " "	bromide,	19,207	" "
" " "	iodide,	19,207	" "

The development of so large an amount of heat, although, doubtless, in a great measure arising from the change from the gaseous to the liquid state, may be regarded as evidence that the acids really enter into combination with water, and are not merely dissolved; it may be noticed also that the same amounts of heat are developed in dissolving hydrogen bromide and iodide, and that their solutions, which under the ordinary atmospheric pressure distil unchanged, have nearly the same boiling point, and correspond approximately in composition.

Solutions of hydrogen chloride and bromide may be preserved unchanged, but the solution of hydrogen iodide gradually becomes brown, especially on exposure to light, owing to the separation of iodine, the hydrogen being oxidized by the oxygen of the air—

$$\underset{\text{Hydrogen iodide.}}{4HI} + \underset{\text{Oxygen.}}{O_2} = \underset{\text{Iodine.}}{2I_2} + \underset{\text{Water.}}{2OH_2}.$$

On the other hand, solutions of chlorine or bromine in water may be preserved unchanged in the dark, but when they are exposed to light oxygen is evolved, and hydrogen chloride or bromide produced—

$$\underset{\text{Chlorine.}}{2Cl_2} + \underset{\text{Water.}}{2H_2O} = \underset{\text{Oxygen.}}{O_2} + \underset{\text{Hydrogen chloride.}}{4HCl}.$$

A solution of iodine does not undergo alteration. In the presence of substances which have a tendency to enter into reaction with oxygen, water is often readily decomposed in this manner by chlorine and bromine without the aid of light, but iodine seldom effects this change; thus, on passing chlorine into a solution of sulphurous acid, the latter is oxidized to sulphuric acid—

$$\underset{\text{Sulphurous acid.}}{H_2SO_3} + \underset{\text{Water.}}{H_2O} + \underset{\text{Chlorine.}}{Cl_2} = \underset{\text{Sulphuric acid.}}{H_2SO_4} + \underset{\text{Hydrogen chloride.}}{2HCl}.$$

The bleaching action which is powerfully exerted by chlorine in presence of water, and less powerfully by bromine, is in most cases the result of a similar change, the substance bleached being usually one which has a tendency to enter into reaction with oxygen.

Chlorine readily displaces bromine and iodine from their compounds with hydrogen and other elements, and, similarly, bromine displaces iodine; indeed the affinity of chlorine for other elements, with few exceptions, is superior to that of bromine, the affinity of bromine being in like manner superior to that of iodine. The decomposition of many chlorine compounds by the corresponding bromine and iodine compounds, and of bromine compounds by the corresponding iodine compounds, would appear at first sight to be in contradiction to this statement, but on examination of all such reactions it is found that they involve a development of heat, and therefore are perfectly normal in character. For example, silver chloride

is converted into silver iodide by digestion with an aqueous solution of hydriodic acid—

$$AgCl + HI = AgI + HCl.$$

It will be obvious that, in a molecule of silver iodide and a molecule of hydrogen chloride, the same quantity of the same elements is present as in a molecule of silver chloride and of a molecule of hydrogen iodide. But in the formation of the latter system from its elements, less heat is developed than in the formation of the former; hence reaction in the direction indicated by the above equation is attended with the development of heat. Thus, in the formation of a molecule of dissolved hydriodic acid from its elements 13,170 units of heat are evolved, and about 34,800 units of heat are developed in the production of a molecule of silver chloride; whereas 39,320 units of heat are developed in the formation of a molecule of dissolved hydrochloric acid from its elements, and about 18,650 units in the production of a molecule of silver iodide. But—

$$(34,800+13,170)-(18,650+39,320)=-10,000$$

that is to say, the action of hydriodic acid on silver chloride is attended with the development of no less than 10,000 units of heat.

All metals which decompose water at a red heat or at lower temperatures decompose a solution of hydrogen chloride with evolution of hydrogen, and form the corresponding metallic chloride, but with very different degrees of readiness; thus—

$$\underset{\text{Zinc.}}{Zn} + 2\underset{\text{Hydrogen chloride.}}{HCl} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc chloride.}}{ZnCl_2}.$$

According to Thomsen, the amounts of heat developed in the production of 2 grammes of hydrogen by the action of various metals on a dilute solution of hydrogen chloride are as follows:—

Lithium	125,860	heat-units.	
Potassium	123,700	"	"
Sodium	114,380	"	"
Magnesium	108,290	"	"
Aluminium	79,880	"	"
Manganese	49,360	"	"
Zinc	34,200	"	"
Iron	21,310	"	"
Cadmium	17,610	"	"
Lead	4,130	"	"

Exact comparative observations of the degrees of readiness with which the various metals evolve hydrogen from a solution of hydrogen chloride have not as yet been made, but from ordinary observations it appears that those act most readily which develop the greatest amount of heat when dissolved. It is very difficult to compare the behavior of different metals, however, since minute quantities of impurity exert a most remarkable influence; thus, ordinary zinc and iron dissolve with the greatest readiness in a dilute solution of hydrogen chloride, but the pure metals are only slowly dissolved.

Hydrogen bromide and iodide closely resemble hydrogen chloride in their behavior with metals; mercury, however, which is not affected by hydrogen chloride or bromide, slowly dissolves in hydrogen iodide. Hydrogen fluoride not only acts with great readiness upon all metals which are dissolved by the other haloid acids, but likewise on many which these acids do not attack,—copper and silver, for example; and it also dissolves many elements which are insoluble in all other acids, such as silicon, boron, titanium, tantalum, and zirconium, with evolution of hydrogen. Gore has shown that anhydrous liquid hydrogen fluoride and chloride are, in most cases, much less energetic in their chemical reactions than their aqueous solutions; this is probably because the products which are formed in the first instance, being insoluble or difficultly soluble in the acid, form a coating on the surface of the substance submitted to the action of the acid, and thus preserve it from further action, or cause the action to take place more slowly; when water is present the product is dissolved, and thus a fresh surface is continually exposed.

The haloid acids readily enter into reaction with most metallic oxides forming water, and the corresponding compound of the metal with the halogen; thus—

$$\underset{\text{Zinc oxide.}}{ZnO} + 2\underset{\text{Hydrogen chloride.}}{HCl} = \underset{\text{Zinc chloride.}}{ZnCl_2} + \underset{\text{Water.}}{OH_2}.$$

$$\underset{\text{Ferric oxide.}}{Fe_2O_3} + 6\underset{\text{Hydrogen chloride.}}{HCl} = \underset{\text{Ferric chloride.}}{Fe_2Cl_6} + 3\underset{\text{Water.}}{OH_2}.$$

Hydrogen fluoride is capable of dissolving some oxides, such as silica, SiO_2, for example, which are not affected by the other haloid acids. It is in consequence easily distinguished from the other haloid acids by the powerful corrosive action which it exerts on glass.

The haloid acids also readily enter into reaction with, or neutralize, the hydroxides, forming water, and the corresponding fluoride, chloride, bromide, or iodide—

$$\underset{\text{Sodium hydroxide.}}{NaOH} + \underset{\text{Hydrogen chloride.}}{HCl} = \underset{\text{Sodium chloride.}}{NaCl} + \underset{\text{Water.}}{H_2O};$$

$$\underset{\text{Barium hydroxide.}}{Ba(OH)_2} + 2\underset{\text{Hydrogen bromide.}}{HBr} = \underset{\text{Barium bromide.}}{BaBr_2} + 2\underset{\text{Water.}}{H_2O}.$$

The thermochemical behavior of hydrochloric acid with hydroxides has already been discussed.

Chlorine enters into reaction with many of the elements at ordinary atmospheric temperatures, and with all of them, with few exceptions, at more or less elevated temperatures; its union with phosphorus, and with finely divided arsenic, antimony, tin, and copper, is attended with combustion. Bromine and iodine closely resemble chlorine in their behavior with other elements; the union of bromine with other elements, however, appears always to take place less readily, and to be accompanied by the development of less heat than is the case with chlorine, and the affinity of iodine for most other elements is still weaker than that of bromine. The iodides also are usually less stable than the corresponding bromides, which are usually less stable than the corresponding chlorides. The compounds of the halogens with metals and with positive elements generally are mostly stable in presence of water, but their compounds with negative elements are mostly decomposed by water, and the halogen separated in the form of haloid acid.

The same element does not always enter into combination with chlorine, bromine, and iodine in the same proportions; thus, phosphorus forms a stable trichloride, PCl_3, and an unstable pentachloride, PCl_5; a stable tribromide, PBr_3, and a pentabromide, PBr_5, less stable than the pentachloride; but with iodine it forms the compounds PI_3 and P_2I_4. Many elements furnish compounds with fluorine containing a higher proportion of fluorine than corresponds to the amount of chlorine in their highest chlorides, or they form stable fluorides but unstable chlorides, bromides, and iodides; for example, phosphorus pentafluoride, PF_5, is not decomposed by heat, whereas the pentachloride, PCl_5, is readily resolved into the trichloride and chlorine by heating.

The halogens do not only combine with hydrogen and other elements, however, but they are capable of forming compounds with each other. Thus, by the action of iodine on silver fluoride, Gore has obtained iodine pentafluoride IF_5, as a colorless highly volatile liquid; iodine at once enters into reaction with chlorine, and is first converted into liquid iodine chloride, ICl, but ultimately yields iodine trichloride, ICl_3, which is a crystalline solid; with bromine iodine appears to furnish only a liquid monobromide, IBr. In like manner, bromine forms with chlorine a liquid bromine chloride, BrCl.

On account of its great affinity for hydrogen, chlorine readily enters into reaction with a large number of hydrogenized carbon compounds, and displaces the hydrogen more or less completely. Thus, methane, CH_4, when submitted to the action of chlorine, is successively converted into monochloromethane, CH_3Cl, dichloromethane, CH_2Cl_2, trichloromethane, $CHCl_3$, and tetrachloromethane, CCl_4,—the displaced hydrogen being evolved as hydrogen chloride. Bromine behaves similarly, but enters into such reactions much less readily; iodine seldom, if ever, behaves in this way.

Compounds of the Halogens with Oxygen.

Oxides of fluorine are unknown, and the oxides of the remaining halogens are very imperfectly investigated. Three oxides of chlorine have been prepared, viz.:—

$$\underset{\text{Hypochlorous anhydride.}}{Cl_2O}, \quad \underset{\text{Chlorous anhydride.}}{Cl_2O_3}, \text{ and } \underset{\text{Chlorine peroxide.}}{ClO_2}$$

At ordinary temperatures these compounds are greenish yellow gases, remarkable on account of their instability, being decomposed with explosive violence by very slight elevations of temperature. Their instability is accounted

for by the circumstance that their decomposition is attended with the development of a very considerable amount of heat; thus, according to Thomsen, the formation of gaseous hypochlorous anhydride from its elements would involve the absorption of 18,040 units of heat per molecule, and consequently this amount is developed when the anhydride is resolved into its elements. The explanation of the absorption of heat in the formation of the oxides of chlorine would appear to be that more energy must be expended in separating the atoms of oxygen from each other, and in separating the atoms of chlorine from each other, than is produced by the combination of the chlorine and oxygen atoms.

Oxides of bromine are also unknown, and since thermochemical investigation has shown that oxygen has less affinity to bromine than to chlorine, their non-formation in reactions corresponding to those by which the oxides of chlorine are produced is no longer surprising.

Iodine differs entirely from chlorine and bromine with regard to its affinity for oxygen. Only one oxide of iodine is known, viz., iodic anhydride, I_2O_5, but this is a white crystalline substance of considerable stability, and, according to Thomsen's determination, the formation of this compound from its elements would involve the *development* of no less than 44,860 units of heat per molecule. It has not been directly produced from its elements, although its formation in this manner is not improbable.

Chlorous anhydride is prepared by passing dry chlorine gas over dry mercurie oxide—

$$2HgO + 2Cl_2 = Cl_2O + Hg_2OCl_2.$$

It may be condensed by surrounding the receiver with a mixture of ice and salt, and thus obtained as a deep red liquid which emits a vapor of a deeper color than that of chlorine, having a peculiar suffocating chlorous smell. It is with the greatest readiness decomposed into chlorine and oxygen, the warmth of the hand being sufficient to cause it to explode. Water dissolves about 200 times its bulk of the gas, forming a pale yellow solution of hypochlorous acid, which has an acid but not sour taste—

$$Cl_2O + H_2O = 2HOCl.$$

By neutralizing this solution with metallic hydroxides or carbonates, corresponding metallic hypochlorites are formed, but these salts are usually prepared by passing chlorine into water in which the metallic hydroxide or carbonate is suspended or dissolved, the liquid being carefully cooled.

$$\underset{\text{Potassium hydroxide.}}{2KOH} + \underset{\text{Chlorine.}}{Cl_2} = \underset{\text{Potassium hypochlorite.}}{KOCl} + \underset{\text{Potassium chloride.}}{KCl} + \underset{\text{Water.}}{OH_2}.$$

A concentrated solution of hypochlorous acid decomposes rapidly, even when kept in ice; a dilute solution is more stable, but is decomposed by boiling into chloric acid, water, chlorine, and oxygen. These substances are probably the products of several distinct changes, such as are represented by the following equations—

$$\begin{array}{lcl} 2HOCl & = & O_2 + 2HCl \\ 3HOCl & = & HO_3Cl + 2HCl. \end{array}$$

Hypochlorous acid. Chloric acid. Hydrogen chloride.

Hypochlorous acid, however, readily decomposes hydrochloric acid, and the chlorine produced is probably the result of reaction between these bodies—

$$HCl + HOCl = Cl_2 + OH_2.$$

Hypochlorous acid is a very powerful oxidizing agent, and rapidly converts many of the elements into their highest oxides, at the same time liberating chlorine; indeed, in many respects it is not unlike ozone and hydrogen dioxide in its chemical behavior, and it enters into reaction with the latter in the manner represented by the equation—

$$HOCl + H_2O_2 = O_2 + HCl + H_2O.$$

Like chlorine, it possesses powerful bleaching properties. The hypochlorites also act as bleaching agents, probably by yielding oxygen to the substance submitted to their action, but less powerfully than the free acid.

The bleaching powder or chloride of lime of commeree is prepared by exposing slaked lime or calcium hydroxide to the action of chlorine gas. There has been much discussion among chemists as to the constitution of the compound so produced, and it is only quite recently that evidence has been obtained which enables us to pronounce a decision. The composition of bleaching powder is represented by the formula $CaCl_2O$, whereas calcium hypochlorite would be represented by the formula $CaCl_2O_2$; it was therefore supposed that the bleaching powder was a mixture of calcium chloride and calcium hypochlorite, since $CaCl_2 + CaCl_2O_2 = 2CaCl_2O$. Apparently, however, it is a distinct compound intermediate between calcium chloride and calcium hypochlorite, thus—

$$Ca\begin{cases} Cl \\ Cl \end{cases}, \quad Ca\begin{cases} Cl \\ (OCl) \end{cases}, \quad Ca\begin{cases} (OCl) \\ (OCl) \end{cases};$$

Calcium chloride. Calcium chlorohypochlorite (Bleaching powder). Calcium hypochlorite.

and its formation from calcium hydroxide may be represented by the following equation—

$$Ca\begin{cases} OH \\ OH \end{cases} + Cl_2 = Ca\begin{cases} Cl \\ (OCl) \end{cases} + OH_2.$$

On dissolving in water, according to Kingzett, it is resolved into calcium chloride and calcium hypochlorite, which may be obtained in crystals by carefully concentrating the solution in vacuo, so that a solution of bleaching powder is correctly regarded as a solution of calcium hypochlorite—

$$2Ca\begin{cases} Cl \\ OCl \end{cases} = CaCl_2 + Ca\begin{cases} OCl \\ OCl \end{cases}.$$

Bleaching powder. Calcium chloride. Calcium hypochlorite.

Solutions of hypochlorites are very unstable, and when boiled they furnish a mixture of chloride and chlorate; thus—

$$\underset{\text{Potassium hypochlorite.}}{3KOCl} = \underset{\text{Potassium chlorate.}}{KO_3Cl} + \underset{\text{Potassium chloride.}}{2KCl}.$$

It is on this account that it is necessary in preparing hypochlorites to act on a cold solution of the hydroxide, since if the solution be heated chlorate is formed by the decomposition of the hypochlorite.

The chlorates are very stable compounds as compared with the hypochlorites. They may be obtained well crystallized, and are all soluble in water. They are destitute of bleaching properties. The most important chlorate is potassium chlorate, $KClO_3$, which is chiefly interesting as a source of oxygen, and is largely employed in the manufacture of fireworks; the resolution of this salt into oxygen and potassium chloride is attended with a development of heat amounting to 9700 units per molecule decomposed.

By exactly decomposing a solution of barium chlorate with sulphuric acid, a solution of chlorie acid, $HClO_3$, is obtained which may be separated from the insoluble barium sulphate by filtration, and concentrated by evaporation in vacuo until it forms a syrupy liquid:—

$$Ba(ClO_3)_2 + H_2SO_4 = 2HClO_3 + BaSO_4.$$

Chloric acid has a faint chlorous odor, and a powerfully acid reaction; it is instantly decomposed by contact with organic matter, with charring, and frequently even with ignition. In diffused daylight it gradually undergoes spontaneous decomposition, and when heated to a little above 100° C. it is rapidly converted into perchloric acid, water, chlorine, and oxygen—

$$\underset{\text{Chloric acid.}}{8HClO_3} = \underset{\text{Perchloric acid.}}{4HClO_4} + \underset{\text{Water.}}{2H_2O} + \underset{\text{Oxygen.}}{3O_2} + \underset{\text{Chlorine.}}{2Cl_2}.$$

It is a powerful oxidizing and bleaching agent.

Chloric acid serves for the preparation of the remaining oxides and oxy-acids of chlorine. To prepare chlorous anhydride from it, 10 parts of pure benzine are dissolved in 100 parts of concentrated sulphuric acid, and when the mixture has cooled 12 parts of pulverized potassium chlorate are added. The chloric acid liberated from the chlorate under these circumstances is deprived of a portion of its oxygen by the benzine, which is oxidized, and at the same time, by the dehydrating influence exercised by the sulphuric acid, the elements of a molecule of water are removed and chlorous anhydride is liberated; thus—

$$2HClO_3 - O_2 - OH_2 = Cl_2O_3.$$

The mixture is heated to about 50° C. in a flask having a delivery tube fitted to its neck by grinding, and blown out in several places into small bulbs; the gas, after passing through water contained in these bulbs, is conducted into

a glass tube surrounded by a mixture of ice and salt. The condensed liquid deposits crystals of a hydrate of chlorous acid, and the supernatant liquid decanted immediately into a small cooled glass cylinder forms the nearly anhydrous oxide Cl_2O_3. Liquid chlorous oxide or anhydride thus obtained is very mobile, is of a deep red color, and has a specific gravity of 1·330 to 1·387 at 0° C.; it boils a little above 0° C., and it explodes somewhat readily at a few degrees above 0° C. The specific gravity of the gaseous oxide accords with that required by the formula Cl_2O_3. Chlorous anhydride is not very soluble in water, 100 grammes of water at 23° C. dissolving 5·65 grammes of the oxide (Brandau). The solution of chlorous acid, $HClO_2$, thus obtained, has powerful bleaching and oxidizing properties; when it is heated, chloric and hydrochloric acids are formed and chlorine evolved. By neutralizing the solution with hydroxides of the alkali or alkaline earth metals corresponding chlorites are obtained, which are soluble; and from these the insoluble chlorites of lead and silver are obtained by double decomposition. Chlorites are decomposed by the feeblest acids, even by carbonic acid.

When fused potassium chlorate is carefully treated with concentrated sulphuric acid, chlorine dioxide or peroxide is evolved; the reaction by which it is produced, it is stated, is represented by the following equation—

$$\underset{\text{Potassium chlorate.}}{3KClO_3} + \underset{\text{Sulphuric acid.}}{2H_2SO_4} = \underset{\text{Chlorine peroxide.}}{2ClO_2} + \underset{\text{Water.}}{H_2O} + \underset{\text{Potassium perchlorate.}}{KClO_4} + \underset{\text{Potassium hydrogen sulphate.}}{2KHSO_4}.$$

The so-called *euchlorine* gas, which is obtained when a mixture of a chlorate and hydrochloric acid is gently heated, appears to be a mixture of chlorine peroxide with chlorine. Chlorine peroxide is gaseous at ordinary temperatures, but by means of a mixture of ice and salt it may be condensed to a red liquid. It has a deep greenish-yellow color, and peculiar sweet chlorous odor; a slight degree of heat and mere contact with organic matters at once determine its explosion. Like all the oxides of chlorine, it acts rapidly upon mercury and most metals. From Pebal's recent experiments there appears to be no doubt that chlorine peroxide is correctly represented by the formula ClO_2, and it is, therefore, to be included with nitric oxide and the few other compounds in which we must suppose an odd number of affinities are free (see p. 473). It is absorbed by alkaline solutions, forming a mixture of a chlorite and a chlorate—

$$\underset{\text{Chlorine peroxide.}}{2ClO_2} + \underset{\text{Potassium hydroxide.}}{2KHO} = \underset{\text{Potassium chlorite.}}{KClO_2} + \underset{\text{Potassium chlorate.}}{KClO_3} + \underset{\text{Water.}}{OH_2}.$$

In this respect especially it differs from the other oxides of chlorine.

The only remaining chlorine compound to be considered is perchloric acid, $HClO_4$. It may be formed from chloric acid by oxidation, but, according to Roscoe, the best method of preparing it consists in boiling down a solution of chloric acid; lower oxides of chlorine escape, and a solution of perchloric acid is left. It may also be obtained from potassium perchlorate, formed by heating potassium chlorate, by distilling it with sulphuric acid.

Aqueous perchloric acid may be concentrated by boiling till it attains a temperature of 203° C., after which it passes over in the form of an oily liquid which approximately has the composition $HClO_4 + 2H_2O$. By distilling this hydrate with twice its volume of sulphuric acid, nearly pure perchloric acid is obtained.

The pure acid is a colorless very soluble liquid, of specific gravity 1·782 at 15°·5 C. In this state it is one of the most powerful oxidizing agents known; a single drop brought in contact with charcoal, wood, or almost any organic substance, immediately causes an explosive combustion, which in violence almost equals the sudden decomposition of the so-called chloride of nitrogen. It produces frightful burns if allowed to fall upon the skin. It undergoes spontaneous decomposition at ordinary temperatures, and cannot be distilled unchanged. It unites very energetically with water, and when mixed with it in suitable proportions forms the hydrate $HClO_4 + H_2O$; this is a white crystalline substance, which melts at 50° C., and undergoes decomposition when heated to 110° C., splitting up into the pure acid and the oily hydrate above mentioned.

Aqueous perchloric acid has a sour taste, and reddens litmus strongly, but does not bleach; it dissolves iron and zinc with evolution of hydrogen, and when dilute it is unaffected by hydrogen sulphide and sulphurous acid, which reduce all other oxy-acids of chlorine. Perchloric acid, in fact, is distinguished from all other oxidized chlorine compounds by its superior stability, oxygen being withdrawn from it with comparative difficulty.

The results of Thomsen's thermochemical examination of various reactions which are involved in the formation of some of the oxidized chlorine compounds are exhibited in the following table. The symbols in the first column indicate the nature of the reaction, and the numbers in the second column the units of heat developed or absorbed, the reaction being supposed to take place between the substances of which the symbols are separated by commas. Thus, the line

$$Cl_2, O \quad -18{,}040 \quad \text{Gaseous oxide}$$

is to be read as meaning that, in the formation of a molecule (in grammes) of gaseous chlorine oxide from chlorine and oxygen, 18,040 units of heat would be absorbed. Similarly, the reaction Cl_2O, Aq, that is to say, the absorption of gaseous chlorine oxide by water is attended with the development of 9440 units of heat; hence the reaction Cl_2, O, Aq, or the formation of a solution of hypochlorous acid (two molecules) from chlorine, oxygen, and water would involve the absorption of 8600 units of heat. For these, as in all Thomsen's experiments, the determinations were made at about 18° C.

	Reaction.	Units of heat developed or absorbed.	Remarks.
Hypochlorous acid.	Cl_2, O	−18,040	Gaseous oxide.
	Cl_2O, Aq	+ 9,440	Absorption of gas by water.
	Cl_2, O, Aq	− 8,600	Formation of aqueous acid.
	Cl, O, H, Aq	+29,880	Ditto from Cl, O, H, and water.
	ClOHAq, KOHAq	+ 9,980	Heat of neutralization.
Chloric acid.	Cl_2, O_5, Aq	−20,480	Formation of aqueous acid from chlorine, oxygen, and water.
	Cl, O_3, H, Aq	+23,940	Ditto from chlorine, oxygen, hydrogen, and water.
	ClO_3HAq, KOHAq	+13,760	Heat of neutralization.
	ClO_3K, Aq	−10,040	Heat of dissolution.
	KCl, O_3	− 9,770	Oxidation of dry KCl.
	K, Cl, O_3	+95,840	Formation of crystalline $KClO_3$ from its elements.
	HClAq, O_3	−15,380	Oxidation of HCl in solution.
	KClAq, O_3	−15,370	Oxidation of KCl in solution.

In this table, and in all similar tables, the reactions are represented *empirically*, and the figures after the symbols merely indicate the number of atoms which enter into the composition of the compound. Thus, the reaction expressed as Cl_2, O, merely refers to the formation of a molecule (in grammes) of hypochlorous anhydride, Cl_2O, from chlorine and oxygen, and the arrangement of the symbols in this manner is not intended to indicate that the compound is formed from a *molecule* of chlorine and an *atom* of oxygen. The symbol Aq is intended to indicate that an *excess* of water is employed, *i.e.*, such an amount that no appreciable development of heat would be caused by the addition of a further quantity.

When bromine is added to an aqueous solution of sodium hydroxide, sodium hypobromite, NaOBr, is formed, but this is much less stable than the corresponding hypochlorite, and is readily converted into bromate and bromide. The bromates and bromic acid resemble the chlorates and chloric acid, but are much less stable; thus, a solution of

bromic acid is decomposed at 100° C., giving off bromine and oxygen, and all reducing agents decompose it with facility. The inferior stability of the oxidized compounds of bromine as compared with those of chlorine appears to indicate that the affinity of bromine to oxygen is less than that of chlorine; this is entirely confirmed by thermochemical investigation, Thomsen having obtained the following values for bromic acid :—

Br_2, O_5, Aq	$= -43{,}520$	Formation of the aqueous acid from bromine, oxygen, and water.
Br, O_3, H, Aq	$= +12{,}420$	Formation of the aqueous acid from its elements.
$BrHAq, O_3,$	$= -15{,}960$	Oxidation of hydrobromic acid.
$KOHAq, BrO_3HAq$	$= +13{,}750$	Heat of neutralization.

When iodine is added to solutions of alkaline hydroxides or carbonates, alkaline hypoiodites corresponding to the hypochlorites are perhaps formed, but as yet have not been isolated. By dissolving iodine in a warm solution of potassium hydroxide a mixture of potassium iodide and iodate is produced—

$$\underset{\text{Iodine.}}{3I_2} + \underset{\text{Potassium hydroxide.}}{6KHO} = \underset{\text{Potassium iodate.}}{KIO_3} + \underset{\text{Potassium iodide.}}{5KI} + \underset{\text{Water.}}{3OH_2}$$

Iodine is converted into iodic acid by heating with the strongest nitric acid, and by the action of many other oxidizing agents; but iodic acid is usually prepared from barium iodate, which is decomposed with the necessary quantity of sulphuric acid. Potassium iodate is most readily prepared by passing chlorine into water in which iodine is suspended until the latter is dissolved, then adding a corresponding quantity of potassium chlorate and warming; the iodine is converted into monochloride, which enters into reaction with the chlorate, and chlorine is evolved—

$$KClO_3 + ICl = KIO_3 + Cl_2.$$

By adding a solution of barium hydroxide, insoluble barium iodate is precipitated, from which, as pointed out, iodic acid may be prepared.

Iodic acid separates from its solution on spontaneous evaporation in crystals of the composition HIO_3; when heated to 120° C. these crystals lose water, and apparently form the compound HI_3O_8 or $HIO_3 + I_2O_5$; at about 170° C. this compound is resolved into water and iodic anhydride, I_2O_5. Iodic anhydrido is a crystalline substance, which readily dissolves in water, forming iodic acid; when heated to about 370° C. it is resolved into oxygen and iodine. Iodic acid is a powerful oxidizing agent, being easily decomposed by deoxidizing agents; hydriodic acid reduces it to iodine and water—

$$HIO_3 + 5HI = 3I_2 + 3H_2O.$$

The chlorates and bromates are mostly easily soluble, and the corresponding salts are isomorphous; but the iodates are mostly difficultly soluble, and with the exception of barium iodate, are not isomorphous with the corresponding chlorates and bromates. Moreover, chloric and bromic acids furnish but one class of salts, of which potassium chlorate, $KClO_3$, is typical; but iodic acid, in addition to the normal iodates, such as potassium iodate, KIO_3, forms acid salts. These differences appear to indicate that iodic acid differs in constitution from the other acids, and Thomsen has pointed out that it is probably a dibasic acid of the formula $H_2I_2O_6$, since it is readily converted into water and the anhydride I_2O_5, a property which is characteristic of dibasic but not of monobasic acids; and since it furnishes acid salts, which is also characteristic of polybasic but not of monobasic acids, and is isomorphous with succinic acid, which is dibasic. Normal potassium iodate would therefore have the formula $K_2I_2O_6$, and the so-called diiodate is probably the acid salt KHI_2O_6.

This view of the constitution of iodic acid is rendered the more probable by the behavior of periodic acid, the disodium salt of which separates as a crystalline powder on passing chlorine into a solution of sodium iodate and sodium hydroxide; the reaction is empirically represented by the equation—

$$\underset{\text{Sodium iodate.}}{NaIO_3} + 3NaOH + Cl_2 = \underset{\text{Disodium periodate.}}{Na_2IH_3O_6} + 2NaCl.$$

To prepare the acid from this salt, it is dissolved in nitric acid, and silver nitrate added; the precipitate of disilver periodate is dissolved in hot dilute nitric acid, and the solution concentrated at a moderate heat until a salt of the composition $AgIO_4$ crystallizes out. By treating this salt with cold water it is decomposed, disilver periodate and periodic acid being produced :—

$$2AgIO_4 + 4OH_2 = Ag_2IH_3O_6 + H_5IO_6;$$

to obtain the latter the solution is evaporated.

Periodic acid separates from its aqueous solution in colorless crystals of the composition H_5IO_6, which are not altered at 100° C., but melt at 130° C., and when heated to a higher temperature give off water and oxygen, leaving iodic anhydride.

Periodic acid furnishes a complex but extremely interesting series of salts. Thus, it forms two potassium salts, one of which has the composition KIO_4, and is obtained on passing chlorine into a solution of potassium iodate and potassium hydroxide; the second is represented by the formula $K_4I_2O_9$, and is obtained on dissolving the former in potassium hydroxide solution. The latter crystallizes with 9 molecules of water, which, however, it loses when exposed over sulphuric acid. Corresponding sodium salts exist. That which has the composition $NaIO_4$ crystallizes either in the anhydrous state, or with 3 molecules of water, which it readily loses in dry air; the second salt, the formation of which was above described, separates in crystals of the composition $Na_4I_2O_9 + 2H_2O$, and is only rendered anhydrous by heating to 220° C. Three silver salts are known, represented by the formulæ $AgIO_4$, $Ag_4I_2O_9 + 3H_2O$, and Ag_5IO_6; the second of these loses 2 molecules of water at 100° C., but the third only at 200° C. The barium salt $Ba_2I_2O_9$ separates in the anhydrous state from strongly acid solutions, but when prepared by precipitating a solution of the acid with barium hydroxide, or of an alkali salt with a barium salt, it contains 6 or 7 molecules of water, which are only completely removed by heating to 300° C. It also furnishes a lead salt of the composition $Pb_3I_2O_{10} + 2H_2O$, and amongst other magnesium salts one of the composition $Mg_4I_2O_{11}$, which crystallizes with 6 and with 9 molecules of water.

The question now arises—What is the nature of the relation between these various salts? By the chemical method alone it is extremely difficult, if not impossible, to decide, but from Thomsen's thermochemical investigation of the acid there can be little doubt as to the answer we should make to this question. When successive molecules of potassium hydroxide are added to a solution of 1 molecule of the acid H_5IO_6 the amounts of heat evolved are as follows :—

On the addition of the	1st molecule,	5,150	heat-units.
"	2d "	21,440	"
"	3d "	3,150	"
"	4th and 5th "	2,300	"

The first and second molecules, therefore, together cause the development of 26,590 units of heat, or of 13,295 units per molecule. But we have seen (p. 421) that on neutralizing a large number of acids, between 13,750 and 13,150 units of heat are developed per molecule of hydroxide added; and as the addition of further quantities of the hydroxide causes a comparatively slight development of heat there is little doubt from these results that the molecule H_5IO_6 is dibasic. But on account of the existence of salts, such as $K_4I_2O_9$, it appears desirable to double this formula, and to represent the molecule of periodic acid by the formula $H_4 . I_2O_{12}H_6$. Several of the salts above alluded to may be regarded as derived from this molecule by the partial or total displacement of the hydrogen by metals; and we may term those which are formed by displacing 4 of the 10 atoms of hydrogen *normal* salts, while those in which 2, 4, or 6 of the remaining atoms of hydrogen are displaced may be called *basic* salts. Thus we have—

Normal salts.

$$Na_4' . I_2O_{12}H_6; Ag_4' . I_2O_{12}H_6$$

Basic salts.

$$Pb_2'' . I_2O_{12}H_4Pb''; Mg_2'' . I_2O_{12}H_2Mg_2''; Ag_4' . I_2O_{12}Ag_6'.$$

That the tendency to form basic salts is slight in the case of the highly positive elements is also shown by the small amount of heat developed on the addition of the third, fourth, and fifth molecules of potassium hydroxide.

The anhydrous salts such as $K_4I_2O_9$ are to be regarded as derived from a distinct acid formed from the molecule $H_4.I_2O_{12}H_6$ by the withdrawal of the elements of three molecules of water. The salts, such as KIO_4, which on account of its isomorphism with potassium permanganate, $K_2Mn_2O_8$, is more probably represented by the formula $K_2I_2O_8$, are, as may be supposed, also derived from a distinct acid, formed in a similar manner by the withdrawal of the elements of a fourth molecule of water; these salts have the same empirical composition as the perchlorates, and as potassium perchlorate is isomorphous with the compound $K_2I_2O_8$, it is probable that it corresponds with it in composition, and that perchloric acid therefore is represented by the formula $H_2Cl_2O_8$. If this conclusion be correct, and chloric acid be correctly represented by the formula $HClO_3$, we have an explanation of the great difference which is observed in the properties of these two acids. Perchloric acid, we have seen, has a great tendency to combine with water, and its hydrates may be regarded as distinct acids, the liquid hydrate bearing the same relation to the acid $H_2Cl_2O_8$ that crystallized periodic acid bears to the hypothetical acid $H_2I_2O_8$, from which salts such as $K_2I_2O_8$ are derived. Basic perchlorates corresponding to the basic periodates are not known, but a cuprammonium salt and a lead salt have been obtained which apparently are derived from the crystalline hydrate of perchloric acid, the latter having the composition $Pb''Cl_2O_8 + PbH_2O_2$ or $Pb''Cl_2O_{10}H_2Pb''$.

It will have been noticed that the amount of heat developed on the addition of the first molecule of potassium hydroxide to the solution of periodic acid regarded as H_5IO_6 is much less than is usually observed with other acids, and the amount developed on the addition of the second molecule much greater; the two molecules together, however, produce an effect comparable with that observed in the case of other acids. But the salt produced on passing chlorine into a solution of potassium hydroxide has the composition $K_2I_2O_8$, so that the first action of potassium hydroxide on a solution of the acid $H_4.I_2O_{12}H_6$ apparently does not merely consist in the direct displacement of hydrogen in this acid by potassium; the elements of four molecules of water are also withdrawn, and since this latter operation involves the absorption of heat, the amount of heat finally developed in the reaction is but small. On the addition of a further quantity of hydroxide, however, change in the reverse order is effected, and hence the normal amount of heat is developed by the combined action of the two molecules of hydroxide. It is interesting also to observe that more heat is developed on adding the third than by the fourth and fifth molecules of hydroxide together, and to contrast this with the circumstance that the silver salt $Ag_4I_2O_{12}H_6$ loses the elements of two molecules of water at 100° C., but the elements of a third only at 200° C. Apparently there is a tendency on the part of potassium hydroxide to enter into reaction with the acid after the production of the normal salt $K_4I_2O_{12}H_6$; but salts containing a relatively larger proportion of potassium evidently cannot exist except in solution, and even then only to a limited extent.

We are now in a position also to explain the formation of sodium periodate by the action of chlorine on a solution of sodium iodate and sodium hydroxide. We have learnt that the action of chlorine on the latter is to produce sodium hypochlorite, and that this is a powerful oxidizing agent—

$$NaOH + Cl_2 = NaOCl + HCl,$$

and there can be little doubt, therefore, that the iodate is at first oxidized by it, and converted into the salt Na_2IO_8; thus—

$$Na_2I_2O_6 + 2NaOCl = Na_2I_2O_8 + 2NaCl.$$

In presence of sodium hydrate and water, however, this salt is at once converted into the normal periodate—

$$Na_2I_2O_8 + 2NaOH + 2H_2O = Na_4I_2O_{12}H_6.$$

The following are the results of Thomsen's thermochemical examination of iodic and periodic acids:—

	Reaction.	Units of heat.	Remarks.
Iodic acid.	I_2, O_5	44,860	Formation of the anhydride from its elements.
	I_2, O_5, Aq	43,070	Do. in aqueous solution.
	I_2O_5, Aq	−1,790	Heat of dissolution of the anhydride.
	I, O_3, H	57,880	Formation of the acid from its elements.
	I, O_3, H, Aq	55,710	Do. in aqueous solution.
	IO_3H, Aq	−2,170	Heat of dissolution of the acid.
	I_2O_5, H_2O	+2,540	Combination of the anhydride with water.
	$IHAq, O_3$	42,540	Oxidation of dissolved hydriodic acid.
	$KOHAq, IO_3HAq$	13,810	Heat of neutralization.
Periodic acid.	I, O_6, H_5	185,780	Formation from the elements.
	IO_6H_5, Aq	−1,380	Heat of dissolution.
	I, O_6, H_5, Aq	184,400	Formation in aqueous solution.
	I, O_4, H, Aq	47,680	Ditto.
	$IHAq, O_4$	34,510	Oxidation of dissolved hydriodic acid.
	I_2, O_7, Aq	27,000	Formation from the elements in aqueous solution.
	$IO_6H_5Aq, KOHAq$	5,150	Heat of neutralization.
	$IO_6H_5Aq, 2KOHAq$	26,590	

It will be noticed that the amounts of heat developed in the formation of these two acids in aqueous solution from their elements are very simply related; thus—

$(I_2, O_6, H_2, Aq) = 111{,}420$ heat-units or $3 \times 37{,}140$
$(I, O_6, H_5, Aq) = 184{,}400$ " " $5 \times 36{,}880$

Again, both acids are easily decomposed by hydriodic acid, yielding water and iodine, and a similar simple relation obtains between the amounts of heat developed in the two reactions—

$(I_2O_6H_2Aq, 10HIAq) = 167{,}040$ heat-units, or $5 \times 33{,}408$
$(IO_6H_5Aq, 7HIAq) = 133{,}770$ " " $4 \times 33{,}442$

The analogous decomposition of chloric acid by hydrochloric acid would involve the absorption of −30.920 units of heat, whilst that of bromic acid by hydrobromic acid would be attended with the development of 101,520 units of heat; the difference between these numbers, 132,440, is almost equal to the amount evolved in the decomposition of periodic acid, and on comparing the several reactions it will be evident that the differences between the amounts of heat evolved are approximately simple multiples of a common constant; thus—

			Differences.
Chloric acid	=	− 30,920	132,440
Bromic "	=	+ 101,520	
Iodic "	=	+ 167,040	65,520
Periodic "	=	+ 133,770	33,270

The differences are thus to each other as 4 : 2 : 1. The meaning of this remarkable relation is at present unknown.

Without further description, it will be obvious that whilst chlorine, bromine, and iodine and their compounds exhibit very considerable general resemblance, yet there are many most important differences between them; and also that chlorine is much more closely related to bromine than is the latter to iodine.

Sulphur—Selenium—Tellurium.

Sulphur,	Symbol S;	Atomic wt.,	31·98.
Selenium,	" Se;	"	79.
Tellurium,	" Te;	"	128.

These three elements are usually classed together, since most of their compounds with other elements are of the same type. In some respects they resemble each other closely, but in others they differ very widely,—selenium being much more closely related to sulphur on the one hand than to tellurium on the other.

Sulphur occurs native in most volcanic districts; it is also found abundantly in combination with metals, such as copper, iron, lead, and zinc, and it is widely distributed

in the form of sulphates of barium, calcium, magnesium, and strontium; it is a necessary constituent of animal and vegetable tissues.

Selenium is of rare occurrence, and is always met with in combination with other elements; it is frequently associated in minute proportions with sulphur in its ores. Tellurium is also a rare element; it is occasionally found native, but generally in combination with various metals, such as bismuth, copper, lead, gold, or silver, and it is usually accompanied by selenium.

Sulphur is a very brittle solid of a lemon-yellow color, insoluble in water, and therefore tasteless. It is a bad conductor of heat, and a non-conductor of electricity. Its specific gravity in the native crystalline state is 2·05. Sulphur melts at 115° C., and at 120° C. is converted into a perfectly limpid pale yellow liquid; but as it is gradually heated it becomes darker and more viscid until, at 200°–240° C., it is so thick that the vessel in which it is contained may be inverted without any outflow taking place. At 250°–300° C. it again liquefies, but does not become so fluid as when first melted, and at 440° C. it boils, yielding an orange-colored vapor.

The density of sulphur vapor at 1000° C. is 32 times as great as that of hydrogen at the same temperature; so that as the atomic weight of sulphur is 32, the molecules of sulphur at this temperature are diatomic; but at about 500° C. its density is three times as great, so that at this temperature its molecules must be regarded as hexatomic.

Selenium is a deep brown-colored brittle solid, of the specific gravity 4·5 in the crystalline state; like sulphur, it is insoluble in water. It boils at a temperature below a red heat, and gives off a deep yellow vapor, the density of which at about 1400° C. is such as to show that it consists of diatomic molecules, but at lower temperatures, like sulphur, its molecule is more complex.

Tellurium is much like a metal in appearance, resembling bismuth in color; it is very brittle; its specific gravity is 6·1 to 6·33, and it conducts heat and electricity, though not very readily. It melts at about 500° C., and at a high temperature is converted into a yellow vapor, the density of which at 1440° C. is such as to show that the molecule of tellurium at this temperature is diatomic. No tendency has hitherto been observed on the part of tellurium to form a more complex molecule in the manner characteristic of selenium and sulphur; and it is noteworthy also that, whereas the density of sulphur vapor at temperatures not far removed from its boiling point is three times as great as at much higher temperatures, the density of selenium vapor under similar circumstances is only about one and a half times as great as at about 1400° C.

Sulphur is chiefly remarkable for the great number of *allotropic* forms in which it can exist. Thus, native sulphur is found crystallized in rhombic octahedra of the specific gravity 2·05. This variety melts at 114°·5 C.; it is readily soluble in carbon disulphide, the sulphide of chlorine, S_2Cl_2, benzine, turpentine, &c., and sulphur is usually deposited in this form on spontaneous evaporation of its solution in carbon disulphide; it is, in fact, the stable form into which all other *allotropes* tend to change. When, however, melted sulphur is allowed to cool slowly it crystallizes in transparent, yellowish-brown, monoclinic prisms, of lower specific gravity, viz., 1·98, but of higher melting point (120° C.); in the course of a few days, although the crystals maintain their prismatic form, they become opaque, and, on examination, are found to be converted into aggregations of minute octahedrons. This change of prismatic into octahedral sulphur is attended with the development of a considerable amount of heat, which is especially noticeable when the conversion is caused to take place rapidly by scratching the crystals. The transformation of the octahedral variety into the prismatic takes place at about the melting point of the former, a transparent crystal of octahedral sulphur being converted into an opaque mass of prismatic crystals when heated for some time to a temperature of 105°–115° C.; also, when a saturated solution of sulphur in hot turpentine is allowed to cool, crystals of prismatic sulphur are at first deposited, but after a time, when the liquid has become comparatively cool, the crystals which separate are octahedral.

Prismatic sulphur is soluble in carbon disulphide and other menstrua which dissolve the octahedral modification; another modification, which is also soluble, but destitute of crystalline form, is obtained on addition of acids to solutions of alkaline polysulphides—

$$\underset{\text{Potassium pentasulphide.}}{K_2S_5} + \underset{\text{Hydrogen chloride.}}{2HCl} = \underset{\text{Sulphur.}}{4S} + \underset{\text{Hydrogen sulphide.}}{H_2S} + \underset{\text{Potassium chloride.}}{2KCl}.$$

It has a greenish-white color, and constitutes ordinary milk of sulphur; by keeping, it becomes gradually converted into octahedral sulphur. Sublimed sulphur, or flowers of sulphur, is probably closely allied to this form, but always contains a small proportion of insoluble sulphur.

When sulphur is heated to 260°–300° C. and then poured in a thin stream into cold water, it is converted into the so-called plastic modification, and is obtained as a soft yellowish-brown semitransparent mass, capable of being drawn out into fine elastic threads. In this state sulphur has the specific gravity 1·95, and is insoluble in carbon disulphide; in the course of a few hours, however, it again becomes brittle and almost entirely reconverted into the octahedral modification, the change being accompanied by the development of heat.

When the chloride of sulphur, S_2Cl_2, is decomposed by water, it furnishes sulphur, hydrochloric acid, and thiosulphuric acid; the sulphur thus obtained is amorphous and insoluble in carbon disulphide, but is converted into octahedral sulphur by fusion, or by exposure for some time to a temperature of 100° C. Thiosulphuric acid also gradually decomposes into sulphur and sulphurous acid, and if a solution of a thiosulphate is decomposed by hydrochloric acid—

$$\underset{\text{Sodium thiosulphate.}}{Na_2S_2O_3} + \underset{\text{Hydrogen chloride.}}{2HCl} = \underset{\text{Sulphur.}}{S} + \underset{\text{Sulphurous acid.}}{H_2SO_3} + \underset{\text{Sodium chloride.}}{2NaCl}$$

the sulphur which separates is soluble in carbon disulphide, but is obtained on evaporation of the solution in an amorphous condition, and cannot then be again dissolved in carbon disulphide; it is stated, however, that if the hyposulphite is decomposed by dilute sulphuric acid, the sulphur which separates is insoluble in carbon disulphide. When a solution of ordinary sulphur in carbon disulphide is exposed to sunlight, an amorphous insoluble modification separates; the reconversion of this modification into octahedral sulphur is attended with the absorption of heat.

Several minor modifications of sulphur have been described, but it is not known whether the differences which they exhibit are inherent, or whether, as is not improbable, they are due to the presence of impurity.

There appears to be a relation between the modification formed in a reaction and the compound or compounds from which it is obtained, since, generally, the sulphur separated from compounds in which it is associated with positive elements is soluble, whilst that separated from compounds in which it is associated with negative elements is insoluble in carbon disulphide; but the conditions under which the sulphur is separated doubtless exercise an important influence.

At present we have no knowledge as to the manner in which the various allotropes are related to each other; it has been suggested, however, that the differences between them are at least in some cases due to differences in molecular composition.

Several allotropic modifications of selenium are also known, but a tendency to form allotropes has not been observed in the case of tellurium.

Three principal modifications of selenium, corresponding to the three principal modifications of sulphur, may be distinguished, viz., (1), black crystalline selenium, of specific gravity about 4·80, which may be placed by the side of the octahedral variety of sulphur, being the form in which selenium separates when solutions of metallic selenides are exposed to the air, and since all other modifications are converted into it when heated to about 150° C.; (2), red crystalline selenium, of specific gravity 4·46 to 4·51, which probably corresponds to monoclinic sulphur, as it has the same crystalline form, and may be obtained by rapidly cooling melted selenium; and (3), red amorphous selenium, of specific gravity about 4·3. This last corresponds to the amorphous allotrope of sulphur, and, as in the case of sulphur, it occurs in two modifications, the one soluble and the other insoluble in carbon disulphide. Black crystalline selenium, unlike octahedral sulphur, however, is insoluble in carbon disulphide, but the red crystalline allotrope is soluble, although to a much less extent than sul-

phur. The conversion of these modifications of selenium into each other is attended with development or absorption of heat, just as in the case of sulphur, and the melting points of the several modifications are different. Thus, if amorphous selenium, which melts a few degrees above 100° C., be heated to about 96° C., it quickly becomes crystalline, the change being attended with considerable rise of temperature, and the melting point rises to 217° C. The electrical conductivity of selenium is found to vary in a remarkable manner with the temperature, and is also influenced by light. Amorphous selenium is a non-conductor up to 80° C., but from this temperature up to 210° C. its conductivity gradually increases, after which it again diminishes. Selenium which has been kept for several hours at 210° C. and then gradually cooled is especially sensitive to the influence of light, its conductivity increasing with the intensity of the light.

Sulphur, selenium, and tellurium form gaseous compounds with hydrogen, analogous in composition to water:—

H_2S	Hydrogen sulphide.
H_2Se	Hydrogen selenide.
H_2Te	Hydrogen telluride.

Hydrogen sulphide may be produced directly from its elements by passing hydrogen gas into boiling sulphur, but it is always prepared by the action of a solution of hydrochloric or sulphuric acid on a metallic sulphide, that of iron being commonly employed—

$$\underset{\text{Ferrous sulphide.}}{FeS} + \underset{\text{Hydrogen chloride.}}{2HCl} = \underset{\text{Hydrogen sulphide.}}{H_2S} + \underset{\text{Ferrous chloride.}}{FeCl_2}.$$

The compounds of selenium and tellurium with hydrogen are obtained in a similar manner from metallic selenides and tellurides. Hydrogen and selenium also directly enter into reaction; the quantity of hydrogen selenide formed is apparently a function of the temperature; it increases from 250° to 260° C., and decreases regularly from the latter point to 700° C.

Hydrogen sulphide, hydrosulphuric acid, or sulphuretted hydrogen gas, is transparent and colorless; it possesses a most offensive odor, and cannot be breathed with impunity, frequently giving rise to nausea and vertigo even when much diluted. It may be condensed by powerful pressure to an extremely mobile liquid, which solidifies when cooled in a bath of solid carbon dioxide and ether to a white transparent mass, which melts at −85° C. Hydrogen sulphide is readily inflammable, burning in air with a blue flame, and forming water and sulphur dioxide—

$$\underset{\text{Hydrogen sulphide.}}{2SH_2} + \underset{\text{Oxygen.}}{3O_2} = \underset{\text{Sulphur dioxide.}}{2SO_2} + \underset{\text{Water.}}{2H_2O}.$$

Most metals when heated in the gas decompose it, a metallic sulphide being produced, and hydrogen liberated. Hydrogen sulphide dissolves in water, a saturated solution containing about three times its volume of the gas; the solution has the odor and taste of the gas, and a slight acid reaction. It is gradually decomposed on exposure to the air, sulphur being deposited—

$$2SH_2 + O_2 = 2S + 2OH_2.$$

It is decomposed in a similar manner by nearly all oxidizing agents, and by the action of chlorine, bromine, and iodine—

$$SH_2 + Cl_2 = 2HCl + S.$$

Iodine, however, cannot decompose the gas at ordinary temperatures except in presence of water. This is because the reaction requires an absorption of heat. Thus, in the production of a molecule of hydrogen sulphide, from hydrogen and sulphur in the state in which it separates when hydrogen sulphide is decomposed by iodine, 4500 units of heat are developed; but in the production of a molecule of hydriodic acid from its elements, 6000 units of heat are absorbed, so that the reaction indicated by the equation $H_2S + I_2 = 2HI + S$ would involve the absorption of $4500 + 2 \times 6000 = 16{,}500$ units of heat. That it takes place in presence of water is due to the fact that the dissolution of the hydriodic acid produced is attended with the development of $2 \times 19{,}200 = 38{,}400$ units of heat; hence, when the reaction is effected in a dilute solution, heat is developed to the extent of $38{,}400 - 16{,}500 = 21{,}900$ units of heat. But it is found that the reaction takes place the less readily as the concentration of the solution increases, and that it ceases when the solution has attained a specific gravity of 1·56 at ordinary temperatures; in more concentrated solutions sulphur even dissolves with production of hydrogen sulphide and liberation of iodine. A simple explanation of this apparently anomalous result, however, is afforded by the observation that the heat developed by the absorption of equal quantities of hydriodic acid is less as the quantity of acid already dissolved in the water is greater. The amount of heat *developed*, therefore, diminishing as the quantity of hydriodic formed by the reaction in the liquid increases, at a certain point becomes equal to that *absorbed* in the decomposition of the hydrogen sulphide by the iodine, and the reaction ceases since it can no longer be attended with a development of heat.

This behavior of iodine with hydrogen sulphide alone, or in presence of water, is one of the most striking illustrations of the fact that reactions involving the expenditure of energy cannot take place directly, and are only possible when the conditions are such that one or more of the products of the reactions enter into secondary reactions, so as to cause the development of more heat than is absorbed in the primary reaction.

The hydrogen in hydrogen sulphide may be displaced by metals,—the compounds formed by displacing one-half the hydrogen being termed sulphydrates or hydrosulphides, whilst those in which the whole of the hydrogen is displaced are termed sulphides. These two classes of compounds correspond to the metallic hydroxides and the metallic oxides respectively, and in many respects closely resemble them; the sulphur compounds, however, are, with few exceptions, far less stable than the corresponding oxygen compounds.

Hydrogen sulphide enters directly into reaction with the metallic hydroxides, exchanging its hydrogen for the metal; for example—

$$\underset{\text{Sodium hydroxide.}}{NaOH} + \underset{\text{Hydrogen sulphide.}}{H_2S} = \underset{\text{Sodium hydrosulphide.}}{NaSH} + \underset{\text{Water.}}{HOH}.$$

It therefore exhibits the behavior of an acid. From Thomsen's experiments it appears that 7740 units of heat are developed on the addition of a solution of one molecule of sodium hydroxide to a solution of one molecule of hydrogen sulphide, and that the further addition of the hydroxide is without effect. Hydrogen sulphide is thus proved to be a *monobasic* acid, and this result also shows that when soluble sulphides, such as sodium sulphide, are dissolved in water, double decomposition occurs, thus: $Na_2S + OH_2 = NaSH + NaOH$, just as when sodium oxide, for example, is added to water: $Na_2O + OH_2 = 2NaOH$. It is uncertain, however, whether the decomposition of the sulphides by water in this manner is complete, or whether it is only partial, and the more complete the greater the quantity of water present.

The highly positive metals lithium, sodium, potassium, calcium, strontium, barium, and magnesium form soluble sulphides and hydrosulphides, but most of the sulphides of other metals are insoluble. The nature of many of the compounds precipitated from metallic solutions by hydrogen sulphide or an alkaline hydrosulphide is not well established; but in many cases apparently they are intermediate in composition between the hydroxides and hydrosulphides; the precipitate formed on the addition of an alkaline hydrosulphide to a solution of a zinc salt, for example, is probably a compound of this kind, and may be represented by the formula HO . Zn . SH,—zinc hydroxide being HO . Zn . OH, and zinc hydrosulphide HS . Zn . SH. The solutions of salts of heavy metals, such as mercury and lead, furnish precipitates of the corresponding sulphides with hydrogen sulphide or alkaline hydrosulphides.

The hydrosulphides of certain elements, such as aluminium and chromium, cannot exist in presence of water, but enter into reaction with it with evolution of hydrogen sulphide; hence, on the addition of an alkaline hydrosulphide to solution of their salts, the corresponding hydroxides are precipitated:—

$$\underset{\text{Aluminium chloride.}}{Al_2Cl_6} + \underset{\text{Sodium hydrosulphide.}}{6NaSH} = \underset{\text{Aluminium hydrosulphide.}}{Al_2(SH)_6} + \underset{\text{Sodium chloride.}}{6NaCl}$$

$$\underset{\text{Aluminium hydrosulphide.}}{Al_2(SH)_6} + \underset{\text{Water.}}{6OH_2} = \underset{\text{Aluminium hydroxide.}}{Al_2(OH)_6} + \underset{\text{Hydrogen sulphide.}}{6SH_2}.$$

Sulphur unites with all the metals and with most of the non-metallic elements; the sulphides are therefore usually prepared directly from their elements. Two classes of sulphides corresponding to the basic and acid oxides may be distinguished, but the distinction between them is much less marked than that between the two classes of oxides. The sulphides of the non-metallic elements and the sulphides of arsenic, antimony, tin, molybdenum, tungsten, vanadium, gold, and platinum, which are soluble in solutions of alkaline hydrosulphides, belong to the class of acid sulphides, and the remaining sulphides are basic. These two classes of sulphides are capable of uniting together to form sulphur salts, just as the basic and acid oxides combine forming oxy-salts. As a rule, the sulphides and oxides of the same element have similar formulæ and correspond in their general behavior. Occasionally there are oxides to which there are no corresponding sulphides, but more frequently sulphides to which there are no corresponding oxides. All sulphides are decomposed more or less readily by hydrochloric acid gas, hydrogen sulphide and a chloride being produced, and in some cases sulphur is also liberated. Many of the sulphides which are decomposed when heated in an atmosphere of hydrochloric acid gas are little, if at all, affected by a boiling solution of the acid.

Hydrogen selenide and telluride closely resemble hydrogen sulphide in properties, but are far less stable compounds. The former has a most offensive acrid odor, impairing or even destroying the sense of smell for several hours, and producing inflammation of the eyes. Their aqueous solutions are decomposed on exposure to the air with separation of selenium and tellurium respectively; and with solutions of salts of most metals they produce precipitates of the corresponding selenhydrates or selenides and tellurhydrates or tellurides. The selenides and the tellurides, like the sulphides, may be formed by the direct combination of their elements, and are usually so prepared; in their general behavior they resemble the corresponding sulphides.

A higher sulphide of hydrogen is known of which the composition has not yet been satisfactorily determined, owing to the difficulty of obtaining it in a pure state; but as it is obtained on adding a solution of potassium pentasulphide, K_2S_5, to a dilute solution of hydrochloric acid, and is formed without evolution of hydrogen sulphide or separation of sulphur, it appears most probable that it is the pentasulphide H_2S_5. It separates as an oily liquid, heavier than water, possessing a peculiar sulphurous disagreeable odor; it is soluble in water. It is a very unstable substance, undergoing decomposition into hydrogen sulphide and sulphur with great facility; this decomposition is instantaneous under the influence of substances such as finely divided platinum, gold, and charcoal. Its stability is increased by the presence of moderately strong acids, but diminished by alkalies. With an alcoholic solution of potassium hydrosulphide it furnishes potassium pentasulphide, hydrogen sulphide being evolved—

$$H_2S_5 + 2KHS = K_2S_5 + 2H_2S.$$

This reaction is analogous to that between sulphuric acid and potassium hydroxide:—

$$H_2SO_4 + 2KHO = K_2SO_4 + 2H_2O;$$

hydrogen pentasulphide may, in fact, be regarded as the analogue of sulphuric acid.

Sulphur, selenium, and tellurium form compounds with chlorine, bromine, and iodine, similar in composition, but differing greatly in stability.

With chlorine, sulphur forms the three compounds—

$$S_2Cl_2,\ SCl_2,\ \text{and}\ SCl_4,$$

all of which are liquid. The chloride S_2Cl_2 is obtained by passing chlorine over sulphur, which is gently heated; it is a mobile reddish-yellow liquid, having a peculiar, penetrating, and most disagreeable odor. It boils without suffering decomposition at 137° C. It is slowly decomposed by water, yielding hydrogen chloride, sulphur, and thiosulphuric acid—

$$2S_2Cl_2 + 3OH_2 = 4HCl + 2S + H_2S_2O_3.$$

When saturated with chlorine at about 10° C. it is converted into the dichloride SCl_2, but if saturated with chlorine at about − 22° C. it furnishes the tetrachloride SCl_4. Both of these compounds are so unstable, however, that they are resolved into the lowest chloride S_2Cl_2 and chlorine when very slightly heated.

The chlorides of selenium and tellurium are also obtained by the direct action of chlorine on the elements. Two chlorides of selenium are known, Se_2Cl_2 and $SeCl_4$, the former being liquid and the latter a white crystalline solid. Tellurium forms the two chlorides $TeCl_2$ and $TeCl_4$, both of which are solid. These chlorides of tellurium, as well as selenium tetrachloride, appear to volatilize without decomposition.

Very little is known of the bromides of sulphur and selenium, but from the observations which have been made there is no doubt that the sulphur bromides are much less stable than the chlorides; sulphur, therefore, like oxygen, appears to have less affinity for bromine than for chlorine. Tellurium furnishes two crystalline bromides, $TeBr_2$ and $TeBr_4$, both of which may be sublimed without decomposition.

The only iodide of sulphur which is known has the composition S_2I_2, and is obtained by the direct union of its elements; it is a black crystalline solid, insoluble in water, and readily decomposes when heated. Iodides of selenium are not known with certainty, but two tellurium iodides have been prepared, TeI_2 and TeI_4; both are black crystalline bodies, which give off iodine when heated.

The chlorides and bromides of selenium and tellurium, like the chlorides and bromides of sulphur, are decomposed by water, but the iodides of these three elements are comparatively stable and are scarcely affected unless heated with water.

Sulphur, selenium, and tellurium burn in oxygen or air, forming the dioxides

$$SO_2\ ,\ SeO_2\ ,\ TeO_2.$$

Under certain conditions, sulphur dioxide takes up an additional atom of oxygen, and is converted into the trioxide, SO_3; a tellurium trioxide, TeO_3, may also be obtained, but the corresponding oxide of selenium is not known. A third oxide of sulphur, S_2O_3, has recently been described.

The dioxides and trioxides of sulphur, selenium, and tellurium have the property in common of forming corresponding acids when combined with water:—

H_2SO_3 Sulphurous acid.	H_2SeO_3 Selenious acid.	H_2TeO_3 Tellurous acid.
H_2SO_4 Sulphuric acid.	H_2SeO_4 Selenic acid.	H_2TeO_4. Telluric acid.

These compounds differ greatly in stability and in their properties generally—the sulphur and selenium compounds being closely related, whilst the tellurium compounds are widely different from them in most respects.

Sulphur dioxide or sulphurous anhydride is a colorless gas, of pungent suffocating odor; by a pressure of three atmospheres, or a refrigerating mixture of ice and salt, it is readily condensed to a colorless mobile liquid, which boils at about − 10° C. The liquid anhydride freezes at − 76° C., forming a transparent colorless crystalline solid which melts at about − 79° C. Water at 0° C. dissolves about 68 times its bulk of the gas, but only 32 times its bulk at 24°, forming a solution of sulphurous acid, H_2SO_3, which is readily decomposed by heat.

Selenium dioxide or selenious anhydride is a white infusible substance, which volatilizes at a temperature below redness; its vapor condenses in snow white deliquescent prisms, which dissolve in water forming selenious acid, H_2SeO_3.

Tellurium dioxide, however, is only very slightly soluble in water, and the solution does not exhibit an acid reaction; the attraction of this oxide for water, in fact, is so slight, that when a solution of tellurous hydrate (tellurous acid), H_2TeO_3, is heated to about 40° C. the oxide separates. It fuses readily and volatilizes, and the fused oxide, which is a transparent, deep yellow liquid, solidifies on cooling to a white crystalline mass.

The difference in physical properties between sulphur and selenium dioxides is so great as to suggest that the molecule of the latter is not represented by the formula SeO_2, but that it is more complex; and although the vapor density of selenium dioxide is such as to negative this assumption for the gaseous substance, there is no evidence to show that the expression SeO_2 is the correct molecular formula for the solid oxide.

Sulphur trioxide or sulphuric anhydride is a white, highly volatile substance which dissolves in water, forming sulphuric acid, H_2SO_4, the combination being attended with the development of so much heat that when the anhydride comes in contact with the water a violent hissing is produced, just as when a red-hot iron is plunged into water. Selenium trioxide has not been isolated, but selenic acid, H_2SeO_4, the acid corresponding to sulphuric acid, is known, and very closely resembles the latter compound in many of its properties. Tellurium trioxide, TeO_3, is an orange yellow solid, insoluble in water, and therefore altogether different in properties from sulphur trioxide; moreover, the resemblance between the compound H_2TeO_4, from which tellurium trioxide is obtained by heating to a temperature below redness, and sulphuric and selenic acids scarcely extends beyond the similarity of their formulæ, since telluric acid is nearly insoluble in water, and its solution has a metallic rather than an acid taste, and reddens litmus but slightly.

Sulphur dioxide is usually prepared for laboratory purposes by heating a metal, such as copper or mercury, with concentrated sulphuric acid; the most probable explanation of its formation in this manner appears to be that the metal acting upon the acid produces the corresponding sulphate and hydrogen, and that the latter whilst in the nascent state acts upon another portion of the acid, reducing it to sulphurous acid, which splits up into sulphur dioxide and water; thus—

$$\underset{\text{Mercury.}}{Hg} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen.}}{2H} + \underset{\text{Mercuric sulphate.}}{HgSO_4}$$

$$\underset{\text{Hydrogen.}}{2H} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Sulphurous acid.}}{H_2SO_3} + \underset{\text{Water.}}{H_2O}$$

$$\underset{\text{Sulphurous acid.}}{H_2SO_3} = \underset{\text{Sulphur dioxide.}}{SO_2} + \underset{\text{Water.}}{H_2O}.$$

We may also suppose, however, that the metal merely withdraws an atom of oxygen from the sulphuric acid, and that the oxide produced dissolves in the acid, forming a sulphate—

$$\underset{\text{Mercury.}}{Hg} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Mercuric oxide.}}{HgO} + \underset{\text{Sulphurous acid.}}{H_2SO_3}$$

$$\underset{\text{Mercuric oxide.}}{HgO} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Mercuric sulphate.}}{HgSO_4} + \underset{\text{Water.}}{H_2O}.$$

The kind of action represented by the first of these equations undoubtedly takes place when carbon in the form of charcoal is heated with sulphuric acid, whereby carbon dioxide, sulphur dioxide, and water are produced—

$$\underset{\text{Carbon.}}{C} + \underset{\text{Sulphuric acid.}}{2H_2SO_4} = \underset{\text{Carbon dioxide.}}{CO_2} + \underset{\text{Sulphur dioxide.}}{2SO_2} + \underset{\text{Water.}}{2H_2O}.$$

When copper is employed not only are sulphur dioxide, water, and cupric sulphate produced, but cuprous and cupric sulphides, Cu_2S and CuS, it is stated, are also formed; their production, however, is due to secondary action.

Selenium dioxide is obtained either by burning selenium in a stream of oxygen, or by evaporating a solution of selenious acid to dryness.

Sulphurous acid is always prepared by passing sulphur dioxide gas into cold water: the combination is attended with a slight elevation of temperature. Selenious acid is produced in a similar manner by dissolving the oxide in water, or by dissolving selenium in concentrated nitric acid, and evaporating to expel the excess of nitric acid. Tellurous acid may be obtained by dissolving tellurium in nitric acid of specific gravity 1·25, and pouring the solution, after the lapse of not more than a few minutes, into water. If the precipitation be delayed for a longer time, the oxide TeO_2 is thrown down instead of the hydrate. It is best prepared by decomposing tellurium tetrachloride with water—

$$\underset{\substack{\text{Tellurium}\\\text{tetrachloride.}}}{TeCl_4} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Tellurous hydrate.}}{H_2TeO_3} + \underset{\substack{\text{Hydrogen}\\\text{chloride.}}}{4HCl}.$$

It is stated that anhydrous sulphurous acid, H_2SO_3, has been obtained in crystals by cooling a saturated aqueous solution to 0° C.; a crystalline hydrate of the composition $H_2SO_3+8H_2O$ was obtained by Pierre by cooling to −6° C. a saturated solution through which a current of the gas was being transmitted. The solution of sulphur dioxide in water is strongly acid, and effervesces with carbonates; by passing a current of the gas through water in which metallic hydroxides or carbonates are dissolved or suspended metallic sulphites are produced. Two classes of metallic sulphites may be thus formed:—the *acid sulphites* or *bisulphites* in which one-half the hydrogen in sulphurous acid is displaced by a metal; and *normal sulphites*, in which the whole of the hydrogen is displaced. It is also possible to displace the two atoms of hydrogen in sulphurous acid by two different metals, and thus to obtain so-called double salts. The following table shows the composition of some of the sulphites, disregarding the water of crystallization which several of them contain:—

Potassium hydrogen sulphite	$KHSO_3$
Potassium sulphite	K_2SO_3
Sodium hydrogen sulphite	$NaHSO_3$
Sodium sulphite	Na_2SO_3
Calcium sulphite	$CaSO_3$
Calcium hydrogen sulphite	$CaH_2(SO_3)_2$

The acid sulphites of barium, strontium, calcium, and magnesium, and the acid and normal sulphites of the alkali metals, are soluble in water, although only the sulphites of alkali metals are freely soluble; but most other sulphites are insoluble, and may be prepared by precipitation with an alkaline sulphite. The acid sulphites are prepared by saturating a solution of the metallic hydroxide or carbonate with sulphur dioxide gas, and then adding to it as much of the hydroxide or carbonate as it originally contained; thus—

$$\underset{\substack{\text{Sodium}\\\text{carbonate.}}}{Na_2CO_3} + \underset{\text{Water.}}{OH_2} + \underset{\substack{\text{Sulphur}\\\text{dioxide.}}}{2SO_2} = \underset{\substack{\text{Sodium hydrogen}\\\text{sulphite.}}}{2NaHSO_3} + \underset{\substack{\text{Carbon}\\\text{dioxide.}}}{CO_2}$$

$$\underset{\substack{\text{Sodium hydrogen}\\\text{sulphite.}}}{2NaHSO_3} + \underset{\substack{\text{Sodium}\\\text{carbonate.}}}{Na_2CO_3} = \underset{\substack{\text{Sodium}\\\text{sulphite.}}}{2Na_2SO_3} + \underset{\text{Water.}}{H_2O} + \underset{\substack{\text{Carbon}\\\text{dioxide.}}}{CO_2}.$$

The alkali and alkaline-earth metals are the only ones, however, which readily produce acid sulphites; in fact, the tendency to form acid salts is almost restricted to these metals in the case of all acids, and it is difficult to obtain acid salts containing heavy metals.

A solution of sulphurous acid slowly absorbs oxygen from the air and is converted into sulphuric acid; in like manner, the sulphites, particularly if in solution, become converted into sulphates on exposure to the air. All sulphites are decomposed at a red heat, either into sulphate and sulphide, or into sulphur dioxide and metallic oxide. They are also decomposed by all acids excepting carbonic and boric acids, sulphurous acid being liberated. Sulphurous acid possesses considerable bleaching powers, and is extensively employed in bleaching straw, wool, and many other articles, which would be injured by chlorine. The articles to be bleached are moistened and suspended in closed chambers in which sulphur is burnt; the sulphur dioxide produced is then absorbed by the damp goods, and their color is discharged. The manner in which it acts is not well understood, but it appears to be by forming colorless compounds with the coloring matters; it does not, like chlorine, decompose coloring matters, for the color may usually be restored by acids or alkalies. The reproduction of the yellow color of new flannel, when it is washed with an alkaline soap for the first time, is an illustration of this. Sulphurous acid is also a powerful antiseptic, and is highly valuable as a disinfecting agent.

Selenious acid is deposited from a hot aqueous solution on slow cooling in colorless prismatic crystals like saltpetre. It closely resembles sulphurous acid in properties, and like it furnishes *acid selenites*, such as potassium hydrogen selenite, $KHSeO_3$, and *normal selenites*, such as potassium selenite, K_2SeO_3, but it also forms so-called *hyperacid* salts with the alkali metals, *e.g.*, $HKSeO_3+H_2SeO_3$. The selenites of alkali metals are soluble in water, but the other selenites are insoluble.

Tellurous hydrate, prepared by decomposing tellurium tetrachloride with water, is a bulky precipitate, which, when dried over sulphuric acid, forms a light white earthy powder, having a bitter metallic taste. It is only slightly soluble in water, but dissolves in alkalies and alkaline carbonates. With the alkali metals tellurous acid forms three classes of salts corresponding to the three classes of selenites, of which the following are examples—

Acid potassium tellurite	$KHTeO_3$
Normal potassium tellurite	K_2TeO_3
Hyperacid potassium tellurite	$KHTeO_3+H_2TeO_3$

With the alkaline-earth metals tellurous acid forms

normal salts, and also certain peculiar salts, such as $BaTe_2O_5$ or $BaTeO_3+TeO_2$, and $BaTe_4O_9$ or $BaTeO_3+3TeO_2$. With the heavy metals it appears to form only normal salts. The tellurites of alkali metals are soluble in water, but those of other metals are difficultly soluble or insoluble.

In its oxides, therefore, it will be evident tellurium differs widely from selenium and sulphur, but it much resembles metals like bismuth and antimony, since it forms salts with acids. Thus, a tellurium sulphate of the composition $Te(SO_4)_2$, it is stated, is formed by dissolving tellurium in concentrated sulphuric acid. Tellurous hydrate also dissolves readily in acids; the solution in hydrochloric acid probably contains either tellurium chloride, $TeCl_4$, or a compound intermediate in composition between tellurium chloride and tellurium hydroxide, $Te(OH)_4$, formed from the latter by the partial displacement of the OH groups by chlorine; when it is dissolved in oxy-acids, apparently salts are formed in which the group TeO displaces hydrogen, corresponding to the antimony salts in which the radicle SbO displaces hydrogen.

Sulphurous acid, on account of its tendency to form sulphuric acid, has considerable power as a reducing agent. Thus iodine and sulphurous acid, in presence of a large quantity of water, yield hydriodic and sulphuric acid—

$$I_2 + H_2O + \underset{\text{Sulphurous acid.}}{H_2SO_3} = 2HI + \underset{\text{Sulphuric acid.}}{H_2SO_4}.$$

With chlorine and bromine similar reactions occur still more readily. On this account, sulphurous acid is largely employed as an "antichlor" to remove the excess of chlorine from articles bleached with bleaching powder. When solutions of sulphurous and selenious acid are mixed, the latter is reduced, especially on warming, and red amorphous selenium precipitated; similarly, a black precipitate of tellurium is formed on warming a solution containing tellurous and sulphurous acids. But these acids also readily part with at least a portion of their oxygen. For instance, when hydrogen sulphide gas is passed into a solution of sulphurous acid, sulphur is deposited, and the solution contains pentathionic acid—

$$\underset{\text{Hydrogen sulphide.}}{5H_2S} + \underset{\text{Sulphurous acid.}}{5H_2SO_3} = \underset{\text{Sulphur.}}{5S} + \underset{\text{Pentathionic acid.}}{H_2S_5O_6} + \underset{\text{Water.}}{9OH_2}.$$

When a solution of selenious acid is similarly treated, a precipitate is thrown down, which apparently consists chiefly of selenium sulphide, SeS_2, mixed with a lower sulphide and free sulphur. Solutions of tellurous hydrate when thus treated furnish a brown precipitate of tellurium sulphide.

Sulphur Trioxide, SO_3.

Dry sulphur dioxide gas and oxygen readily combine when the mixture is passed over gently heated platinum black or platinized pumice, forming sulphur trioxide or sulphuric anhydride, SO_3. This compound may be obtained from sulphuric acid by distilling it with phosphoric anhydride:—

$$\underset{\text{Sulphuric acid.}}{H_2SO_4} + \underset{\text{Phosphoric anhydride.}}{P_2O_5} = \underset{\text{Sulphur trioxide.}}{SO_3} + \underset{\text{Metaphosphoric acid.}}{2HPO_3}.$$

It is usually prepared from Nordhausen sulphuric acid, which gives off sulphur trioxide when gently heated, ordinary sulphuric acid remaining behind.

Sulphur trioxide usually crystallizes in white slender needles, but it exists in two modifications. Thus, when the liquid oxide is cooled, it solidifies at 16° C. in long colorless prisms, which melt at the same temperature; but if kept at temperatures below 25°, it changes into a mass of fine white needles. This second modification gradually liquefies at temperatures above 50°, and again passes into the first modification; it dissolves with extreme slowness in sulphuric acid, whereas the liquid oxide is miscible in all proportions with the acid. Liquid sulphuric anhydride undergoes very great expansion by heat, its mean coefficient of expansion between 25° and 45° C. being ·0027 for 1° C.; it is quite colorless when pure. Sulphur trioxide very readily parts with one of its atoms of oxygen, converting phosphorus trichloride, for example, into phosphorus oxytrichloride.

$$\underset{\text{Phosphorus trichloride.}}{PCl_3} + \underset{\text{Sulphur trioxide.}}{SO_3} = \underset{\text{Sulphur dioxide.}}{SO_2} + \underset{\text{Phosphorus oxytrichloride.}}{POCl_3}.$$

This reaction takes place when the substances are merely mixed together, although a strong red heat is necessary in order to resolve the trioxide into sulphur dioxide and oxygen.

When finely divided sulphur is added in small quantities to liquid sulphuric anhydride, drops of a deep blue color sink to the bottom and solidify immediately. These consist of the compound S_2O_3. The temperature during the operation must be kept at 15° C., for if it is lower the anhydride does not remain liquid, and if higher the substance decomposes. When about a gramme of sulphur has been added the anhydride is poured off, and the solid residue freed from any that remains by a gentle heat. A bluish-green crystalline mass is thus obtained, which decomposes at ordinary temperatures, giving off sulphur dioxide, and leaving sulphur; water immediately decomposes it, forming sulphuric, sulphurous, and probably thiosulphuric acids. The corresponding selenium compound, $SeSO_3$, may be prepared in a similar manner.

Sulphuric Acid, H_2SO_4.

Of all chemical compounds this is probably the most important, on account of its numerous practical applications, and enormous quantities of it are now manufactured. The method employed consists essentially in oxidizing sulphurous acid by atmospheric oxygen, which is accomplished with the aid of nitric oxide gas in the following manner. Sulphur dioxide gas is prepared by burning sulphur, or iron pyrites, FeS_2, in a properly constructed furnace, sulphur being always employed when the purest qualities of acid are required, and this gas is conveyed into a large leaden chamber, into which steam and air are also continuously admitted. At the back of the furnace in which the sulphur is burnt, a small vessel is placed containing sodium nitrate and sulphuric acid, which continue to generate nitric acid for some time; thus—

$$\underset{\text{Sodium nitrate.}}{NaNO_3} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Nitric acid.}}{HNO_3} + \underset{\text{Sodium hydrogen sulphate}}{NaHSO_4}.$$

The exact changes which occur among the various substances thus introduced into the chambers are but imperfectly understood; the nitric acid, however, is apparently decomposed by the sulphurous acid in such a manner that finally nitric oxide is produced—

$$2HNO_3+3SO_2+2H_2O=2NO+3H_2SO_4.$$

But nitric oxide combines directly with oxygen at ordinary temperatures, forming the oxides N_2O_3 and N_2O_4, and it is generally supposed that the nitric oxide thus formed acts as a carrier of oxygen,—that on coming in contact with the oxygen of the air introduced into the chamber, it is converted into a higher oxide, which, however, is no sooner produced than it is reduced again to nitric oxide by the sulphurous acid, which is oxidized to sulphuric acid; supposing the oxide formed to be nitric peroxide, we may represent the change by the following simple equation:—

$$2SO_2+2H_2O+N_2O_4=2H_2SO_4+2NO.$$

The nitric oxide again absorbs oxygen to form the higher oxide, which again enters into reaction with sulphur dioxide and water, with liberation of nitric oxide, and so on continuously. Theoretically, therefore, a limited quantity of nitric oxide should suffice to produce an indefinitely large amount of sulphuric acid, but practically this is not the case, chiefly owing to the loss occasioned by the dissolution of a certain quantity in the sulphuric acid which collects on the floor of the chambers; a certain amount also escapes from the chambers with the nitrogen of the air, but this is usually absorbed by passing the escaping vapors through a tower filled with pieces of coke, kept moistened with sulphuric acid, or over which water is constantly pouring; when acid is employed it is afterwards pumped into a similar scrubber, and deprived of its nitric oxide gas by means of the sulphur dioxide gas from the burning sulphur or pyrites, and when water is used it is pumped into, and distributed on the floors of, the leaden chambers.

In practice the amount of sulphuric acid produced usually approximates very closely to the theoretical quantity.

It is beyond question that the reactions which occur in the formation of sulphuric acid are not all of the simple character represented by the equations above given. Thus,

the formation of nitric oxide from nitric acid is probably the final result of three distinct reactions. In the first place, from the sulphur dioxide and nitric acid a compound which is known as the lead chamber crystals, on account of its forming crystals, is probably produced; thus—

$$\text{I.}\quad \underset{\text{Sulphur dioxide.}}{SO_2} + \underset{\text{Nitric acid.}}{NO_2.OH} = \underset{\text{Lead chamber crystals.}}{SO_2\begin{cases}NO_2\\OH\end{cases}}.$$

This compound, it will be observed, is very closely related to sulphuric acid, and may be regarded as formed from it by the displacement of one of the OH groups by the group NO_2. It is decomposed by water, yielding sulphuric and nitrous acids:—

$$\text{II.}\quad \underset{\text{Lead chamber crystals.}}{SO_2\begin{cases}NO_2\\OH\end{cases}} + \underset{\text{Water.}}{HOH} = \underset{\text{Sulphuric acid.}}{SO_2\begin{cases}OH\\OH\end{cases}} + \underset{\text{Nitrous acid.}}{NO_2H}.$$

From the nitrous acid thus formed nitric oxide may be produced in two ways,—either by its spontaneous decomposition in accordance with the equation

$$\underset{\text{Nitrous acid.}}{3HNO_2} = \underset{\text{Nitric oxide.}}{2NO} + \underset{\text{Nitric acid.}}{HNO_3} + \underset{\text{Water.}}{H_2O};$$

or by the action of sulphur dioxide—

$$\underset{\text{Nitrous acid.}}{2HNO_2} + \underset{\text{Sulphur dioxide.}}{SO_2} = \underset{\text{Nitric oxide.}}{2NO} + \underset{\text{Sulphuric acid.}}{H_2SO_4}.$$

The latter reaction appears to be the more probable on account of the large amount of sulphur dioxide present, but it is not unlikely that both occur.

With regard to the part which the nitric oxide plays in the conversion of sulphurous into sulphuric acid, it is highly probable that, by the conjoint action of the oxygen and water present, it is converted into nitrous acid, from which nitric oxide is reproduced by the action of the sulphur dioxide in the manner above pointed out—

$$4NO + O_2 + 2OH_2 = 4HNO_2.$$

If this be the case, nitrous acid is the active agent in the conversion of sulphur dioxide into sulphuric acid. It is known to effect the oxidation of sulphur dioxide with the greatest readiness, whereas dilute nitric acid has very little action. On this account, it is probable also that the nitric oxide is not converted into the peroxide, as sometimes is supposed, and that the latter is the active agent in the formation of sulphuric acid, for our general experience appears to warrant the conclusion that, as sulphur dioxide enters so readily into reaction with nitrous acid, this acid would be produced from the nitric oxide almost entirely to the exclusion of other oxidation products. Moreover, nitric peroxide in presence of water forms nitrous and nitric acids: $N_2O_4 + H_2O = HNO_2 + HNO_3$; so that, even supposing that the nitric oxide is converted into nitric peroxide, the formation of sulphuric acid would still in a large measure be due to the action of nitrous acid. Although sulphur dioxide acts very slowly on dilute nitric acid, it readily reduces it to nitric oxide in presence of moderately concentrated sulphuric acid; hence any nitric acid formed in the process, when carried down to the floor of the chamber and mixed with the moderately concentrated sulphuric acid there collected, would also undergo reduction by the sulphur dioxide.

The acid from the leaden chambers has generally a specific gravity of about 1·55; by concentration in shallow leaden pans this is raised to above 1·7. The further concentration is effected in glass or platinum retorts. The commercial acid, known as oil of vitriol, has a specific gravity of about 1·84; it is frequently of a more or less brown color from the presence of organic matter, and always contains lead. Other impurities, such as arsenic and nitrous or nitric acid, are not unfrequently present.

Pure sulphuric acid, H_2SO_4, is an oily, colorless, inodorous liquid, of specific gravity 1·842; it solidifies at −35° C. It cannot be distilled unchanged, and when heated gives off the anhydride until a liquid remains containing about 1·5 per cent. of water and 98·5 per cent. of sulphuric acid, which boils at 338° C.; acid of this strength may always be obtained by boiling down acid of any other degree of concentration. When the acid is vaporized, dissociation takes place very rapidly, the vapor at temperatures above 400° C. consisting entirely of a mixture of water and sulphuric anhydride. Sulphuric acid chars most organic substances containing oxygen and hydrogen on account of its great affinity for water, causing the separation of these elements in the form of water and the liberation of carbon; when exposed to moist air it will even double its weight in the course of a few days, and on this account it is much employed as a desiccating agent. Much heat is developed when it is mixed with water, as will be evident from the following table, which represents the amounts of heat developed on mixing one molecule of the acid (98 grammes) with *n* molecules of water at about 18° C., according to Thomsen's determinations:—

No. of Molecules of water added.	Units of heat developed.	No. of Molecules of water added.	Units of heat developed.
1	6,272	99	16,850
2	9,364	199	17,056
3	11,108	499	17,304
5	13,082	799	17,632
9	14,940	1599	17,848
19	16,248	∞	17,994
49	16,676		

The last number in the table represents the amount of heat which, according to calculation, would be developed on mixing a molecule of sulphuric acid with an infinitely large quantity of water. It will be seen that the addition of the first two molecules is accompanied with the development of an amount of heat equal to half the entire amount developed on adding an excess of water; this appears to be accounted for by the formation of definite compounds of sulphuric acid with water. The first of these *hydrates*, $H_2SO_4 + H_2O$, may be obtained crystallized in colorless six-sided prisms, by cooling a mixture of the acid and water in these proportions to about 8° C.; it boils at 205°–210° C., and may be produced by evaporating any more dilute sulphuric acid at 205° C. until it ceases to lose water. The second hydrate, $H_2SO_4 + 2H_2O$, may, in a similar manner, be obtained by evaporating any more dilute acid at 100° C. until it ceases to lose water; it boils at 193° C. The specific gravity of the first hydrate is 1·78, and that of the second 1·62; when water is added to the acid in the proportions to form the latter, the maximum condensation (about 8 per cent.) is observed which occurs on mixing these substances.

Further evidence in support of the view that sulphuric acid forms definite compounds with water which may be regarded as distinct acids is afforded by its behavior on neutralization, by the persistent manner in which many sulphates retain one or two molecules of water, and by the existence of so-called basic sulphates. Thus, when it is neutralized by sodium hydroxide, considerably less heat is developed by the first than by the second molecule of hydroxide; this behavior does not appear remarkable if it be supposed that it exists in solution in combination with water, and that, therefore, as in the case of periodic acid, not only is hydrogen displaced by sodium on the addition of the hydroxide, but the elements of one or more molecules of water are also separated, the latter being an operation which necessarily would involve the expenditure of energy, as the combination of the acid with water is attended with the development of heat (see page 422).

By displacing one-half the hydrogen in sulphuric acid by metals *acid sulphates* are formed, and *normal sulphates* are produced by displacing the whole of the hydrogen. Many of the normal sulphates crystallize with the same number of molecules of water, and are isomorphous, as, for example—

Magnesium sulphate	.....	$MgSO_4, 7H_2O$
Zinc	"	$ZnSO_4, 7H_2O$
Iron	"	$FeSO_4, 7H_2O$
Nickel	"	$NiSO_4, 7H_2O$
Cobalt	"	$CoSO_4, 7H_2O$

Five of the seven molecules of water are removed with facility from these salts, but the sixth is less readily removed, especially from magnesium sulphate, and they are not deprived of the seventh unless heated to 200°–300° C. Copper, cadmium, and manganese sulphates behave similarly, and are only with difficulty deprived of the last molecule of water. The last molecule retained with such persistency by these salts was termed, by Graham, *water of constitution*, to distinguish it from water of crystallization. In the present state of our knowledge it is impossible absolutely to define the meaning of these terms, or even to say that there is an absolute difference between the so-

called water of constitution and water of crystallization, and not merely one of degree; but since we have independent evidence tending to prove the existence of distinct acids formed by the combination of sulphuric acid with water, we may conveniently regard the above-mentioned salts as derived from these acids. Magnesium sulphate, for example, we may regard as the normal magnesium salt of the acid H_6SO_6, crystallized with five molecules of water. It will be evident that such salts as this bear a relation to the acid from which they are regarded as derived similar to that which the normal periodates bear to crystalline periodic acid, H_5IO_6; indeed, a very considerable general resemblance may be traced between the periodates and the sulphates. Thus, the sulphates of potassium, K_2SO_4, and of silver, Ag_2SO_4, separate from aqueous solution in anhydrous crystals; and sodium sulphate, Na_2SO_4, is also deposited in the anhydrous state at temperatures above 34° C.; it is only with metals such as magnesium, zinc, and copper that salts are obtained which may be regarded as derived from the acids H_4SO_5 or H_6SO_6. Similarly, the periodates KIO_4, $NaIO_4$, and $AgIO_4$, derived from the at present hypothetical acid HIO_4, are readily produced, but with other metals chiefly salts derived from the acid H_5IO_6 are obtained.

But that these hydrates of sulphuric acid are distinct acids derives its most important confirmation from the existence of the so-called basic sulphates, such as Zn_2SO_5 or $ZnSO_4+ZnO$, Hg_3SO_6 or $HgSO_4+2HgO$, and $Cu_3SO_6+3H_2O$ or $CuSO_4+2CuO+3H_2O$; these salts are strictly comparable with the basic periodates.

A large number of double and mixed salts formed by the union of two or more sulphates are known. Thus, magnesium sulphate and the isomorphous sulphates form isomorphous double salts with potassium, sodium and ammonium sulphates, which crystallize with six molecules of water, and which usually are therefore regarded as formed by the displacement of the molecule of so-called water of constitution by the alkaline sulphate—

Magnesium potassium sulphate			$MgK_2(SO_4)_2, 6H_2O$
Zinc	"	"	$ZnK_2(SO_4)_2, 6H_2O$
Iron	"	"	$FeK_2(SO_4)_2, 6H_2O$
Nickel	"	"	$NiK_2(SO_4)_2, 6H_2O$
Cobalt	"	"	$CoK_2(SO_4)_2, 6H_2O$

It has already been pointed out that sulphuric acid may be regarded as a compound of the dyad radicle SO_2 with the monad radicle OH, or as $(SO_2)''(OH)_2'$, this view of its "constitution" being chiefly founded on its behavior with the chlorides of phosphorus. Thus, by the action of phosphorus pentachloride on sulphuric acid, an atom of oxygen and an atom of hydrogen, in other words, the group OH, are displaced by a single atom of chlorine—

$$HO.SO_2.OH+PCl_5=HO.SO_2.Cl+POCl_3+HCl.$$

Although evidence of the existence of a second OH group in sulphuric acid cannot be obtained in a similar manner by the continued action of the phosphorus pentachloride, it is afforded by the behavior of the compound SO_2Cl_2, produced by the direct union of chlorine and sulphur dioxide with water, which successively converts it into the compound $HO.SO_2.Cl$ and sulphuric acid—

$$Cl.SO_2.Cl+HOH=HO.SO_2.Cl + HCl;$$
$$HO.SO_2.Cl+HOH=HO.SO_2.OH+HCl.$$

Sulphuric chloride, SO_2Cl_2, and sulphuric chlorhydrate, $SO_2(OH)Cl$, are both colorless liquids; the former boils at about 70° C., and the latter at 158° C. Sulphuric chlorhydrate may be formed by the direct combination of hydrogen chloride with sulphuric anhydride, and when heated in closed vessels to 170° C., it furnishes sulphuric chloride and sulphuric acid:—

$$2Cl.SO_2.OH=Cl.SO_2.Cl+HO.SO_2.OH.$$

Sulphuric acid enters into reaction with a large number of hydrogenized carbon compounds in such a manner that water is formed and hydrogen displaced by the monad group $SO_2.OH$; for example—

$$\underset{\text{Sulphuric acid.}}{HO.SO_2.OH} + \underset{\text{Benzene.}}{C_6H_6} = \underset{\text{Benzenesulphonic acid.}}{C_6H_5.SO_2.OH} + OH_2.$$

The *sulphonic acids*, as the compounds thus produced are termed, are powerful monobasic acids. But the action may proceed further, both OH groups in sulphuric acid being displaced by monad compound radicles, in which case neutral bodies called *sulphones* are formed; thus—

$$\underset{\text{Sulphuric acid.}}{HO.So_2.OH} + 2\underset{\text{Benzene.}}{C_6H_6} = \underset{\text{Benzenesulphone.}}{C_6H_5.SO_2.C_6H_5} + 2OH_2.$$

Selenic Acid, H_2SeO_4.

This acid may be obtained by oxidizing selenious acid by the action of chlorine, or bromine, and water—

$$H_2SeO_3 + Br_2 + H_2O = H_2SeO_4 + 2HBr.$$

It is a transparent colorless liquid, which in the most concentrated state boils at 280° C., and has a specific gravity of 2·6. In this state it is not quite pure selenic acid, but contains a little water, which cannot be driven off without decomposing the acid into selenium dioxide, oxygen, and water. Selenic acid resembles sulphuric acid in many of its properties, being very hygroscopic, and when it is added to water a considerable amount of heat is developed. It is reduced to selenious acid when boiled with hydrochloric acid—

$$H_2SeO_4 + 2HCl = H_2SeO_3 + Cl_2 + H_2O;$$

but it is not decomposed by the hydrogen produced when zinc or iron is dissolved in its solution. Like sulphuric acid it precipitates barium salts, even in presence of other mineral acids.

The selenates or salts produced by displacing the hydrogen in selenic acid by metals correspond in composition, and also very closely in their properties, to the sulphates, with which they are isomorphous.

Telluric Acid, H_2TeO_4.

The potassium salt of this acid is obtained by fusing tellurium or tellurous oxide with potassium nitrate. From this salt barium tellurate may be prepared by precipitating its solution with a barium salt, and the acid is produced by decomposing barium tellurate with sulphuric acid.

Telluric acid crystallizes from water in large prisms of the composition $H_2TeO_4 + 2H_2O$. This hydrate has a metallic taste, and reddens litmus slightly. It dissolves slowly in cold water, but freely in boiling water. It loses its water of crystallization at a little above 100° C. The compound H_2TeO_4 is nearly insoluble in cold water, but dissolves on boiling; when heated to a temperature below redness it furnishes the oxide TeO_3. It is reduced to tellurous acid by boiling with hydrochloric acid, and it is also decomposed by sulphurous acid, which is without action on selenic acid, with precipitation of tellurium.

In addition to acid and normal tellurates, such as $KHTeO_4$ and K_2TeO_4; and hyperacid tellurates, of which the salt $KHTeO_4 + H_2TeO_4$ is an example, telluric acid also furnishes so-called di- and tetra-tellurates, such as $(NH_4)_2Te_2O_7$ and $(NH_4)_2Te_4O_{13}$ or $(NH_4)_2TeO_4 + 3TeO_3$, and basic tellurates, such as Ag_6TeO_6 and $Ag_6Te_2O_9$. The ditellurates may be regarded as salts of the acid $H_2Te_2O_7$, analogous to anhydrosulphuric acid, and the basic salt Ag_6TeO_7 as formed from the hydrate H_6TeO_6 or $H_2TeO_4 + 2H_2O$; whilst salts such as $Ag_6Te_2O_9$ are apparently derivatives of an acid formed by the withdrawal of the elements of three molecules of water from two molecules of the acid H_6TeO_6.

Other Acids of Sulphur.

In addition to sulphurous and sulphuric acids, a number of acids, more or less closely related to them, may be obtained. The following is a complete list of the known acids of sulphur:—

Hyposulphurous acid	H_2SO_2
Sulphurous acid	H_2SO_3
Sulphuric acid	H_2SO_4
Thiosulphuric acid	$H_2S_2O_3$
Anhydrosulphuric acid	$H_2S_2O_7$
Dithionic acid	$H_2S_2O_6$
Trithionic acid	$H_2S_3O_6$
Tetrathionic acid	$H_2S_4O_6$
Pentathionic acid	$H_2S_5O_6$

Hyposulphurous Acid.—This acid is obtained by the action of zinc on a solution of sulphurous acid, which dissolves the metal, forming zinc sulphite; the hydrogen, which is the accessory product of this reaction, is not evolved, however, but reduces a portion of the acid, forming hyposulphurous acid; thus—

$$\underset{\text{Sulphurous acid.}}{H_2SO_3} + Zn = 2H + \underset{\text{Zinc sulphite.}}{ZnSO_3}$$

$$\underset{\text{Sulphurous acid.}}{H_2SO_3} + 2H = \underset{\text{Hyposulphurous acid.}}{H_2SO_2} + H_2O.$$

The solution thus obtained is very unstable, and rapidly decomposes with separation of sulphur. Sodium hyposulphite, $NaHSO_2$, is a more stable substance, and is produced in a similar manner by the action of zinc on a solution of sodium hydrogen sulphite. This salt crystallizes in slender colorless needles; it is soluble in water, but insoluble in alcohol. When exposed to the air in a moist state it becomes very hot, and is converted by oxidation into hydrogen sodium sulphite, but in the dry state it is not affected by oxygen. The remarkable observation has been made, however, that when a solution of sodium hyposulphite is oxidized by free oxygen, that is to say, when water saturated with oxygen is added to a solution of the hyposulphite, only one-half the oxygen is employed in causing the conversion of the hyposulphite into the sulphite, the remaining half becoming affixed to water, forming hydrogen dioxide; the reaction may be expressed by the following equation:—

$$\underset{\text{Sodium hyposulphite.}}{NaHSO_2} + O_2 + H_2O = \underset{\text{Sodium hydrogen sulphite.}}{NaHSO_3} + \underset{\text{Hydrogen dioxide.}}{H_2O_2}.$$

Hyposulphurous acid has a much greater decolorizing and reducing power than sulphurous acid; it immediately reduces the metals from mercury and silver salts, and it precipitates copper hydride, Cu_2H_2, from a solution of copper sulphate.

Thiosulphuric Acid, $H_2S_2O_3$.

This acid is formed from sulphurous acid by combining it with sulphur; thus, when a solution of sodium sulphite is digested with sulphur, sodium thiosulphate is produced—

$$\underset{\text{Sodium sulphite.}}{Na_2SO_3} + S = \underset{\text{Sodium thiosulphate.}}{Na_2S_2O_3}.$$

It will be obvious that this reaction is precisely analogous to that which occurs when sodium sulphite is converted into sodium sulphate by the action of oxygen.

Thiosulphuric acid cannot be isolated, on account of its instability, and when an acid—hydrochloric acid, for example—is added to a solution of a thiosulphate, the thiosulphuric acid which is produced rapidly decomposes into sulphur and sulphurous acid: $H_2S_2O_3 = H_2SO_3 + S$. The thiosulphates of alkali and alkaline earth metals are crystalline and soluble in water, and are fairly stable salts; the thiosulphates of the heavy metals, however, which are precipitated on the addition of solutions of metallic salts to a solution of sodium thiosulphate, are very unstable, and rapidly decompose into a metallic sulphide and sulphuric acid, thus—

$$\underset{\text{Silver thiosulphate.}}{Ag_2S_2O_3} + H_2O = \underset{\text{Silver sulphide.}}{Ag_2S} + \underset{\text{Sulphuric acid.}}{H_2SO_4}.$$

Sodium thiosulphate is largely employed in photography for the purpose of dissolving the chloride, bromide, and iodide of silver. These salts are readily soluble in a solution of the thiosulphate until they are exposed to light, when they become insoluble. If, therefore, a sheet of paper coated with one of these silver salts be exposed to light under an object which is in part transparent and in part opaque, such as a piece of lace, for example, the silver salt is rendered insoluble in those parts upon which the light has fallen, and by then immersing the paper in a solution of sodium thiosulphate the unaltered silver salt is removed, and the picture is thus "fixed." The solvent power of the thiosulphate is due to the formation of a soluble silver sodium thiosulphate—

$$Na_2S_2O_3 + AgCl = NaAgS_2O_3 + NaCl;$$

many other metallic salts insoluble in water are dissolved by a solution of sodium thiosulphate, probably also in consequence of the formation of similar mixed salts.

Anhydrosulphuric Acid, $H_2S_2O_7$.

This acid is obtained by dissolving sulphuric anhydride in sulphuric acid in the requisite proportions: $H_2SO_4 + SO_3 = H_2S_2O_7$. It crystallizes in large colorless transparent prisms. When gently heated it is decomposed into sulphuric anhydride, which distils over, and sulphuric acid, which remains. Water dissolves it, forming sulphuric acid.

The so-called Nordhausen or fuming sulphuric acid consists chiefly of this acid. It is prepared at Nordhausen, in Saxony, by distilling an impure ferric sulphate, $Fe_2(SO_4)_3$, obtained by exposing ferrous sulphate, $FeSO_4$, to a moderate heat in contact with the air,—the distillate, consisting chiefly of sulphuric anhydride, being received in sulphuric acid. This acid readily dissolves many hydrogenized carbon compounds which are only with difficulty acted upon by ordinary sulphuric acid, converting them into sulphonic acids; it is employed on this account to dissolve indigo, and in the preparation of anthraquinonedisulphonic acid, from which alizarin is artificially produced.

Salts of this acid, such as $Na_2S_2O_7$, $Ag_2S_2O_7$, BaS_2O_7, are obtained by combining the corresponding normal sulphates with sulphuric anhydride; water decomposes them, forming corresponding acid sulphates. The acid salt, KHS_2O_7, or hydrogen potassium anhydrosulphate, is obtained by dissolving the normal salt in anhydrosulphuric acid; it crystallizes in prisms.

The chloride of anhydrosulphuric acid, $S_2O_5Cl_2$, is produced by the action of sulphuric anhydride on many chlorinated compounds, thus—

$$\underset{\text{Sulphuric anhydride.}}{2SO_3} + \underset{\text{Carbon tetrachloride.}}{CCl_4} = \underset{\text{Anhydrosulphuric chloride.}}{S_2O_5Cl_2} + \underset{\text{Carbonyl chloride.}}{COCl_2}$$

It is a colorless oily liquid, of specific gravity 1·829 at 18° C., and boils at 146° C. In contact with water it decomposes slowly and noiselessly, forming sulphuric and hydrochloric acids, and is thus distinguished from sulphuric chlorhydrate, $SO_2(OH)Cl$, which is rapidly decomposed with almost explosive violence when thrown into water.

The lead chamber crystals (p. 437), when heated, furnish a magnificently crystalline body, which is also a derivative of anhydrosulphuric acid—

$$2SO_2 \left\{ \begin{matrix} NO_2 \\ OH \end{matrix} \right. = S_2O_5(NO_2)_2 + H_2O;$$

it distils at about 360° C. without decomposing.

Dithionic Acid, $H_2S_2O_6$.

The manganese salt of this acid is obtained by the action of a solution of sulphurous acid on manganese dioxide—

$$MnO_2 + 2H_2SO_3 = MnS_2O_6 + 2H_2O.$$

This salt may be converted into the barium salt by treatment with barium hydroxide, and from a solution of the barium salt the acid is produced by adding exactly sufficient sulphuric acid to precipitate the barium. By concentrating the solution in a vacuum over sulphuric acid it may be obtained of specific gravity 1·347, but on further concentration the acid is resolved into sulphuric acid and sulphur dioxide—

$$H_2S_2O_6 = H_2SO_4 + SO_2.$$

A dilute solution decomposes in a similar manner when heated. In contact with the air dithionic acid is slowly oxidized to sulphuric acid.

The dithionates produced by decomposing barium dithionate, BaS_2O_6, with the corresponding sulphates, are all soluble in water and crystallize well. They exhibit considerable stability, but when heated are more or less readily converted into the corresponding normal sulphate and sulphur dioxide.

Trithionic Acid, $H_2S_3O_6$.

Potassium trithionate is produced, together with potassium thiosulphate, when a saturated solution of hydrogen potassium sulphite is gently heated with sulphur; it is not improbable that the thiosulphate is a secondary product, formed by the action of hydrogen sulphide resulting from the action of the sulphur on the hydrogen potassium sulphite—

$$\underset{\text{Hydrogen potassium sulphite.}}{2HKSO_3} + 2S = \underset{\text{Potassium trithionate.}}{K_2S_3O_6} + H_2S.$$

Trithionic acid may be obtained from a concentrated solution of the potassium salt by precipitating the potassium by hydrofluosilicic acid. The solution has a sour

and somewhat bitter taste, and is inodorous; it is permanent in a dilute state only, and on concentrating it in a vacuum over sulphuric acid it begins to decompose, even at 0° C., sulphur dioxide being evolved, and sulphur deposited, while sulphuric acid remains in solution. The salts of trithionic acid are but little known; they are extremely unstable, and even when boiled with water are decomposed and converted into sulphates, with evolution of sulphur dioxide and deposition of sulphur—

$$\underset{\text{Potassium trithionate.}}{K_2S_3O_6} = \underset{\text{Potassium sulphate.}}{K_2SO_4} + SO_2 + S.$$

Tetrathionic Acid, $H_2S_4O_6$.

The salts of this acid are produced by the action of iodine on thiosulphates; for example—

$$\underset{\text{Sodium thiosulphate.}}{2Na_2S_2O_3} + I_2 = \underset{\text{Sodium tetrathionate.}}{Na_2S_4O_6} + 2NaI.$$

The acid may be prepared from the barium salt by double decomposition with sulphuric acid. A dilute solution may be boiled without decomposing; but a concentrated solution is decomposed when heated, yielding sulphur, and sulphurous and sulphuric acids. Its salts are all soluble in water, and are much more stable than the trithionates, but for the most part their solutions cannot be evaporated without decomposition.

Pentathionic Acid, $H_2S_5O_6$.

A solution of this acid is obtained by alternately passing sulphur dioxide and hydrogen sulphide gases through water—

$$5H_2SO_3 + 5H_2S = H_2S_5O_6 + 9H_2O + 5S;$$

the solution may be concentrated by a gentle heat till it attains a specific gravity of 1·25–1·3, and may then be further concentrated in a vacuum to the specific gravity of about 1·6. The solution is colorless and inodorous, and has a strongly acid taste; it may be preserved unchanged at ordinary temperatures, but on heating a concentrated solution of the acid, hydrogen sulphide and sulphur dioxide are evolved, sulphur is deposited, and sulphuric acid remains.

The salts of pentathionic acid are so unstable that it is difficult to obtain them in the solid state. In their formation from the acid there is a great tendency for the fifth atom of sulphur to be separated, tetrathionates being produced, which have greater stability, and sometimes two atoms of sulphur are given up and trithionates are formed.

A number of the reactions involved in the formation of various sulphur compounds, and also of a few selenium and tellurium compounds, have been submitted to thermochemical investigation by Thomsen. The results deduced from his experiments are given in the following table:—

	Reaction.	Units of heat developed or absorbed.	Remarks.
	Sulphur.		
Hydrogen sulphide.	(I_2, Aq, SH_2)	21,830	
	(S, H_2)	4,510	
	(SH_2, Aq)	4,750	
	(S, H_2, Aq)	9,260	
Sulphurous acid.	(SO_2, Aq)	7,700	Gaseous acid.
	(SO_2, Aq)	1,500	Condensed acid.
	(S, O_2)	71,070	Determined by Favre and Silbermann.
	(S, O_2, Aq)	78,770	
	$(SO_2Aq, 2NaOHAq)$	28,970	
Sulphuric acid.	(SO_2, O)	32,160	SO_3 becomes liquid.
	(SO_2, O, Aq)	71,330	
	(SO_2, Aq, O)	63,630	
	(SO_2, O_2, H_2)	121,840	
	(SO_3, H_2O)	21,320	SO_4H_2 becomes liquid.
	(SO_4H_2, Aq)	17,850	
	(SO_3, Aq)	39,170	Liquid anhydride.
	(S, O_3)	103,230	Supposing that $(S, O_2 = 71,070)$.
	(S, O_4, H_2)	192,910	
	(S, O_4, H_2, Aq)	210,760	
	$(SO_3Aq, 2NaOHAq)$	31,380	
Dithionic acid.	$(2SO_2, O, Aq)$	68,950	
	$(2SO_2Aq, O)$	53,550	
	(SO_3Aq, SO_2Aq)	−10,030	
	(S_2, O_5, Aq)	211,090	
	(S_2, O_6, H_2, Aq)	279,450	
	$(S_2O_5Aq, 2NaOHAq)$	27,070	
Thiosulphuric acid.	(SO_2, S, Aq)	−1,570	
	(SO_2Aq, S)	−9,270	
	(S_2O_2Aq, O_4)	225,300	
	(S_2, O_2, Aq)	69,500	
	(S_2, O_3, H_2, Aq)	137,860	
Tetrathionic acid.	$(2SO_2, O, S_2, Aq)$	62,820	
	$(2SO_2Aq, O, S_2)$	47,420	
	(S_4, O_5, Aq)	204,960	
	(S_4, O_6, H_2, Aq)	273,320	
	Selenium.		
Selenious acid.	(Se, O_2)	57,710	Cryst. anhydride.
	(SeO_2, Aq)	−920	
	(Se, O_2, Aq)	56,790	
	$(SeO_2Aq, 2NaOHAq)$	27,020	
Selenic acid.	(Se, O_3, Aq)	77,240	
	(SeO_2, O, Aq)	19,530	
	(SeO_2Aq, O)	20,450	
	$(ScO_3Aq, 2NaOHAq)$	30,390	
	Tellurium.		
Tellurous acid.	(Te, O_2, H_2O)	81,190	
Telluric acid.	(TeO_2Aq, O)	25,850	
	(Te, O_3, Aq)	107,040	

The number 4510 for the reaction S, H_2 applies strictly only to sulphur in the state in which it separates when hydrogen sulphide is decomposed by iodine, and would require a small correction to make it applicable to rhombic sulphur.

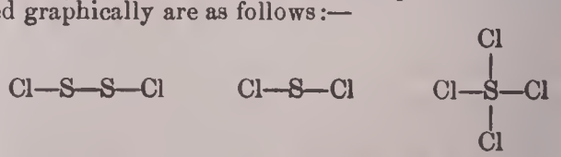
On comparing the numbers representing the amounts of heat developed in the formation of sulphurous and sulphuric acids and of the corresponding selenium and tellurium compounds, thus—

	Sulphur.	Selenium.	Tellurium.
	R = S.	R = Se.	R = Te.
R, O_2, Aq	78,770	56,790	81,190
R, O_3, Aq	142,400	77,240	107,040
RO_2Aq, O	63,630	20,450	25,850

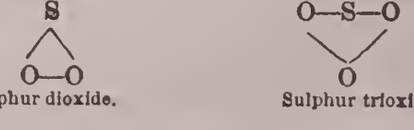
it will be evident that the affinity of selenium to oxygen, as measured by the heat developed, is less than that of sulphur to oxygen, and also less than that of tellurium to oxygen. In this respect, therefore, sulphur, selenium, and tellurium form a series corresponding to that in which chlorine, bromine, and iodine may be arranged. Bromine, we have seen, is intermediate in its properties between chlorine and iodine, and its atomic weight is also almost the mean of the atomic weights of these two elements, and its affinity to oxygen is less than that of either chlorine or iodine; the atomic weight of selenium, which is intermediate in its properties between sulphur and tellurium, is also nearly the mean of the atomic weights of these elements.

Constitution of the Sulphur Compounds.

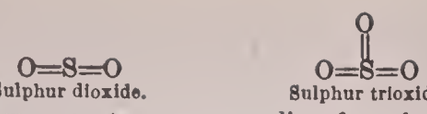
The constitution of the compounds of sulphur with monad elements may be readily deduced; thus, the only formulæ by which the chlorides of sulphur can be represented graphically are as follows:—



But the constitution of each of the oxides of sulphur may be expressed in two ways, thus—

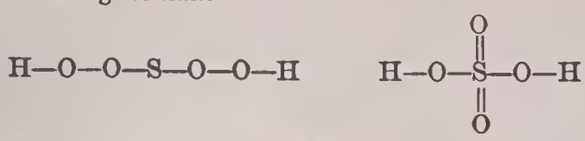


Sulphur dioxide. Sulphur trioxide.

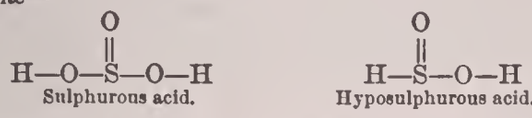


Sulphur dioxide. Sulphur trioxide.

In like manner, two corresponding formulæ may be assigned to each of the acids formed by combining these oxides with the elements of a molecule of water. Sulphuric acid, for instance, may be represented by either of the following formulæ—

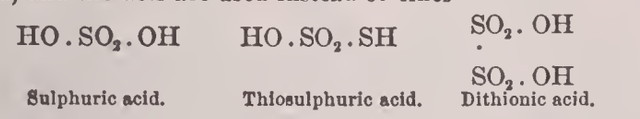


But as compounds in which two or more atoms of oxygen are directly united together (for example, hydrogen dioxide, the higher oxides of chlorine, and chloric acid, as to the constitution of which there can be little doubt, as they contain only monad elements associated with oxygen) readily decompose with separation of oxygen, the first of these formulæ for sulphuric acid appears improbable on account of the stability of the acid and of most of the compounds derived from it. If, however, the second formula be adopted, it follows that the formula which represents the three atoms of oxygen in the trioxide as directly associated with the sulphur atom is the more probable. It is probable that sulphur dioxide and sulphurous acid are analogous in constitution to sulphur trioxide and sulphuric acid, and from the manner in which hyposulphurous acid is formed from sulphurous acid we may infer that it has the constitution represented by the second of the following formulæ—

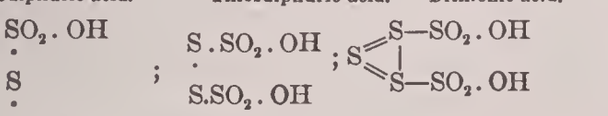


Sulphurous acid. Hyposulphurous acid.

The following formulæ are the most probable expressions of the constitution of the remaining acids of sulphur; the constitution of the SO_2 group is the same as in sulphuric acid, and the dots are used instead of lines—



Sulphuric acid. Thiosulphuric acid. Dithionic acid.



Trithionic acid. Tetrathionic acid. Pentathionic acid.

We have previously pointed out (p. 410) the value which is to be attached to constitutional formulæ such as are here assigned to the sulphur compounds.

NITROGEN.

Symbol, N ; Atomic wt., 14 ; Molecular wt., 28.

Nitrogen in the free state constitutes about one-fifth by volume of the atmosphere; in combination it occurs in nitrates and ammoniacal salts, and it enters into the composition of all animal and vegetable tissues.

It is best obtained from air by removing the oxygen by means of copper heated to redness; the air being first led through a solution of potassium hydrate to free it from carbon dioxide, and then through concentrated sulphuric acid to remove moisture, and when thus purified, passed through a tube containing metallic copper heated to dull redness. By passing a mixture of air and ammonia over heated copper, the copper oxide is reduced as fast as it is formed, and a short length of copper suffices for the preparation of an indefinite quantity of nitrogen; thus—

$$2Cu + O_2 = 2CuO,$$
$$3CuO + 2NH_3 = N_2 + 3H_2O + 3Cu.$$

The supply of air is easily regulated, as an excess shows itself by tarnishing the surface of the copper.

The easiest method of obtaining pure nitrogen is to heat a solution of ammonium nitrite, which splits up into nitrogen and water: $NO_2NH_4 = N_2 + 2H_2O$. But as this salt is difficult to prepare, it is better to substitute for it a mixture of potassium nitrite and ammonium chloride, which together produce ammonium nitrite and potassium chloride—

$$KNO_2 + NH_4Cl = NH_4NO_2 + KCl.$$

Nitrogen is a colorless, inodorous, tasteless, incondensable gas; it is only very sparingly soluble in water, 100 volumes of water at 15° C. dissolving about one and a half volumes of nitrogen. It is incombustible, and does not support the combustion of ordinary combustibles; it is not poisonous, but an animal immersed in it dies simply for want of oxygen. Nitrogen evinces but little tendency to enter into reaction with other elements; titanium, tungsten, vanadium, and probably a few others combine directly with it, however, but its compounds are mostly produced by indirect means.

Atmospheric air consists not only of nitrogen and oxygen, which are its chief constituents, but besides these contains carbon dioxide, ammonia, water vapor, &c.; solid substances, such as common salt, are also frequently held in suspension by it, especially in the neighborhood of the sea and of towns. Air from which all other constituents are removed does not always exhibit the same composition, however, although the variations are very slight; usually in pure air the proportion of oxygen is from 20·9 to 21 volumes in 100 of air, but considerably less oxygen has been found in air from confined spaces and in a few samples collected in warm countries. Full information on this subject may be obtained from Dr. Angus Smith's work on Air and Rain.

The fact, however, that oxygen and nitrogen are not always contained in air in the same proportions is alone a sufficient proof that they are not combined, but only mixed together, as the constituents of a compound always occur in invariable proportions. This conclusion is confirmed in many ways. Thus, the proportions in which nitrogen and oxygen are present in air are not those of their atomic weights, nor do they bear any simple relation to them. We know also that when gases enter into reaction to form new compounds their combination is usually attended with an alteration of volume, and heat is developed; moreover, the resulting compound possesses properties which differ strikingly from those of its constituents. But when oxygen and nitrogen are mixed together in the proportions in which they are present in air, neither is any alteration in volume observed, nor is heat developed; and the properties of the resulting mixture are precisely those of air, and just such as we should expect to result from the admixture of a gas which very readily supports combustion with one in which combustion is impossible. Again, were air a compound it should dissolve in water as such, or in other words, the proportion of oxygen and nitrogen in the dissolved air should be the same as in the undissolved air; but if a mixture, the more soluble constituent should dissolve the more readily, and relatively more oxygen than nitrogen should dissolve, since oxygen is more soluble than nitrogen. Experiment proves that the latter is the case, for if water which has been recently boiled to free it from dissolved gases and allowed to cool out of contact with air be shaken with air, and the dissolved air be then expelled from it by heating, and collected, it is found on analysis to contain 32 instead of only 21 per cent. by volume of oxygen. Lastly, we have seen (p. 416) that the oxygen may be to a great extent separated from the nitrogen by a mechanical process by submitting air to filtration through a thin caoutchouc membrane.

It is impossible for animals to live for any length of time in pure oxygen, apparently because oxidation takes place so rapidly that the animal is incapable of assimilating sufficient food to supply the waste; but by admixture with the perfectly neutral nitrogen the activity of the oxygen becomes greatly diminished.

Air from open places contains usually from 3 to 6 volumes of carbon dioxide in 10,000 volumes, but the amount of carbon dioxide in the atmosphere is subject to continual change, although within narrow limits. It does not continually increase in amount, notwithstanding that animals expire carbon dioxide, and that large quantities are produced by the combustion of wood and coal, because plants exercise a power which is the reverse of that of which animals are possessed, viz., that of decomposing carbon dioxide and restoring its oxygen to the atmosphere.

Ammonia, NH_3; Mol. wt., 17.

Ammonia is the only compound of nitrogen and hydrogen which is known to us. It may be formed directly from its elements by submitting a mixture of the two gases to the action of the silent electric discharge; the

combination is very imperfect, however. It is also obtained by the action of nascent hydrogen on nitric acid and many of its salts; but it is always prepared by heating an ammonium salt with an alkaline hydroxide, ammonium chloride and calcium hydroxide or slaked lime being the substances which are usually employed—

$$\underset{\text{Ammonium chloride.}}{2NH_4Cl} + \underset{\text{Calcium hydroxide.}}{Ca(OH)_2} = \underset{\text{Ammonia.}}{2NH_3} + 2OH_2 + \underset{\text{Calcium chloride.}}{CaCl_2}.$$

Ammonia is a product of the decay of all nitrogenous animal and vegetable substances, and the ammonia present in the atmosphere is chiefly if not entirely derived from this source; but it appears not improbable that ammonia is directly produced in the atmosphere by the decomposition of water into its elements by the electric discharge, and the combination also under the influence of the discharge of the hydrogen thus produced with nitrogen. Ammonia is present in the atmosphere apparently as carbonate, and in rain-water, especially in that of thunder showers, as nitrate and nitrite. Ammonia salts are sometimes found as minerals, chiefly in volcanic districts. The source from which ammonia salts are now obtained, however, is the watery liquid which distils over in the manufacture of coal gas; the ammonia is liberated from this liquid by heating it with slaked lime, and by receiving it in sulphuric acid ammonium sulphate is produced,—a salt which is largely employed as an artificial manure.

Ammonia is a transparent colorless gas, of a very pungent peculiar odor, and a burning taste. It may be reduced to the liquid state by a pressure of about 17 atmospheres at the ordinary temperature, or by cold alone at about −50° to −40° C.; by exposing the dry gas to a cold of −75° C. and a pressure of 20 atmospheres, Faraday obtained ammonia as a white transparent crystalline body, melting at −75° C. It does not support combustion, and is only feebly combustible. It is decomposed into its elements by a succession of electric sparks.

Ammonia is dissolved by water with great avidity, much heat being developed and great expansion taking place; according to Roscoe and Dittmar, 1 gramme of water at 0° C. dissolves no less than ·875 gramme of ammonia. The solution has the smell and taste of the gas, and a powerfully alkaline reaction; it loses almost all its ammonia below 100° C.

Ammonia completely neutralizes acids, forming definite crystalline salts, known as ammonium salts, which are formed by the direct combination of ammonia with the acids; ammonia and hydrochloric acid, for example, form ammonium chloride, $NH_4Cl = NH_3 + HCl$, whilst ammonia and sulphuric acid furnish ammonium sulphate, $(NH_4)_2SO_4 = 2NH_3 + H_2SO_4$. The constitution of these salts, it will be evident, is analogous to that of the salts of the metals generally if we regard them as derived from the acids by the displacement of the hydrogen of the latter by the monad compound radicle *ammonium*, NH_4, and this view is confirmed by the observation that the ammonium salts are isomorphous with the corresponding potassium salts. They are all soluble in water, and are readily decomposed by the alkaline hydroxides, and by most basic oxides, with evolution of ammonia.

The solution of ammonia in water is frequently regarded as the hydroxide of the hypothetical radicle ammonium, that is to say, as a solution of ammonium hydroxide, $NH_4.OH$, the analogue of potassium hydroxide, KOH. But Thomsen has shown that considerably less heat is developed when an acid is neutralized by a solution of ammonia than when it is neutralized by a solution of an alkaline hydroxide, such as potassium hydroxide, for example, the reaction KHOAq, HClAq being accompanied by the development of 27,500 units of heat, whilst only 24,500 are developed in the reaction NH_3Aq, HClAq. Thomsen is inclined to regard this result as evidence that ammonia exists as such in its aqueous solution, and not as the hydroxide $NH_4.OH$, but the difference observed appears scarcely sufficient to warrant this conclusion in the face of the chemical evidence which points to the existence of an ammonium hydroxide; it is more probable, perhaps, that an aqueous solution of ammonia consists in part of the hydroxide and in part of free ammonia.

A very large number of derivatives may be obtained from ammonia by displacing one or more atoms of hydrogen in it by positive or negative radicles. Those which are formed by the introduction of monad positive radicles are distinguished by the name *amines*, whilst those containing monad negative radicles are called *amides;* when two atoms of hydrogen in a single molecule of ammonia are displaced by dyad negative radicles so-called *imides* are produced. A simple instance of the formation of an amine derivative is afforded by the action which takes place when potassium is heated in an atmosphere of ammonia—

$$\underset{\text{Ammonia.}}{2NH_3} + 2K = \underset{\text{Potassamine.}}{2NH_2K} + H_2.$$

By digesting iodine in an excess of aqueous ammonia a black explosive compound is produced, which apparently is formed by the displacement of two of the atoms of hydrogen by iodine—

$$\underset{\text{Ammonia.}}{3NH_3} + 2I_2 = \underset{\text{Diiodamide.}}{NHI_2} + 2NH_4I.$$

It may be exploded by friction even under water, and in the dry state can scarcely be touched without exploding. When chlorine is passed into an aqueous solution of ammonia, nitrogen is evolved and ammonium chloride is produced; thus—

$$2NH_3 + 3Cl_2 = N_2 + 6HCl$$
$$6NH_3 + 6HCl = 6NH_4Cl$$
$$\therefore \quad 8NH_3 + 3Cl_2 = N_2 + 6NH_4Cl.$$

If the action of the chlorine be continued after the whole of the ammonia is thus acted upon, the ammonium chloride becomes attacked, and yellow oily drops of the so-called chloride of nitrogen are formed. The composition of this substance has not yet been satisfactorily ascertained; it probably contains hydrogen, and its formula is supposed to be $NHCl_2$, but it is not unlikely that the compound NCl_3 is also produced. It explodes with extreme violence when heated, or when brought in contact with fatty matters, or with turpentine, phosphorus, and many other substances.

The Oxides and Acids of Nitrogen.

No less than five oxides of nitrogen are known, viz.—

$$\underset{\text{Nitrous oxide.}}{N_2O} \; ; \; \underset{\text{Nitric oxide.}}{NO} \; ; \; \underset{\text{Nitrous anhydride.}}{N_2O_3} \; ; \; \underset{\text{Nitric peroxide.}}{N_2O_4} \; ; \; \underset{\text{Nitric anhydride.}}{N_2O_5}.$$

Nitrous and nitric oxides are merely dissolved by water, but the remaining oxides enter into reaction with it, producing acids,—nitrous and nitric anhydrides being converted into the corresponding acids, nitrous and nitric acids, and a mixture of those two acids being formed from the intermediate oxide, nitric peroxide; thus—

$$\underset{\text{Nitrous anhydride.}}{N_2O_3} + H_2O = \underset{\text{Nitrous acid.}}{2HNO_2}$$

$$\underset{\text{Nitric peroxide.}}{N_2O_4} + H_2O = \underset{\text{Nitrous acid.}}{HNO_2} + \underset{\text{Nitric acid.}}{HNO_3}$$

$$\underset{\text{Nitric anhydride.}}{N_2O_5} + H_2O = \underset{\text{Nitric acid.}}{2HNO_3}$$

As these various oxides of nitrogen are all prepared from nitric acid, we may conveniently describe this compound first—

Nitric Acid, HNO_3.

This acid is now usually prepared by distilling sodium nitrate or Chili saltpetre, a salt which occurs abundantly in South America, with concentrated sulphuric acid in the proportions indicated by the equation—

$$2NaNO_3 + H_2SO_4 = 2HNO_3 + Na_2SO_4.$$

When potassic nitrate is employed, it is advantageous to use double the quantity of sulphuric acid; thus—

$$KNO_3 + H_2SO_4 = HNO_3 + KHSO_4,$$

as the heat required to produce the reaction—

$$KNO_3 + KHSO_4 = HNO_3 + K_2SO_4$$

is so great that a considerable amount of the acid is decomposed.

The acid passes over as an almost colorless liquid in the middle of the process, but is colored at the beginning and end by decomposition products. To obtain the pure acid, it is mixed with an equal bulk of concentrated sulphuric acid and the mixture distilled; the first portions of the distillate are collected, and a current of dry air passed for several hours through the liquid, which is gently warmed and sheltered from strong daylight.

Pure nitric acid is a colorless, mobile, fuming liquid, of the specific gravity 1·53 at 15° C.; it solidifies at about —55° C. It is an extremely unstable substance, and cannot be distilled without experiencing partial decomposition; it is also decomposed when exposed to sunlight, becoming yellow, and oxygen being evolved. It begins to boil at 86° C., but the temperature rises gradually, and oxygen and red fumes of oxides of nitrogen are evolved; when the boiling point reaches about 123° C., an aqueous acid, having a specific gravity of about 1·42, and containing about 68 per cent. of nitric acid, distils unchanged, and weaker and stronger acids may alike be reduced to this strength by boiling. As in the case of other aqueous acids, however, the composition of nitric acid of constant boiling point varies with the pressure under which ebullition takes place.

The addition of water to nitric acid causes the development of heat. The following table shows the extent to which this occurs, the amount of heat developed on adding n molecules of water to a molecule of the acid being given in the second column of the table, whilst the third exhibits the amount developed on adding a quantity of water equal to that already present:—

n.	HNO_3, nH_2O.	HNO_3nH_2O, nH_2O.
0·5	2019 units.	1284 units.
1·0	3303 "	.....
1·5	4185 "	1572 "
2·0	4844 "	.....
2·5	5331 "	1388 "
3	5757 "	.....
4	6316 "	.....
5	6719 "	653 "
10	7372 "	139 "
20	7511 "	—14 "
40	7497 "	—15 "
80	7482 "	+29 "
100	7477 "	.....
160	7511 "	+74 "
320	7585 "	.....

These numbers do not appear to furnish any evidence of the formation of a distinct hydrate on adding water to nitric acid.

Nitric acid is a monobasic acid, and furnishes an important class of salts called *nitrates*, such as potassium nitrate, KNO_3, copper nitrate, $Cu(NO_3)_2$, and bismuth nitrate, $Bi(NO_3)_3$. In addition to these normal nitrates, a number of so-called basic nitrates are known which may be regarded as normal salts of a distinct acid, formed by the combination of a molecule of nitric acid with a molecule of water; such are the basic bismuth nitrate $BiNO_4$ and the basic lead nitrates $Pb_2H_2N_2O_8$ and $Pb_3N_2O_8$. The normal nitrates are best prepared by dissolving the metallic oxides, hydroxides, or carbonates in diluted nitric acid; they are all soluble in water. The most important nitrate is that of potassium, which is employed in the manufacture of gunpowder.

Nitric acid is an extremely powerful oxidizing agent, and one of the most corrosive substances known; it rapidly destroys all animal textures and most vegetable products, and even if diluted it stains the skin, wool, and all albuminous substances a bright yellow color. Many hydrogenized carbon compounds are converted by it into so-called nitro-derivatives, one or more atoms of hydrogen being displaced by the monad compound radicle NO_2; the hydrocarbon benzene, for example, when added to the concentrated acid yields nitrobenzene—

$$C_6H_6 + HNO_3 = C_6H_5 . NO_2 + H_2O .$$

Most metals, excepting gold, platinum, rhodium, iridium, titanium, and perhaps a few others, are more or less readily acted on by nitric acid and converted into nitrates; but the non-metallic elements and metalloids—iodine, sulphur, selenium, tellurium, phosphorus, arsenic, antimony, amorphous boron and carbon, and tungsten—are oxidized by it, and furnish iodic, sulphuric, selenious, tellurous, phosphoric, arsenic, antimonic, boric, carbonic, and tungstic acids.

The action of nitric acid on metals, however, is much influenced by temperature and concentration. An acid of the specific gravity 1·25 to 1·35 is usually the most active. The pure concentrated acid is without action on bismuth, iron, tin, and many other metals at ordinary temperatures. Thus, a piece of bright iron is at once attacked by an acid of about the specific gravity 1·35, but it may be preserved in acid of the specific gravity 1·45 without losing its brilliancy; what is more remarkable, however, is that by plunging it into the more concentrated acid it is rendered *passive* to the action of the weaker acid, for on removing it and at once introducing it into the weaker acid, no action is observed, although on diluting the acid below 1·35 the iron is attacked.

In order, however, to understand the behavior of nitric acid with metals, it is necessary that we should first consider the action of metals upon acids generally. There is little doubt that in all cases the metal simply displaces the hydrogen of the acid, forming a salt; and if, under the conditions under which the experiment is made, the acid has no tendency to enter into reaction with the hydrogen which is displaced, whilst it is in the nascent state, hydrogen is also evolved; but if the acid can enter into reaction with the nascent hydrogen the products of the secondary reaction are obtained instead. For example, zinc readily dissolves in cold diluted sulphuric acid, forming zinc sulphate, and hydrogen is evolved since it is without action on sulphuric acid under these conditions—

$$Zn + H_2SO_4 = ZnSO_4 + H_2 .$$

But when zinc and *concentrated* sulphuric acid are heated together, zinc sulphate and sulphur dioxide are obtained, and no hydrogen is evolved. In this case, the hydrogen is displaced from the sulphuric acid under conditions which are favorable to its action upon the acid, and it deprives the acid of a portion of its oxygen, forming sulphurous acid, which is at once resolved into water and sulphur dioxide.

The behavior of nitric acid with metals is precisely similar to that of zinc with heated concentrated sulphuric acid, nitric acid being a substance which with the greatest readiness may be deprived of its oxygen by the action of nascent hydrogen. In fact, hydrogen is never evolved by the action of metals on nitric acid, but instead oxides of nitrogen, nitrogen itself, ammonia, and other products of secondary reaction are obtained. The formation of these products is due to a somewhat complex series of reactions, which most probably are as follows. In the first place, by the removal of one of the atoms of oxygen the nitric acid is converted into nitrous acid, HNO_2; by further reduction this acid furnishes the so-called hyponitrous acid, HNO; and by the continued action of the nascent hydrogen the hyponitrous acid is converted into hydroxylamine or oxyammonia, $NH_2(OH)$, which finally is reduced to ammonia, NH_3. The reactions which successively occur in the formation of these compounds are represented by the following equations:—

$$\underset{\text{Nitric acid.}}{HNO_3} + H_2 = \underset{\text{Nitrous acid.}}{HNO_2} + H_2O$$

$$\underset{\text{Nitrous acid.}}{HNO_2} + H_2 = \underset{\text{Hyponitrous acid.}}{HNO} + H_2O$$

$$\underset{\text{Hyponitrous acid.}}{HNO} + H_2 = \underset{\text{Hydroxylamine.}}{NH_2(OH)}$$

$$\underset{\text{Hydroxylamine.}}{NH_2(OH)} + H_2 = \underset{\text{Ammonia.}}{NH_3} + H_2O$$

But the products of these reactions enter into reaction with each other, and are decomposed, and thus the gases are produced which are evolved when metals are dissolved in nitric acid. The nitric oxide doubtless results chiefly from the decomposition of the nitrous acid in the manner represented by the equation—

$$3HNO_2 = 2NO + HNO_3 + H_2O .$$

The nitrous oxide may be produced in two ways:—from hyponitrous acid, which immediately on formation is resolved into nitrous oxide and water: $2HNO = N_2O + H_2O$; and by the action of nitrous acid on hydroxylamine—

$$HNO_2 + NH_2(OH) = N_2O + 2H_2O .$$

The nitrogen produced is probably formed in a similar manner by the action of the nitrous acid on the ammonia—

$$HNO_2 + H_3N = N_2 + 2H_2O ;$$

and perhaps also, together with nitric oxide, by the action of nitric acid on hyponitrous acid.

As the product of the action of nitric acid on a metal is always a mixture, it is evident that several of the reactions pointed out must occur simultaneously. The composition of the product varies, in a manner not yet understood, with the metal, the strength of the acid, and with the temperature.

The approximate percentage composition of the gas obtained by the action of a mixture of nitric acid of the specific gravity 1·42 with twice its bulk of water on a number of metals is given in the following table:—

Name of Metal.	N_2O	NO	N
Nickel	85	4	11
Cobalt	79	6	15
Tin	68	23	9
Magnesium	61	17	22
Zinc	53	40	7
Lead	41	52	7
Cadmium	20	78	2
Thallium	19	70	11
Iron	6	89	5
Indium	4	91	5
Aluminium	1	97	2
Copper	1·5	97	1·5
Silver	0	97	3

It is difficult at present to explain the remarkable difference in the behavior of the various metals with nitric acid which this table indicates. As we have stated above, the action of the metal probably consists simply in displacing the hydrogen of the acid, and the gases evolved are the more or less direct products of the action of the hydrogen so displaced at the moment of liberation on the acid which is always present in excess. The question, therefore, that we have to consider is, Why does the hydrogen displaced from nitric acid by different metals produce such very different effects? If the behavior of closely related metals such as magnesium, zinc, and cadmium be compared, it is evident that magnesium is the most active, since it produces a relatively smaller quantity of nitric oxide, and relatively larger quantities of nitrous oxide and nitrogen, than either zinc or cadmium, cadmium being the least active; in other words, the reduction of the nitric acid is most perfect when it is effected by the hydrogen displaced by the aid of magnesium, and least perfect when it is effected by the aid of cadmium, We know that when these metals act upon acids which are not attacked by nascent hydrogen, such as hydrochloric acid, for example, different amounts of heat are developed, most heat being developed by the action of magnesium, and least by the action of cadmium. But since the mere displacement of hydrogen in hydrochloric acid by different metals is attended with the development of different amounts of heat, it appears probable that the same will be the case with nitric acid, and also that more heat would be developed in the reaction

$$Mg + 2HNO_3 = Mg(NO_3)_2 + 2H$$

than in the corresponding reactions with either zinc or cadmium; and that on this account the reduction of nitric acid is carried furthest when magnesium is employed, and further with zinc than with cadmium. Whether this explanation is applicable to the action of metals generally there is not sufficient evidence at present to show.

Nitrous Oxide, N_2O; Mol. wt., 43·96.

This gas is obtained in a pure state by carefully heating ammonium nitrate, which at a temperature between 200° and 250° C. breaks up into water and nitrous oxide—

$$NH_4NO_3 = N_2O + 2H_2O.$$

It is the chief constituent of the gas produced on dissolving magnesium, zinc, tin, nickel, or cobalt in nitric acid, and it is also furnished, but to a less extent, by other metals.

Nitrous oxide is a transparent colorless gas, possessing a faint sweetish smell and taste; it may be condensed by a pressure of about 50 atmospheres at 7° C. to a colorless liquid, and even frozen by the cold produced by its own evaporation. By exposing a mixture of liquid nitrous oxide and carbon disulphide to evaporation in vacuo, Natterer obtained a reduction of temperature which he estimated at − 140° C., which is lower than has been obtained by any other means. 100 volumes of water at 0° C. dissolve 130 of nitrous oxide, but the solubility diminishes rapidly as the temperature rises. It supports the combustion of bodies almost, if not quite, as well as oxygen, but is readily distinguished from that gas by its solubility in water, and by not forming red fumes when mixed with nitric oxide gas.

The most remarkable property which nitrous oxide gas possesses is that of causing loss of sensibility in animals. When respired for a short time it produces a singular species of transient intoxication, attended in many instances with an irresistible tendency to muscular exertion, and often to uncontrollable laughter; hence it has acquired the name of *laughing gas*. It is now largely used as an anæsthetic for producing insensibility to pain during surgical operations, and especially in the extraction of teeth.

Nitrous oxide is a perfectly neutral substance, and does not exhibit any tendency to enter into combination with other bodies.

Nitric Oxide, NO; Mol. wt., 29·96.

This gas is one of the products of the action of nitric acid on metals; the gas obtained on dissolving copper in moderately concentrated nitric acid contains at first about 97 per cent. of nitric oxide, but as the action proceeds and cupric nitrate accumulates in the solution, the proportion of nitric oxide evolved diminishes, whilst that of nitrous oxide increases. This appears to be due to the alternate reduction of the cupric nitrate to cuprons nitrate—

$$\underset{\text{Cupric nitrate.}}{2Cu(NO_3)_2} + H_2 = \underset{\text{Cuprous nitrate.}}{Cu_2(NO_3)_2} + 2HNO_3$$

and reconversion of the latter into cupric nitrate, as by the action of nitric acid on cuprous nitrate, nitric oxide mixed with a large proportion of nitrous oxide is produced.

Pure nitric oxide may be prepared by gently heating a mixture of a ferrous salt, such as ferrous chloride or ferrous sulphate, with hydrochloric or dilute sulphuric acid and potassium or sodium nitrate. The nitric acid liberated from the nitrate is reduced by the ferrous salt, which is oxidized to a ferric salt, and nitric oxide is evolved—

$$\underset{\text{Ferrous chloride.}}{6FeCl_2} + 6HCl + \underset{\text{Nitric acid.}}{2HNO_3} = \underset{\text{Nitric oxide.}}{2NO} + \underset{\text{Ferric chloride.}}{3Fe_2Cl_6} + 4H_2O.$$

Nitric oxide is a colorless, transparent, uncondensable gas, almost insoluble in water; it is the most stable of the oxides of nitrogen, and may even be exposed to a red heat without undergoing decomposition. A lighted taper and phosphorus just kindled are extinguished by it, but if the phosphorus be burning vigorously when introduced into the gas the temperature is then sufficiently high to enable it to decompose the gas into its elements, and it continues to burn as brilliantly as in pure oxygen.

Nitric oxide immediately combines with oxygen when mixed with it, forming deep red fumes of higher oxides of nitrogen. It is perfectly absorbed by a solution of ferrous chloride or sulphate, which it turns black; when the solution is heated, most of the nitric oxide is expelled from it unchanged, and in this way nitric oxide may be separated from other gases insoluble in solutions of the ferrous salts. Nitric oxide is absorbed by nitric acid, and apparently nitrous acid is produced—

$$HNO_3 + 2NO + H_2O = 3HNO_2.$$

It combines directly with chlorine, forming the compound NOCl, or nitrosyl chloride, which is also produced together with chlorine when a mixture of concentrated nitric and hydrochloric acids—the so-called aqua regia—is heated—

$$HNO_3 + 3HCl = NOCl + Cl_2 + 2H_2O.$$

Nitrosyl chloride is most readily prepared, however, by gently heating a mixture of dry sodium chloride and the lead chamber crystal compound (p. 437)—

$$SO_2\begin{cases} O.NO \\ OH \end{cases} + NaCl = NOCl + SO_2\begin{cases} ONa \\ OH. \end{cases}$$

It is an orange-yellow colored gas, which readily liquefies; the liquid has a deep orange color, and boils at about − 8° C. It is decomposed by water, forming hydrochloric and nitrous acids—

$$\underset{\text{Nitrosyl chloride.}}{NOCl} + HOH = \underset{\text{Nitrous acid.}}{NO.OH} + HCl.$$

Nitrous Anhydride, N_2O_3.

The properties of this compound have not yet been satisfactorily ascertained. Apparently, it is produced, together with nitric peroxide, when nitric oxide is mixed with oxygen, and when nitric acid is heated with arsenious anhydride; it is stated that it may be prepared in a pure state by passing a mixture of nitric peroxide with an excess of nitric oxide through a heated tube, and that it may be condensed to a deep blue colored liquid, which begins to boil at about 2° C., but is decomposed into nitric oxide and peroxide. It combines readily at ordinary temperatures with oxygen, forming nitric peroxide.

Nitric Peroxide, N_2O_4; Mol. wt., 91.86.

Nitric peroxide may be obtained by combining nitric oxide with oxygen, and by heating lead nitrate—

$$\underset{\text{Lead nitrate.}}{2Pb(NO_3)_2} = \underset{\text{Nitric peroxide.}}{2N_2O_4} + \underset{\text{Lead oxide.}}{2PbO} + O_2.$$

At low temperatures it forms colorless prismatic crystals, which melt at −9° C.; at this temperature the liquid oxide is almost colorless, but it assumes a yellow color, increasing in depth up to its boiling point. It boils at about 25° C., yielding a brownish-red vapor, the depth of which also increases with the temperature, until at 40° C. it is so dark as to be almost opaque. The vapor of nitric peroxide, however, probably even at temperatures below its boiling point, is a mixture of the compound N_2O_4 with simpler molecules of the composition NO_2; the proportion of the latter increases as the temperature rises, and at temperatures above 150° C. the decomposition into NO_2 is apparently complete. The compound NO_2 is not decomposed at a dull red heat.

Nitric peroxide has a pungent suffocating odor, and is quite irrespirable. It is decomposed by water with production of nitrous and nitric acids: $N_2O_4 + H_2O = HNO_2 + HNO_3$. Chlorine is without action on nitric peroxide in the cold, but when a mixture of the two gases is passed through a heated tube the compound NO_2Cl or nitrylic chloride is formed. It is a pale yellow liquid, which is decomposed by water into nitric and hydrochloric acids.

Nitric Anhydride, N_2O_5.

This compound may be obtained directly from nitric acid by the action of phosphoric anhydride—

$$\underset{\text{Nitric acid.}}{2HNO_3} + \underset{\text{Phosphoric anhydride.}}{P_2O_5} = \underset{\text{Nitric anhydride.}}{N_2O_5} + \underset{\text{Metaphosphoric acid.}}{2HPO_3}.$$

It may also be obtained by the action of chlorine on silver nitrate—

$$2AgNO_3 + 2Cl_2 = 2NO_2Cl + 2AgCl + O_2$$
$$AgNO_3 + NO_2Cl = N_2O_5 + AgCl.$$

Nitric anhydride crystallizes in transparent prisms, which melt at about 30° C.; it is very unstable, particularly in the fused state, and gradually decomposes even at ordinary temperatures into oxygen and nitric peroxide. Water converts it into nitric acid: $N_2O_5 + H_2O = 2HNO_3$.

Nitrous Acid, HNO_2.

In the pure state this compound is unknown to us, but its salts, the *nitrites*, may readily be prepared. Thus, on heating sodium or potassium nitrate to redness until the gas which is evolved begins to contain nitrogen, a residue which consists chiefly of sodium or potassium nitrite is obtained; these nitrites are soluble in alcohol, and may by its aid be separated from the nitrates, which are insoluble. A mixture of nitrate and nitrite is also produced on passing the gas evolved when nitric acid is heated with arsenious anhydride, starch, or sugar into a solution of potassium or sodium hydroxide, and when orygen is added to nitric oxide which is in contact with a solution of an alkali. On adding silver nitrate solution to a concentrated solution of the impure nitrite, silver nitrite, $AgNO_2$, which is difficultly soluble in water, is precipitated; this salt may be purified by crystallization from a large quantity of hot water, and from it other nitrites may be prepared in a pure state by double decomposition with the corresponding chlorides; thus—

$$\underset{\text{Silver nitrite.}}{AgNO_2} + \underset{\text{Potassium chloride.}}{KCl} = \underset{\text{Silver chloride.}}{AgCl} + \underset{\text{Potassium nitrite.}}{KNO_2}.$$

Although oxygen and nitrogen do not directly combine, when a succession of electric sparks is passed through a mixture of the two gases confined over water, red fumes are produced which dissolve in the water, forming nitric and nitrous acids. The nitrite and nitrate present in the atmosphere and in rain water are doubtless formed in this manner.

On adding an acid to a nitrite, nitrous acid is liberated, but at once decomposes with evolution of nitric oxide—

$$KNO_2 + HCl = HNO_2 + KCl$$
$$3HNO_2 = 2NO + HNO_3 + OH_2.$$

Nitrous acid can only exist, in fact, in presence of a large quantity of water, or of nitric acid. It parts with its oxygen more readily, and is therefore a more powerful oxidizing agent, than nitric acid. It also appears to act more readily than nitric acid upon many metals. Thus, pure nitric acid is almost without action upon silver, but on passing a few bubbles of nitric oxide gas into the acid, and thus producing a minute quantity of nitrous acid, the metal is at once attacked, and is dissolved more and more rapidly the longer the action continues, doubtless because the hydrogen displaced from the acid by the silver reduces nitric acid to nitrous acid, so that the more silver is dissolved the richer the solution becomes in nitrous acid. Platinum also, which is insoluble in nitric acid, is dissolved by nitrous acid.

On some hydrogenized carbon compounds nitrous acid exerts an action similar to that of nitric acid, and causes the displacement of hydrogen by the monad compound radicle NO, producing *nitroso*-compounds. Thus—

$$\underset{\text{Phenol.}}{C_6H_5.OH} + \underset{\text{Nitrous acid.}}{NO.OH} = \underset{\text{Nitrosophenol.}}{C_6H_4(NO).OH} + H_2O.$$

Nitrous acid readily absorbs oxygen, and is converted into nitric acid. The nitrites are also converted into nitrates when exposed in the moist state to air. Nitrous acid is easily distinguished from nitric acid by its power of liberating iodine from iodides, by the readiness with which it destroys the blue color of a solution of indigo at ordinary temperatures, and by its decolorizing a solution of potassium permanganate,—nitric acid being without the power of liberating iodine from iodides, or of bleaching permanganate solution.

Hyponitrous Acid, HNO.

When sodium is added to a solution of sodium nitrate, the hydrogen displaced from the water by the sodium reduces the nitrate to nitrite, which in its turn undergoes further reduction to the hyponitrite, NaNO. On rendering the solution slightly acid with acetic acid, and adding silver nitrate, a yellow pulverulent precipitate of silver hyponitrite, AgNO, is produced. It is insoluble in water, and almost insoluble in acetic acid, but is soluble in either dilute nitric or sulphuric acid, and without immediate decomposition. Moderately diluted nitric, sulphuric, or hydrochloric acid decomposes it with the evolution of nitrogen, and the production of apparently both nitrous and nitric acids in the solution. It is immediately oxidized by concentrated nitric acid. A solution of the sodium salt acidified with acetic or hydrochloric acid decolorizes potassium permanganate; it does not liberate iodine from iodides, however, but on the contrary decolorizes a solution of iodine. When the solution acidified with acetic acid is heated, nitrous oxide is evolved.

Hydroxylamine, $NH_2(OH)$.

This compound is formed when nitric acid is added to a mixture of tin and hydrochloric acid, the hydrogen produced by the action of the tin on the hydrochloric acid reducing the nitric acid. It may also be formed by the direct union of nitric oxide with hydrogen, namely, by passing a stream of nitric oxide gas through a series of glass cylinders containing tin and hydrochloric acid, together with a little platinum chloride solution, whereby hydrogen is produced at ordinary temperatures.

It is a very unstable substance, and can be obtained only in solution, but well-crystallized *hydroxylammonium* salts are formed by its union with acids. Thus, the hydrochloride, $NH_3Cl(OH)$, or $NH_2(OH).HCl$, crystallizes from alcohol in long spicular crystals, and from water in large irregular monoclinic prisms; it melts at 100° C., but decomposes, with violent evolution of gas, into nitrogen,

ammonium chloride, water, and hydrochloric acid. A solution of hydroxylamine has an alkaline reaction, and precipitates many metallic salts: it decomposes quickly if concentrated, and gradually if dilute, with evolution of nitrogen and formation of ammonia—

$$3NH_2(OH) = N_2 + NH_3 + 3OH_2.$$

Hydroxylamine is readily reduced to ammonia by the action of the nascent hydrogen from sodium amalgam and water.

The results of Thomsen's thermochemical investigation of various nitrogen compounds are collected in the following table:—

Reaction.		Units of heat developed or absorbed.	Remarks.
Ammonia	(N, H_3)	26,710	Ammonia gas.
	(NH_3, Aq)	8,440	
	(N, H_3, Aq)	35,150	
	$(NH_3Aq, HClAq)$	12,270	
	(NH_3Aq, H_2S, Aq)	6,190	
	(N, H_4, Cl, Aq)	86,740	
	(N, H_4, Br, Aq)	75,800	
	(N, H_4, I, Aq)	60,580	
	(N, H_5, S, Aq)	50,600	
	(N, H_4, Cl)	90,620	Crystalline salts formed from the gaseous constituents.
	(N, H_4, Br)	80,180	
	(N, H_4, I)	64,130	
	(NH_3, HCl)	41,910	
	(NH_3, HBr)	45,030	
	(NH_3, HI)	43,460	
Nitrous oxide	(N_2, O)	−18,320	Gaseous.
Nitric peroxide	(NO, O)	19,570	
	(NO_2, Aq)	7,750	
Nitric acid	$(2NO_2Aq, O)$	18,300	
	(N_2O_2, O_3, Aq)	72,940	
	(NO_2, O, H, Aq)	51,080	

It will be observed that a considerable amount of heat would be absorbed in the formation of nitrous oxide from its elements; consequently, when this gas is decomposed into its elements, heat is developed, and on this account it is readily decomposed by burning bodies. This fact also explains the non-formation of nitrous oxide from its elements. Probably, heat would also be absorbed in the formation of nitric oxide from its elements. The absorption of heat is perhaps necessary, because the amount of energy in the form of heat which can be developed by the combination of nitrogen with oxygen to form nitrous and (?) nitric oxides is less than must be expended in separating the atoms of oxygen of the oxygen molecules from each other, and the atoms of nitrogen of the nitrogen molecules from each other.

PHOSPHORUS.

Symbol, P; At. wt., 30·96; Mol. wt. of gas, 123·84.

This element never occurs in the free state, but is always found in combination as a salt of phosphoric acid. Considerable deposits of more or less pure calcium phosphate occur in a few places, and phosphates are found in minute proportions in most rocks and in soils, and in river and spring waters. Phosphates are necessary to the life of all plants and animals. In plants they accumulate chiefly in the seed, in animals they accumulate in the bones, of which calcium phosphate is the chief earthy constituent, but they are also an important element of blood and nervous tissue.

Phosphorus was discovered in 1669 by Brandt of Hamburg, who obtained it by distilling the residue of evaporated urine with charcoal. Scheele in 1775, however, was the first who devised a process for its extraction from bones, and it has always since been prepared from this source. The bones are burnt to a white ash, which is finely powdered and mixed with a sufficient quantity of diluted sulphuric acid to displace by hydrogen two-thirds of the calcium in the tricalcium phosphate, which is the main constituent of bone ash, in the manner represented by the equation—

$$\underset{\text{Tricalcium phosphate.}}{Ca_3(PO_4)_2} + \underset{\text{Sulphuric acid.}}{2H_2SO_4} = \underset{\text{Monocalcium phosphate.}}{H_4Ca(PO_4)_2} + \underset{\text{Calcium sulphate.}}{2CaSO_4}.$$

The solution of monocalcium phosphate, or superphosphate of lime as it is ordinarily termed, which is obtained, is separated from the insoluble calcium sulphate, and evaporated to a syrup; this is mixed with about one-fourth its weight of charcoal powder, and heated gradually to dull redness in an iron pot with constant stirring. By this means the elements of two molecules of water are removed, the monocalcium phosphate being converted into calcium metaphosphate—

$$CaH_4(PO_4)_2 = Ca(PO_3)_2 + 2H_2O.$$

The porous mixture of calcium metaphosphate and charcoal thus obtained is introduced into earthen retorts, and distilled at a bright red heat. The calcium metaphosphate is then converted into tricalcium phosphate and phosphoric anhydride, and the latter is decomposed by the charcoal into carbonic oxide and phosphorus, which passes over in vapor and is condensed in water—

$$3Ca(PO_3)_2 = 2P_2O_5 + Ca_3(PO_4)_2$$
$$P_2O_5 + 5C = 2P + 5CO.$$

The crude phosphorus which is produced is usually purified by adding a mixture of potassium chromate and sulphuric acid to it when in a melted state. The impurities are thus oxidized, and rise to the surface in the form of a scum, and the pure phosphorus remains colorless and transparent at the bottom of the vessel.

Freshly-prepared phosphorus is almost perfectly transparent and colorless, or has, at most, a faint yellow tinge. It melts at 44° C., forming a viscid oily liquid, and boils at 290° C. Its vapor at a temperature of 1040° C. is about 62 times as heavy as hydrogen gas, and hence, as the atomic weight of phosphorus is about 31, it appears that the molecule of gaseous phosphorus is tetratomic. Phosphorus has a specific gravity of about 1·82. It is a non-conductor of heat and electricity. It is insoluble in water, but freely soluble in carbon disulphide, phosphorus trichloride, and sulphur chloride, S_2Cl_2. It crystallizes in forms of the regular system.

Phosphorus is extremely inflammable, taking fire in the open air at a temperature very little above its melting point; if it contains impurities, it inflames still more easily. It gradually absorbs oxygen when exposed to the air at ordinary temperatures, giving off a white vapor, which has a peculiar garlic odor; in presence of moisture phosphorous acid, H_3PO_3, and phosphoric acid, H_3PO_4, are produced.

Phosphorus, like sulphur, can exist in several allotropic modifications, the most remarkable being that produced by exposing ordinary phosphorus to light, or by heating it for some hours to a temperature of about 240° C. in an atmosphere free from oxygen. It is thus converted into a red amorphous substance, which is insoluble in carbon disulphide, and may be heated to 250° C. without alteration, but at 260° C., under the ordinary pressure, it is reconverted into ordinary phosphorus. The red modification has a much higher specific gravity (2·14) than ordinary phosphorus, and it is also distinguished by its inertness as compared with the latter; thus, it is not oxidized in the air at common temperatures, and it emits no odor. The transformation of ordinary phosphorus into this variety is attended with development of heat. Troost and Hautefeuille have shown that the formation of the red modification is governed by different laws according as the phosphorus is in the state of gas or liquid, and that it takes place much more rapidly in the latter case. When the tension of the vapor becomes diminished to a certain minimum value, varying for each temperature, the transformation ceases; this *tension of transformation* is established only after some time. Liquid phosphorus at 280° C., for instance, becomes wholly transformed into red phosphorus. The vapor given off at 260° C. is stable, but that formed at higher temperatures becomes slowly and partially converted into red phosphorus, the production of which ceases when the tension attains a given minimum; the rapidity with which this change takes place is greater the higher the temperature. At temperatures up to 520° C., however, the maximum tensions of phosphorus vapor are much higher than the tensions of transformation; thus, at 360° C. the tension of transformation is ·6 atmosphere, but to prevent phosphorus boiling at this temperature, a pressure of 3·2 atmospheres must be exerted. Above 520° C. the maximum tension is not established on account of

the rapidity with which the transformation takes place; and at temperatures above 550° C. the tension observed is no greater than the tension of transformation, because the transformation of the liquid phosphorus takes place more rapidly than its evaporation. The observed maximum tension and tension of transformation at different temperatures are given in the following table:—

Temperature.	Maximum tension.	Tension of transformation.
360°	3·2 atmospheres	0·6 atmospheres
440°	7·5 "	1·75 "
487°	...	6·8 "
494°	18·0 "	
503°	21·9 "	
510°	...	10·8 "
511°	26·2 "	
531°	...	16·0 "
550°	...	31·0 "
577°	...	56·0 "

The red phosphorus produced by heating ordinary phosphorus in closed vessels differs, however, in appearance according to the temperature at which it is prepared. That obtained at 265° C. has a bright red color and glassy fracture; that produced at 440° C. is orange-yellow in color, and exhibits a dull fracture; at 500° C. it is denser, and has a violet gray color; and, lastly, that prepared at 580° C. has a conchoidal fracture, exhibits signs of commencing fusion, and often encloses ruby red crystals. These modifications differ also in specific gravity, and when oxidized to phosphoric acid by iodic acid solution they develop different amounts of heat. Thus—

Temperature of formation.	Sp. gr. at 0° C.	Heat of oxidation per gramme.
265°	2·148	5592 units.
360°	2·19	5570 "
500°	2·293	above 5272 "
580° (fused)	?	5222 "
580° (crystalline)	2·34	5272 "

Hydrogen, except in the nascent state, appears to be without action on phosphorus. Oxygen forms the two oxides P_2O_3 and P_2O_5. Chlorine, bromine, and iodine enter directly into reaction with ordinary phosphorus, the combination being attended with inflammation; red phosphorus also enters into reaction with these elements at ordinary temperatures, and heat is developed, although to a much less extent. When sulphur and ordinary phosphorus are melted together, combination takes place with great violence, and the experiment of bringing the two bodies together is attended with much danger. If dissolved in carbon disulphide, they are without action upon each other. Red phosphorus readily enters into reaction with sulphur when a mixture of the two substances is gently warmed, and although much heat is developed by their combination, the reaction is not explosively violent. Selenium also unites with phosphorus when the two are heated together nearly to the boiling point of the latter. Most metals combine with phosphorus when they are heated in its vapor, or when it is thrown upon them whilst they are in a state of ignition.

Compounds of Phosphorus with Hydrogen.

Three of these compounds are known, viz., phosphine or phosphoretted hydrogen gas, PH_3, and a liquid and a solid hydrogen phosphide.

Phosphine is obtained in a pure state by decomposing phosphonium iodide by a solution of potassium or sodium hydroxide: $PH_4I + KHO = PH_3 + KI + H_2O$. It is a colorless gas, possessing a most intolerable garlic-like odor; it is sparingly soluble in water, the solution being neutral to test paper. Phosphine is extremely inflammable, igniting at a temperature a little above 100° C.; contact with a drop of fuming nitric acid, or with chlorine or bromine, also causes it to inflame. A mixture of the gas with oxygen standing over water is gradually absorbed, and phosphorous acid produced. It is a powerful reducing agent, withdrawing oxygen with great readiness from bodies like nitric oxide, sulphur dioxide, and sulphuric acid. It precipitates many metallic salts, the precipitate in most cases consisting either of metallic phosphide, as in the case of copper, or of reduced metal, as in the case of gold and silver. It combines with hydriodic acid, forming phosphonium iodide, PH_4I, and with hydrobromic acid, forming phosphonium bromide, PH_4Br, but not with hydrochloric acid or other acids; these salts are crystalline bodies, which are decomposed by water into phosphine and hydriodic or hydrobromic acid.

Phosphine mixed with more or less hydrogen is obtained by the action of water on the calcium phosphide, prepared by heating phosphorus with lime; by heating phosphorus with a solution of an alkaline hydroxide—

$$\underset{\text{Calcium hydroxide.}}{3Ca(OH)_2} + 8P + 6OH_2 = 2PH_3 + \underset{\text{Calcium hypophosphite.}}{3Ca(PH_2O_2)_2};$$

and when phosphorous, or hypophosphorous, acid is heated—

$$\underset{\text{Hypophosphorous acid.}}{2H_3PO_2} = PH_3 + \underset{\text{Phosphoric acid.}}{H_3PO_4}.$$

$$\underset{\text{Phosphorous acid.}}{4H_3PO_3} = PH_3 + \underset{\text{Phosphoric acid.}}{3H_3PO_4}.$$

The gas obtained by the first and second methods is spontaneously inflammable, owing to the presence of liquid hydrogen phosphide, which may be separated by passing the gas through a U-tube cooled by a mixture of ice and salt. Liquid hydrogen phosphide probably has the composition P_2H_4; by contact with various substances, and especially by hydrochloric acid, and by exposure to light, it is converted into phosphine and a yellowish solid hydrogen phosphide, supposed to have the composition P_2H or P_4H_2—

$$5P_2H_4 = 6PH_3 + P_4H_2.$$

Compounds of Phosphorus with the Halogens.

A gaseous phosphorus pentafluoride may be obtained by the action of phosphorus pentachloride on arsenic trifluoride: $5AsF_3 + 3PCl_5 = 3PF_5 + 5AsCl_3$. It is not decomposed by the passage of electric sparks, even when mixed with oxygen or hydrogen. Two chlorides of phosphorus are produced by the action of chlorine on phosphorus,—a liquid trichloride, PCl_3, and a solid pentachloride, PCl_5. Bromine in like manner forms a liquid tribromide, PBr_3, and a solid pentabromide, PBr_5. Bromine also combines with phosphorus trichloride, forming the chlorobromide PCl_3Br_2, and this compound is capable of combining with further quantities of bromine, forming the compounds $PCl_3Br_2 . Br_2$ and $PCl_3Br_2 . 3Br_2$; all these chlorobromides of phosphorus are crystalline bodies. Iodine forms the two iodides PI_3 and P_2I_4, which are both crystalline.

Phosphorus trichloride boils at 76° C., and the tribromide is also volatile without decomposition, but the remaining chlorine and bromine compounds of phosphorus are decomposed by heat into the trihaloid compounds and halogen: $PCl_5 = PCl_3 + Cl_2$. The iodides are also decomposed by heat, apparently into iodine and amorphous phosphorus.

The haloid compounds of phosphorus are all readily decomposed by water. The pentachloride and pentabromide are first converted into the oxychloride and oxybromide, two of the atoms of halogen being displaced by a single atom of oxygen—

$$PCl_5 + H_2O = POCl_3 + 2HCl,$$

and by the continued action of water these compounds are converted into phosphoric acid; thus—

$$POBr_3 + 3H_2O = PO_4H_3 + 3HBr.$$

The behavior of the trihaloid compounds of phosphorus is analogous to that of the oxychloride and oxybromide, phosphorous acid being produced—

$$PI_3 + 3H_2O = PO_3H_3 + 3HI.$$

The compounds containing more than five atoms of halogen behave as mixtures of the pentahaloid compounds with halogens—that is to say, they furnish the products of the decomposition by water of the pentahaloid compound, and also the free halogen. The iodide of phosphorus, P_2I_4, is peculiar in its behavior with water; it is stated that when it is decomposed by a small quantity of water only phosphorous and hypophosphorous acids are formed—

$$P_2I_4 + 5H_2O = H_3PO_3 + H_3PO_2 + 4HI;$$

but that when a large quantity of water is employed, a yellow insoluble substance of the composition P_5H_3O is produced, the reaction taking place in the manner represented by the equation—

$$6P_2I_4 + 24H_2O = P_5H_3O + \underset{\text{Hypophosphorous acid.}}{PO_2H_3} + \underset{\text{Phosphorous acid.}}{3PO_3H_3} + \underset{\text{Phosphoric acid.}}{3PO_4H_3} + 24HI.$$

Oxides of Phosphorus.

The combustion of phosphorus in air produces both phosphorous and phosphoric anhydrides, P_2O_3 and P_2O_5; the latter may be readily obtained by burning phosphorus in an excess of dry air, but it is almost impossible to obtain the former free from the latter. The best mode of preparing the trioxide is to burn phosphorus in a very slow current of dry air; it then condenses as a bulky white amorphous sublimate.

Phosphorous anhydride is readily soluble; it absorbs moisture with avidity, and dissolves in water, producing phosphorous acid: $P_2O_3 + 3H_2O = 2H_3PO_3$.

Phosphoric anhydride is a snow-white, flocculent, amorphous substance. It sublimes below a red heat. It has an attraction for water which probably is only exceeded by that of sulphuric anhydride, deliquescing quickly in moist air, and dissolving in water with a hissing noise and great development of heat; the solution contains metaphosphoric acid: $P_2O_5 + H_2O = 2HPO_3$; but this acid gradually combines with a further quantity of water, forming phosphoric acid: $HPO_3 + H_2O = H_3PO_4$. By virtue of its affinity to water, phosphoric anhydride causes the separation of the elements of water from many compounds; sulphuric acid, for example, when heated with phosphoric anhydride, is converted into sulphuric anhydride—

$$\underset{\text{Sulphuric acid.}}{H_2SO_4} + \underset{\substack{\text{Phosphoric}\\\text{anhydride.}}}{P_2O_5} = \underset{\substack{\text{Sulphuric}\\\text{anhydride.}}}{SO_3} + \underset{\substack{\text{Metaphosphoric}\\\text{acid.}}}{2HPO_3}.$$

Oxyacids of Phosphorus.

The following oxyacids of phosphorus are known:—

Hypophosphorous acid	HPH_2O_2
Phosphorous acid	H_2PHO_3
Phosphoric acid	H_3PO_4
Metaphosphoric acid	HPO_3
Pyrophosphoric acid	$H_4P_2O_7$

Hypophosphorous acid, HPH_2O_2.—To prepare this acid a solution of barium hypophosphite is treated with exactly sufficient sulphuric acid to precipitate the barium, and concentrated until its boiling point rises to 130° C.; on the liquid cooling, a mass of crystals of the acid is obtained. The solution of the barium salt is obtained by warming (not boiling) phosphorus with an excess of a solution of barium hydroxide, and afterwards removing the excess of hydroxide by passing carbon dioxide through the liquid:—

$$3Ba(OH)_2 + 8P + 6OH_2 = 3Ba(PH_2O_2)_2 + 2PH_3.$$

Hypophosphorous acid melts at 17° C.; it is perfectly stable at ordinary temperatures, but its solution is slowly oxidized to phosphorous and phosphoric acids when exposed to the air. It is a powerful reducing agent, precipitating silver and gold from solutions of their respective salts, and when heated to about 60° C. with a solution of copper sulphate it forms a precipitate of copper hydride, Cu_2H_2. When zinc is dissolved in the acid, the hydrogen produced reduces a portion of the acid to phosphine, which is given off as gas.

Hypophosphorous acid is a monobasic acid. Its salts are crystallizable and soluble in water. They are permanent when dry, but their solutions are gradually oxidized on exposure to the air, especially if heated. When boiled with alkaline hydroxides they are decomposed into phosphate and hydrogen, thus—

$$KPH_2O_2 + 2KHO = K_3PO_4 + 2H_2.$$

The dry salts are decomposed by heat, and in most cases furnish a residue of pyrophosphate and metaphosphate, phosphine and hydrogen being evolved, and sometimes water produced; the proportions in which these products are formed is not constant, and depends on the nature of the salt, thus—

$$5NaPH_2O_2 = Na_4P_2O_7 + NaPO_3 + 2PH_3 + 2H_2$$
$$7Sr(PH_2O_2)_2 = 3Sr_2P_2O_7 + Sr(PO_3)_2 + 6PH_3 + 4H_2 + H_2O$$
$$13Ba(PH_2O_2)_2 = 6Ba_2P_2O_7 + Ba(PO_3)_2 + 12PH_3 + 4H_2 + 4H_2O$$

The behavior of the nickel and cobalt, and uranyl salts is peculiar, a phosphide being also formed—

$$6Co(PH_2O_2)_2 = 4Co(PO_3)_2 + 2CoP + 2PH_3 + 9H_2$$
$$9(UO_2)(PH_2O_2)_2 = 6UP_2O_7 + U(PO_3)_4 + 2UP + 18H_2$$

Phosphorous Acid, H_2PHO_3.—This acid is most readily prepared by decomposing phosphorus trichloride with water. By concentrating the solution by boiling until the temperature rises to 180° C., and then cooling, it is obtained in the crystalline state. The crystals melt at 70° C. Like hypophosphorous acid, it is resolved into phosphine and phosphoric acid when heated. Its solution is oxidized on exposure to the air. It is a powerful reducing agent, precipitating silver, gold, and mercury from their salts, but it does not form copper hydride with copper sulphate. Iron and zinc dissolve in a solution of phosphorous acid with evolution of phosphine, a portion of the acid being reduced by the hydrogen resulting from the conversion of another portion into the metallic salt.

Phosphorous acid is a dibasic acid, the salts produced on neutralizing its solution with alkaline hydroxide being formed by the displacement of at most two atoms of hydrogen by metals; thermochemical investigation also indicates that it is a dibasic acid. It is possible, however, to displace a third atom of hydrogen by metals, and to produce such a compound as Na_3PO_3, for example, but this cannot exist in presence of water. Many of the phosphites apparently must be regarded not as derived from the acid H_2PHO_3, but as derivatives of a distinct acid of the composition $H_4P_2H_4O_7$, or $2H_2PHO_3 + H_2O$; barium phosphite dried at 200°–250° C., for instance, has the composition $Ba_2P_2H_4O_7$.

The phosphites are much more stable than the hypophosphites, but are all decomposed by heat. Salts, such as the barium salt $Ba_2P_2H_4O_7$, furnish hydrogen and pyrophosphate on ignition—

$$Ba_2P_2H_4O_7 = 2H_2 + Ba_2P_2O_7;$$

but the normal phosphites, such as zinc phosphite $ZnPHO_3$, furnish hydrogen, a pyrophosphate, and a phosphide—

$$14ZnPHO_3 = 7H_2 + 6Zn_2P_2O_7 + Zn_2P_2.$$

Phosphoric Acid, H_3PO_4.—This acid may be produced by oxidizing phosphorus with nitric acid, by the oxidation of hypophosphorous and phosphorous acids, by the action of water on phosphoric anhydride and on phosphorus pentachloride, and by decomposing its salts with acids,—tricalcium phosphate or bone earth, for example, with sulphuric acid.

It may be obtained in crystals by concentrating an aqueous solution by boiling until the temperature rises to 215° C., and when the liquid is cold adding a few crystals, which cause it to solidify.

The crystals melt at about 38° C. They are readily soluble in water, and furnish a strongly acid solution, which at a boiling heat decomposes the salts of most volatile acids.

Phosphoric acid is a tribasic acid, and furnishes three classes of salts, of which the three sodium salts

$$\underset{\substack{\text{Sodium dihydrogen}\\\text{phosphate.}}}{NaH_2PO_4}, \quad \underset{\substack{\text{Disodium hydrogen}\\\text{phosphate.}}}{Na_2HPO_4}, \quad \underset{\text{Trisodium phosphate.}}{Na_3PO_4}$$

may serve as examples. It has a great tendency, however, to furnish dimetallic salts, such as Na_2HPO_4, which are always produced when a solution of phosphoric acid is neutralized with a metallic carbonate (see p. 423).

Metaphosphoric Acid, HPO_3.—This acid is the product of the action of water on phosphoric anhydride, and is also obtained by heating phosphoric acid to redness, and by decomposing the metaphosphates with another acid.

Metaphosphoric acid in the solid state, as obtained by evaporating its solution and heating the residue to redness, is a colorless, glassy, uncrystallizable mass, which dissolves slowly though somewhat abundantly in water, forming a strongly acid liquid; but the solution is very unstable, and is converted gradually at ordinary temperatures, and rapidly on heating, into phosphoric acid. Metaphosphoric acid is an extremely stable body; it volatilizes completely at a bright red heat, and apparently is only in part decomposed into water and phosphoric anhydride.

The metaphosphates, or salts of metaphosphoric acid, which may be produced by heating the monometallic salts of phosphoric acid, for example—

$$\underset{\text{Sodium phosphate.}}{NaH_2PO_4} = \underset{\text{Sodium metaphosphate.}}{NaPO_3} + H_2O,$$

and in various other ways, are remarkable for exhibiting very different properties according to the manner in which they are prepared. Thus, ordinary sodium metaphosphate, obtained by igniting sodium phosphate and sudden cooling,

forms a vitreous mass, the aqueous solution of which gives gelatinous precipitates with the salts of the heavy metals. But when a considerable quantity of ordinary fused sodium metaphosphate is allowed to cool very slowly, a crystalline mass results, and on digesting this in a slight excess of warm water the liquid separates into two layers, one containing a crystalline sodium metaphosphate, and the other the ordinary vitreous salt. By heating copper oxide and a slight excess of phosphoric acid together to 350° C., a crystalline powder is formed, insoluble in water; and by treating this copper salt with sodium sulphide another crystalline sodium metaphosphate is produced. If oxide of lead be employed, and the resulting lead salt decomposed with sodium sulphide, a sodium metaphosphate is obtained which forms with water a gummy mass, which will not pass through a filter. Lastly a fifth variety of metaphosphates, remarkable for their insolubility in water, are formed by adding phosphoric acid in excess to solutions of sulphates or nitrates, evaporating to dryness, and heating the residue to 316° C. or upwards. They are crystalline powders.

These different metaphosphates are generally regarded as polymeric compounds, that is to say, as compounds having different molecular weights although of the same empirical composition; and the attempt has been made to infer their formulæ from the relative number of atoms of the two metals contained in the mixed salts derived from them. Thus, the sodium in ordinary sodium metaphosphate may be partially displaced by another metal, and a mixed salt produced containing the two metals in the ratio of 5 atoms of the one monad metal to 1 atom of the other; hence it is concluded that ordinary sodium metaphosphate is a hexametaphosphate, $Na_6P_6O_{18}$. The mixed salts derived from the second variety of sodium metaphosphate above described contain the two metals in the ratio of 2 atoms of the one monad metal to 1 atom of another, and are therefore regarded as trimetaphosphates, the sodium salt being represented by the formula $Na_3P_3O_9$. The mixed salts formed from the third and fourth varieties contain equal numbers of atoms of the two metals, and it is therefore supposed that they are respectively di- and tetra-metaphosphates, and that their sodium salts, for example, have the composition $Na_2P_2O_6$ and $Na_4P_4O_{12}$. The insoluble crystalline metaphosphates are regarded as monometaphosphates.

Pyrophosphoric acid, $H_4P_2O_7$.—The normal salts of this acid, which is tetrabasic, may be produced by igniting the dimetallic phosphates; for example—

$$2Na_2HPO_4 = Na_4P_2O_7 + H_2O.$$

A solution of the acid may be prepared by decomposing lead pyrophosphate suspended in water by hydrogen sulphide. Apparently the acid has not yet been obtained in a pure state.

Pyrophosphoric acid is converted into metaphosphoric acid when heated to redness, and into phosphoric acid when boiled with water; the latter change, it is stated, takes place also at ordinary temperatures, but very slowly. A solution of pyrophosphoric acid does not precipitate albumen or silver nitrate, but after neutralization it gives a white precipitate with the latter. Metaphosphoric acid coagulates albumen, and gives a white precipitate with silver nitrate; and phosphoric acid does not coagulate albumen, and when neutralized gives a yellow precipitate with silver nitrate.

In addition to the normal pyrophosphates, acid salts may be obtained, formed by the displacement of only one, two, or three of the four atoms of hydrogen in the acid by metals. By fusing together sodium pyrophosphate and sodium metaphosphate the salts $Na_6P_4O_{13}$ and $Na_{12}P_{10}O_{31}$ have been obtained; these salts may be regarded as formed from acids derived respectively from four and ten molecules of phosphoric acid by the abstraction of the elements of three and nine molecules of water in the same way that pyrophosphoric acid is derived from two molecules of phosphoric acid, by the abstraction of the elements of a single molecule of water—

$$2H_3PO_4 - H_2O = H_4P_2O_7$$
$$4H_3PO_4 - 3H_2O = H_6P_4O_{13}$$
$$10H_3PO_4 - 9H_2O = H_{12}P_{10}O_{31}$$

These acids are terms in a series, of which pyrophosphoric acid is the first member, formed by the withdrawal of the elements of $n-1$ molecules of water from n molecules of phosphoric acid.

Very little attention has been paid as yet to the thermochemical investigation of the phosphorus compounds. The results obtained by Andrews and by Thomsen are collected in the following table; the numbers all refer to phosphorus in its ordinary state:—

Reaction.	Units of heat evolved or absorbed.	Remarks.
(P, Cl_5)	75,000	Andrews.
(P_2, O_5)	362,800	Abria.
	367,800	Andrews.
(PO_4H_3, Aq).....	2,690	Heat of solution of the crystalline acids.
(PO_3H_3, Aq).....	−130	
(PO_2H_3, Aq).....	−170	
(P, O_4, H_3)	5,210	Heat of solution of the fused acids at the same temperature. The difference between the heat of solution of the fused and crystalline acids is the heat of fusion.
(P, O_3, H_3)	2,940	
(P, O_2, H_3)	2,140	
(P, O_4, H_3)	302,600	Formation of the crystalline acids from their elements.
(P, O_3, H_3)	227,700	
(P, O_2, H_3)	139,970	
(P, O_4, H_3)	300,080	Formation of the fused acids from their elements.
(P, O_3, H_3)	224,630	
(P, O_2, H_3)	137,660	
(P, O_4, H_3, Aq).	305,290	Formation of the acids in aqueous solution from their elements.
(P, O_3, H_3, Aq).	227,570	
(P, O_2, H_3, Aq).	139,800	
(P_2, O_5, Aq)	405,400	Formation of the acids from phosphorus, oxygen, and water.
(P_2, O_3, Aq)	250,060	
(P_2, O, Aq)	74,520	

Sulphides and Sulpho-Acids of Phosphorus.

The compounds P_4S_3, P_2S_3, and P_2S_5 are readily produced by carefully heating together sulphur and red amorphous phosphorus in the required proportions. It is stated that the lower sulphides P_4S and P_2S may also be obtained by melting together ordinary phosphorus and sulphur under hot water in the proportions indicated by these formulæ, and that both are liquid compounds. The sulphides P_4S_3, P_2S_3, and P_2S_5 may be crystallized from their solutions in carbon disulphide; they all exhibit acid properties, dissolving readily in solutions of the metallic sulphides, forming salts of sulpho-acids of phosphorus, which have been little studied, however, on account of their instability. They also dissolve in solutions of the alkaline hydroxides and carbonates, forming salts of oxysulpho-acids of phosphorus; but these are also very unstable bodies, and readily decompose in contact with water. The sulphides of phosphorus are readily decomposed by water alone, their sulphur being displaced by oxygen and corresponding oxy-acids of phosphorus produced, the sulphur being separated as hydrogen sulphide; thus—

$$P_2S_3 + 6H_2O = 3H_2S + 2H_3PO_3.$$

By heating amorphous phosphorus with selenium in various proportions, the selenides P_4Se, P_2Se, P_2Se_3, and P_2Se_5 are produced. They resemble the corresponding sulphides, and also exhibit acid characters, combining with metallic selenides to form salts of seleniophosphoric acids, which are even less stable than the corresponding sulpho-salts.

Oxy- and Sulpho-Haloid Compounds of Phosphorus.

We have already pointed out that phosphorus pentachloride and bromide are converted by water into phosphorus oxychloride, $POCl_3$, and phosphorus oxybromide, $POBr_3$. Phosphorus oxychloride may also be obtained by the direct combination of phosphorus trichloride with oxygen, being produced on passing oxygen through the boiling trichloride; it is a colorless mobile liquid at ordinary temperatures, but solidifies on cooling to a mass of crystals, which melt at 2° C.; it boils at 110° C. The oxybromide is a similar compound; its crystals melt at 46° C., and it boils at 195° C.

The oxides of phosphorus do not combine with the halogens, but by the action of nitric peroxide on phosphorus trichloride an oxychloride of phosphorus is formed, which bears the same relation to pyrophosphoric acid that phos-

phorus oxychloride or phosphoric chloride bears to phosphoric acid—

$$4PCl_3 + 3N_2O_4 = 2P_2O_3Cl_4 + 2NO + 4NOCl.$$

Pyrophosphoric chloride, as this compound may be termed, is a colorless liquid, which boils between 210° and 215° C., but decomposes partially into phosphoric chloride and phosphoric anhydride: $3P_2O_3Cl_4 = 4POCl_3 + P_2O_5$. It is immediately decomposed by water, producing hydrochloric and phosphoric acids.

Phosphorus sulphochloride or sulphophosphoric chloride, $PSCl_3$, and sulphophosphoric bromide, $PSBr_3$, are obtained on heating phosphorus trichloride and tribromide with sulphur, and by the action of hydrogen sulphide on the pentachloride and pentabromide of phosphorus: $PCl_5 + H_2S = PSCl_3 + 2HCl$. The sulphochloride is an oily liquid, having an intensely pungent odor, and boils at 126° C. The sulphobromide crystallizes; it is partially decomposed on distillation into sulphur and the compound $PSBr_3$, PBr_3. They are only slowly decomposed by water, the sulphobromide even forming a crystalline hydrate with water, $PSBr_3$, H_2O; the decomposition of the sulphochloride is represented by the following equations—

$$PSCl_3 + H_2O = POCl_3 + H_2S$$
$$POCl_3 + 3H_2O = PO_4H_3 + 3HCl.$$

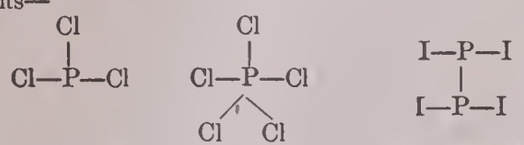
The sulphobromide apparently is first converted into monosulphophosphoric acid: $PSBr_3 + 3H_2O = PSO_3H_3 + 3HBr$, which is then resolved partly into sulphur and phosphorous acid, and partly, by the action of the water, into phosphoric acid and hydrogen sulphide. Phosphorus sulphochloride behaves in a similar manner when heated with a solution of sodium hydroxide; thus—

$$PSCl_3 + 6NaOH = PSO_3Na_3 + 3NaCl + 3H_2O.$$

A sulphopyrophosphoric bromide, $P_2S_3Br_4$, corresponding to pyrophosphoric chloride, is formed by directly combining bromine with the sulphide P_2S_3. It is an oily liquid, which cannot be distilled, being resolved by heat into phosphorus pentasulphide and phosphoric bromide: $3P_2S_3Br_4 = P_2S_5 + 4PSBr_3$.

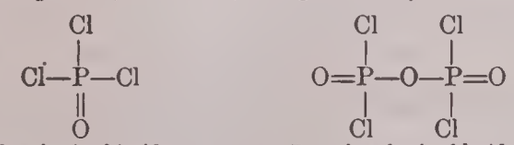
Constitution of the Phosphorus Compounds.

The formulæ of the two chlorides and of the tetriodide of phosphorus may be given in illustration of the constitution of the compounds of phosphorus with monad elements—



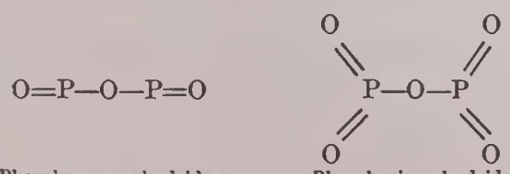
Phosphorus trichloride. Phosphorus pentachloride. Phosphorus tetriodide.

The two oxychlorides of phosphorus are represented by the following formulæ, the corresponding bromine and sulphur compounds, of course, being similarly constituted:—



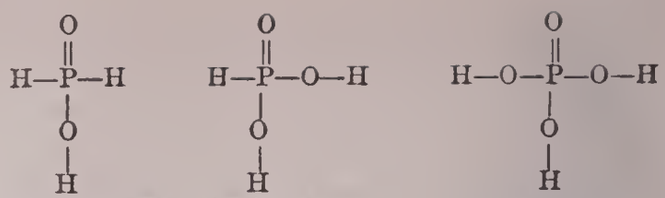
Phosphoric chloride. Pyrophosphoric chloride.

The constitution of the oxides is expressed by the formulæ—



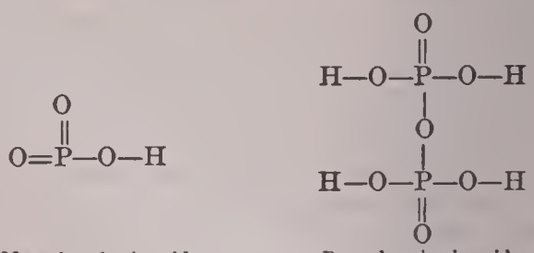
Phosphorous anhydride. Phosphoric anhydride.

Similar formulæ are assigned to the corresponding sulphides. Hypophosphorous, phosphorous, and phosphoric acids may be regarded as derived from the compound POH_3, or phosphine oxide, by the displacement of one, two, and three atoms of hydrogen by the monad radicle OH; although this compound is not known at present, analogous bodies are readily obtained on oxidizing the substituted phosphines formed by displacing the hydrogen in phosphine by positive monad compound radicles, such as methyl, CH_3—



Hypophosphorous acid. Phosphorous acid. Phosphoric acid.

The relation of meta- and pyrophosphoric acid to phosphoric acid will be evident from the following formulæ—



Metaphosphoric acid. Pyrophosphoric acid.

Boron.

Symbol, B; At. wt., 11; Valency, '''.

This element always occurs in the combined state as boric acid, or as a salt of boric acid. Two modifications of boron may be obtained, viz., an amorphous and a crystalline modification; the former is produced by reducing boric anhydride, B_2O_3, by heating it with sodium, and the latter is formed when the reduction is effected by the aid of aluminium at a very high temperature.

Amorphous boron is a dark-brown powder; it does not oxidize in the air at ordinary temperatures, but when heated it burns in air or oxygen, in the latter with dazzling brightness, forming the oxide B_2O_3. By ignition in an atmosphere of nitrogen it is converted into a white amorphous boron nitride BN. It does not decompose water, even at the boiling heat, but readily dissolves in nitric acid, producing boric acid; when heated with potassium hydroxide it forms a potassium borate, hydrogen being evolved.

On heating amorphous boron with aluminium it is dissolved, and crystallizes from the fused metal on cooling. it may be separated from the latter by the aid of hydrochloric acid. The crystals are usually of a more or less brown color, but in lustre, refracting power, and hardness they are nearly equal to the diamond. Crystalline boron is only slightly oxidized at the temperature at which diamond burns.

Boron forms a trichloride, BCl_3, a tribromide, BBr_3, and a trifluoride, BF_3. The chloride may be obtained by the direct action of chlorine on amorphous boron, the combination taking place at ordinary temperatures; it is also produced by strongly heating a mixture of boric anhydride and charcoal in an atmosphere of chlorine, and by heating boric anhydride with phosphorus pentachloride to 150° C. The bromide may be obtained in a similar manner by the direct combination of its elements. Both are colorless, mobile liquids; the chloride boils at 17° C., and the bromide at 90° C. They are readily decomposed by water; thus—

$$\underset{\text{Boron chloride.}}{BCl_3} + 3H_2O = \underset{\text{Boric acid.}}{H_3BO_3} + 3HCl.$$

Boron chloride is not easily deprived of its chlorine by the action of metals, which is apparently accounted for by the fact that much heat is evolved in its formation from its elements. According to Troost and Hautefeuille, the amounts of heat disengaged in the formation of the chloride and oxide of boron from their elements, and in the decomposition of the former by a large excess of water, are as follows—

(B, Cl_3)	= 104,000	units of heat.
(B_2, O_3)	= 317,200	" "
(BCl_3, Aq)	= 79,200	" "

Boron fluoride is formed by the action of hydrofluoric acid on boric anhydride, viz., by heating a mixture of boric anhydride and calcium fluoride with concentrated sulphuric acid. It is a colorless gas, of pungent, suffocating odor; when passed into water, which dissolves about 700 times its volume of the gas, it is partly decomposed into boric and hydrofluoric acids, and partly combines with the hydrofluoric acid thus produced, forming fluoboric

acid, HBF_4. This acid can only be obtained in a state of dilute solution, but many salts formed from it are known, such as potassium borofluoride, KBF_4, for example. Its existence appears to indicate that boron is capable of acting as a pentad element.

Boron oxide, B_2O_3, is most readily obtained by strongly heating boric acid; it forms a colorless, brittle, glassy mass, which dissolves readily in water, producing boric acid, and is one of most stable oxides known. It unites with metallic oxides, when fused with them, forming borates, and at high temperatures it is capable of decomposing carbonates, sulphates, and indeed the salts of all acids the anhydrides of which are more volatile than itself.

Boric acid, H_3BO_3 or $B(OH)_3$, occurs native in many volcanic districts, especially in Tuscany, where it issues from the earth together with vapor of water; borax, $Na_2B_4O_7+10H_2O$, and a few other of its salts are also found in nature. It crystallizes from water in white nacreous laminæ, which are easily soluble; when heated to about 100° C., it furnishes a residue of the composition $H_6B_4O_9$, which, on heating to 160° C., becomes $H_2B_4O_7$, and at a stronger heat it is converted into the anhydride, B_2O_3. A large number of borates are known, but the nature of their relation to boric acid is not well understood. A comparatively small number are derived from the acid H_3BO_3, the majority apparently being formed from an acid of the empirical composition HBO_2, to which the name metaboric acid is given. Salts derived from the acids $H_6B_4O_9$ and $H_2B_4O_7$ are also known, and ordinary borax, the most important of the borates, may be regarded as formed from the latter acid.

Carbon.

Symbol, C; At. wt., 11·97; Valency, ^{IV}.

The properties of carbon itself and its oxides have already been described (p. 77), and need not therefore be again discussed.

On comparing the compounds of carbon with those of other elements we find that, whereas there is reason to believe that the number of atoms of any of the other elements directly associated together in a molecule of their compounds is very small, probably never exceeding five, carbon compounds frequently contain a relatively very large number of carbon atoms, which from the behavior of the compounds we are led to suppose are in direct association with each other; and while none of the remaining elements are known to furnish more than a single *stable* compound with hydrogen, the number of stable compounds of carbon with hydrogen which have been obtained may be counted by hundreds. We are thus led to the conclusion that carbon possesses two distinctive properties:—firstly, that of uniting with itself to an almost unlimited extent in comparison with other elements; and secondly, that of combining with hydrogen in numerous proportions. It is in consequence capable of uniting with the same elements in a multiplicity of proportions, and of furnishing a great variety of compounds, which probably exceed in number those of all the remaining elements together.

The study of the compounds of carbon constitutes that branch of our science which is termed organic chemistry, which is treated separately below, pp. 471 *sqq.*;—the study of the remaining elements and of their compounds constituting inorganic or, as it is also termed, mineral chemistry. The division is both useful and necessary, on account of the great number of carbon compounds which exist, and because, generally speaking, the compounds of other elements are distinguished from those of carbon by their comparative simplicity, and also by the comparative want of stability which all but the simplest exhibit; this we may attribute to the possession by carbon of the distinctive properties above mentioned, but otherwise there is no essential difference between the compounds of carbon and those of the remaining elements.

Organic chemistry originally dealt only with substances more or less directly derived from the animal or vegetable kingdom, and it was long believed that the chemist was powerless to produce organic substances from their elements as they were formed in the animal or plant under the influence of life, it being supposed that, therefore, the interposition of a special force, termed the vital force, was requisite. The first step towards the disproval of this hypothesis was made by Wöhler, who in 1828 succeeded in artificially producing urea, the characteristic crystalline constituent of the urine; but its final overthrow was not accomplished until 1845, when Kolbe showed that it was possible to produce acetic acid from carbon by a comparatively very simple series of reactions. Berthelot's discovery in 1862 of the formation of acetylene, C_2H_2, from its elements, however, affords the simplest solution of the problem of the artificial production of organic substances from their elements, as acetylene may be without difficulty converted into ordinary alcohol, and from this body all the carbon compounds which have been artificially prepared may be more or less directly derived. Chemists have already succeeded in preparing a large number of substances which occur as products of animal or vegetable life,—for example, oxalic, tartaric, and salicylic acids; coumarin, the crystalline substance from which the Tonka bean derives its pleasant odor; and alizarin, the coloring matter derived from madder root. From the insight we have recently gained into their constitution, there is little doubt that eventually the synthesis of even the most complex organic bodies, such as albumen, will be possible.

Although carbon combines with hydrogen in a great variety of proportions, it furnishes only a very limited number of compounds with other elements; thus, only one sulphide of carbon, CS_2, and one nitride of carbon, C_2N_2, are known, and no well characterized compounds of carbon with the metals have been obtained. The compounds of carbon with the halogens are more numerous. The only compound that calls for consideration here is the sulphide; the others will be noticed in the section on Organic Chemistry.

Carbon disulphide, CS_2, the analogue of carbon dioxide, is obtained by passing sulphur vapor over charcoal heated to redness. It is a colorless, very mobile, highly refracting liquid of faint unpleasant odor, insoluble in water; it boils at 46° C. It is extremely inflammable, and its vapor when mixed with air is highly explosive; the products of its combustion are carbon dioxide and sulphur dioxide. The formation of carbon disulphide from its elements is attended with the absorption of no less than 22,000 units of heat, which explains how it is that it so readily inflames, and also the fact that it is necessary to apply heat continuously in preparing it; whereas the combustion of carbon in oxygen, when once it commences, proceeds spontaneously, owing to the large amount of heat developed in the process; we may suppose that the expenditure of energy is necessary because less heat is developed by the combination of the atoms of carbon and sulphur than is requisite to convert the carbon and sulphur from the state in which they ordinarily exist into that in which they exist in carbon disulphide, or, in other words, than is requisite to effect the separation from each other of the atoms of carbon and of sulphur in the carbon and sulphur molecules.

Carbon disulphide belongs to the class of acid sulphides or sulphur-anhydrides. It readily dissolves in solutions of alkaline hydroxides and of metallic sulphides, forming salts analogous to the metallic carbonates, and which may be regarded as derived from the carbonates by the partial or entire displacement of the oxygen in the latter by sulphur. The stability of these salts and of the correspond ing acids increases with the amount of sulphur; thus, sulphocarbonic acid, H_2CS_3, which is formed from the salt produced by combining carbon disulphide with metallic sulphides, may be obtained as a yellow oily liquid, whereas carbonic acid, H_2CO_3, can only exist in extremely dilute solution.

Carbon disulphide readily dissolves sulphur and phosphorus, and also oils and fatty matters; on this account it meets with many practical applications.

By gently heating a mixture of carbon disulphide and sulphuric anhydride, carbon oxysulphide is produced, one-half the sulphur in the former being displaced by oxygen: $CS_2+SO_3=COS+SO_2+S$; this compound may also be obtained by combining carbon monoxide with sulphur, by passing a mixture of the gas with sulphur vapor through a red hot tube. It is a colorless gas, possessing an odor like that of carbon disulphide; in properties, as in composition, it is intermediate between carbon dioxide and disulphide.

Silicon.

Symbol, Si; At. wt., 28; Valency, ^{IV}.

This element always occurs in combination either with oxygen alone as silicon dioxide or silica, or with oxygen

and metals as silicates,—constituting, in fact, in these forms of combination, the greater part of the earth's crust.

Silicon may be obtained from its chloride or fluoride by the action of metals such as potassium, sodium, or aluminium; like carbon it exists in three distinct modifications. *Amorphous silicon* produced by heating potassium silicofluoride, K_2SiF_6, with potassium, or the corresponding sodium salt with sodium, is a dull brown powder, heavier than water; it is not affected by nitric or sulphuric acid, but is readily dissolved by hydrofluoric acid, and by a warm aqueous solution of potassium hydroxide. It fuses at a temperature below that at which steel melts; and when heated in air or oxygen it burns brilliantly and is converted into silicon dioxide. When strongly heated in a platinum crucible it becomes much denser and darker in color, and much less oxidizable, being converted into *graphitoidal silicon*. On heating a mixture of aluminium with potassium silicofluoride to the melting point of silver, a metallic button is obtained, which, when treated successively with hydrochloric and hydrofluoric acids, yields graphitoidal silicon partly in isolated hexagonal tables. This modification has the specific gravity 2·49, and may be heated to whiteness in oxygen without burning; it is not attacked by any acid excepting a mixture of nitric and sulphuric acids, and is only slowly dissolved by a solution of potassium hydroxide.

When the vapor of silicon tetrachloride mixed with hydrogen is passed over fused aluminium, the chloride is reduced, and the silicon dissolves in the aluminium; after a time a point is reached at which the silicon separates from the fused metal in large beautiful needles, having a dark iron-grey color. These crystals constitute the *adamantine* variety of silicon.

Silicon appears to be capable of combining with hydrogen in the nascent state, as when a plate or wire of aluminium containing silicon is connected with the positive pole of a galvanic battery, and made to decompose a solution of sodium chloride, gas is evolved which spontaneously inflames. Silicon hydride mixed with much hydrogen is also obtained on decomposing with concentrated hydrochloric acid the magnesium silicide produced by heating a mixture of magnesium chloride, sodium silicofluoride, and sodium chloride with sodium. The pure gas is produced by the decomposition of triethylsiliconorthoformate in contact with sodium—

$$\underset{\text{Triethylsiliconorthoformate.}}{4SiH(OC_2H_5)_3} = \underset{\text{Silicon hydride.}}{SiH_4} + \underset{\text{Tetrethylorthosilicate.}}{3Si(OC_2H_5)_4}.$$

It is a colorless gas, not spontaneously inflammable under the ordinary temperature or pressure, but only when gently heated under reduced pressure, or when mixed with hydrogen. When heated by itself it is decomposed into amorphous silicon and free hydrogen. It is insoluble in water, and is not altered by dilute hydrochloric or sulphuric acid; potassium hydroxide, however, decomposes it readily—

$$\underset{\text{Silicon hydride.}}{SiH_4} + 2KOH + H_2O = \underset{\text{Potassium silicate.}}{K_2SiO_3} + 4H_2.$$

It precipitates silicide of copper from a solution of copper sulphate, and metallic silver mixed with a black substance, which is, perhaps, silver silicide, from a solution of silver nitrate.

By heating silicon in chlorine gas, or in an atmosphere of bromine, or iodine, it is converted into the compounds $SiCl_4$, $SiBr_4$, and SiI_4; the chloride and bromide are best prepared, however, by passing chlorine or bromine vapor over an intimate mixture of silica and charcoal heated to redness. Silicon tetrachloride and tetrabromide are colorless liquids, boiling at 50° C. and 153° C. respectively; the tetriodide crystallizes from its solution in carbon disulphide in colorless octahedra (which melt at 120·5° C.), and boils at about 290° C., distilling without alteration in a stream of carbon dioxide. They are quickly decomposed by water; thus—

$$SiCl_4 + 2H_2O = SiO_2 + 4HCl.$$

When silicon tetriodide is heated to near its boiling point with finely divided metallic silver it is converted into disilicon hexiodide, Si_2I_6; this crystallizes from carbon disulphide in colorless hexagonal prisms which are decomposed on fusion into the tetriodide and a body which is perhaps the subiodide, Si_2I_4. By the action of bromine, this compound is converted into the corresponding bromide, Si_2Br_6, and by gently heating it with mercuric chloride the chloride Si_2Cl_6 is obtained. The bromide forms crystals which distil without decomposition at about 240° C.; disilicon hexachloride is a colorless mobile liquid, which boils at 146°–148° C., the corresponding carbon chloride, C_2Cl_6, being a crystalline solid which boils at 330° C.; it is very slowly decomposed when heated in closed vessels to 350° C. into the tetrachloride and silicon, and is entirely converted into these substances at 800° C. A lower liquid chloride, which probably has the composition Si_2Cl_4, is obtained in small quantity together with the hexachloride when the vapor of the tetrachloride is passed over fused silicon heated to a very high temperature.

By passing the vapor of silicon tetrachloride through an exhausted porcelain tube containing fragments of felspar heated nearly to the fusing point of the latter, it is partially converted into the oxychloride $(SiCl_3)_2O$; this is a colorless liquid boiling at 136°–139° C., which is decomposed by water in the same manner as silicon tetrachloride. When the vapor of this compound mixed with oxygen is passed several times through a heated tube, silicon tetrachloride is reproduced, and a complex mixture of higher liquid oxychlorides is obtained containing the compounds $Si_4O_3Cl_{10}$ (b. p. 152°–154° C.), $Si_4O_4Cl_8$ (b. p. about 200° C.), $Si_8O_{10}Cl_{12}$ (b. p. about 300° C.), together with still higher oxychlorides.

By passing hydrochloric acid over crystallized silicon heated to barely visible redness, a mixture is produced of silicon tetrachloride with the compound $SiHCl_3$, which from its relation in composition to trichloromethane or chloroform, $CHCl_3$, is termed silicon-chloroform. The corresponding iodo-derivative, $SiHI_3$, is formed in a similar manner by the action of hydriodic acid gas mixed with hydrogen. Silicon chloroform is a colorless extremely mobile liquid, and boils at about 36° C.; it is converted by chlorine at ordinary temperatures into the tetrachloride, and when heated with bromine it furnishes silicon trichlorobromide, $SiCl_3Br$, which boils at 80° C. Silicon iodoform, $SiHI_3$, is a colorless, strongly refracting liquid; it boils at about 220° C.

When a mixture of silicon tetrachloride vapor and hydrogen sulphide gas is passed through a tube heated to redness, the compound $SiCl_3.SH$ is obtained; it is a colorless liquid, boiling at 96° C.

Hydrofluoric acid acts readily on silicon dioxide and silicious substances generally, forming silicon tetrafluoride: $SiO_2 + 4HF = SiF_4 + 2H_2O$. Silicon tetrafluoride is a colorless gas, which liquefies under very strong pressure, and solidifies at —140° C.; it is not inflammable. It is readily absorbed by water, which decomposes it into silica and hydrofluosilicic acid: $3SiF_4 + 2H_2O = 2H_2SiF_6 + SiO_2$. This acid is not known except in solution, but its salts, which are readily produced by neutralizing its solution with metallic oxides, hydroxides, or carbonates, are stable compounds, and are mostly soluble in water. By prolonged ignition they are decomposed into silicon fluoride which escapes, and a metallic fluoride which remains behind. Potassium fluosilicate, K_2SiF_6, is one of the least soluble of the potassium salts, and consequently this acid is often used to precipitate potassium from solutions of its salts.

By passing the tetrafluoride over silicon heated nearly to the softening point of porcelain, it is converted into a subfluoride, which probably has the composition Si_2F_6; it is a white, very light powder.

Only one oxide of silicon is known, viz., the dioxide or silica, SiO_2. According to Troost and Hautefeuille, its formation from amorphous silicon and oxygen is attended with the development of a very large amount of heat, viz.,—

$$(Si, O_2) = 219{,}240 \text{ units of heat.}$$

According to the same observers, in the formation of the tetrachloride from amorphous silicon and chlorine, and in its decomposition by 140 times its weight of water, the following amounts of heat are developed:—

$$(Si, Cl_4) = 157{,}640$$
$$(SiCl_4, Aq) = 81{,}640$$

and from the amount of heat developed on dissolving amorphous and crystallized (? adamantine) silicon in a mixture of nitric and hydrofluoric acids they calculate that the transformation of the former into the latter is attended with the development of 8120 units of heat.

When obtained by igniting the gelatinous silica from the decomposition of the haloid silicon compounds by water, or of the soluble silicates by acids, silica is a snow-white amorphous powder; but it occurs native as quartz in large transparent crystals of the hexagonal system, of the specific gravity 2·5 to 2·8, and of extreme hardness. Native silica of all kinds is insoluble in water and in all acids except hydrofluoric acid; this is also true of artificial ignited silica. The gelatinous hydrate which separates on the addition of acids to solutions of alkaline silicates is also almost insoluble in water and in acids, but that which results from the decomposition of silicon fluoride is stated to be soluble in a considerable quantity of water. Gelatinous silica dissolves without difficulty in solutions of potassium or sodium hydroxide at the ordinary temperature, and all forms of silica are more or less readily dissolved by solutions of these alkalies, especially when heated with them under pressure; in this manner, according to the proportions of silica and alkali employed, various alkaline silicates are formed which are the more soluble the greater the proportion of alkali metal they contain. Those which contain a larger proportion than is indicated by the formula Na_2SiO_3, but still a sufficient quantity to make them completely soluble in water, are termed "water-glasses;" water-glass is now largely manufactured and employed for hardening and preserving stone, in the preparation of paints, especially for mural painting, and in the manufacture of soap.

Although silica is an extremely weak acid oxide, on account of its non-volatility, it is capable of decomposing the salts of all volatile acids at more or less elevated temperatures, and the salts formed from it are stable at the highest temperatures. A great variety of artificial and natural silicates are known,—some of which may be regarded as derived from silicic acid, H_2SiO_3, and others from an acid which may be termed orthosilicic acid, H_4SiO_4, but the majority are far more complex, those which occur as natural minerals being formed by the association of silica with basic oxides in proportions included between the following limits:—

$$4M_2'O \text{ or } 4M''O : SiO_2 \text{ and } M_2'O \text{ or } M''O : 2SiO_2$$
$$2R_2O_3 : SiO_2 \text{ and } R_2O_3 : 6SiO_2.$$

On adding acids to a solution of an alkaline silicate, a gelatinous "hydrate of silica" is precipitated; the whole of the silica may be retained in solution, however, if a dilute solution of an alkaline silicate be poured into a considerable excess of hydrochloric acid, but may be precipitated by gradually neutralizing the acid. The retention of the silica in solution is, perhaps, due to the formation of a soluble chlorhydrin (p. 490). If a stratum $\frac{4}{10}$ of an inch in depth of the hydrochloric acid solution be placed in a "dialyzer" formed by stretching wetted parchment paper across a light hoop of wood or gutta-percha, and the dialyzer be floated in a vessel of water, the water in the outer vessel being changed at intervals, after four or five days the hydrochloric acid and the soluble chlorides are found to have diffused completely into the water; but the solution in the dialyzer still contains the silica, and a 5 per cent. solution prepared in this way may be concentrated by boiling down in an open flask until it contains nearly 14 per cent. of silica. The solution is tasteless, limpid, and colorless; it has an acid reaction rather greater than that of carbonic acid; for every 100 parts of silica present, however, only 2·13 parts of potassium hydroxide are requisite to neutralize the acid reaction. The solution is not easily preserved for many days, as it becomes converted into a solid transparent jelly; coagulation is retarded by hydrochloric acid, and by small quantities of potassium or sodium hydroxide, but is effected in a few minutes by the addition of $\frac{1}{1000}$ part of any alkaline carbonate, although ammonia and its salts are without effect. Sulphuric, nitric, and acetic acids are also without action, but a few bubbles of carbon dioxide gas slowly cause coagulation. The condition in which the silica is present in the solution having these very remarkable properties is not known, but on the assumption that a chlorhydrin is produced on decomposing the alkaline silicate by an excess of hydrochloric acid, it appears not improbable that, as the excess of the latter is removed by dialysis, the chlorhydrin is gradually decomposed by the water, and, perhaps, converted into the hydroxide H_2SiO_3 or some other soluble hydroxide, and that the subsequent coagulation may be due to the conversion of this hydroxide into an insoluble hydroxide of different molecular composition. The solution evaporated at 15° C. in a vacuum leaves the silica in the form of a transparent, glassy, very lustrous hydrate, containing after two days' exposure over sulphuric acid an amount of water which agrees very nearly with the formula H_2SiO_3.

When silicon chloroform is added to water at the ordinary temperature, hydrogen is evolved, and hydrated silica is produced: $SiHCl_3 + 2H_2O = H_2 + SiO_2 + 3HCl$; but if water at zero is employed, a precipitate is obtained which, after drying over sulphuric acid, and then at 150° C., has the composition $(HSiO)_2O$. This compound is analogous in composition to the unknown anhydride of formic acid: $(HCO)_2O = 2HCO(OH) - OH_2$; its formation is probably preceded by that of the hydroxide $SiH(OH)_3$. It is a snow-white, voluminous, amorphous substance, slightly soluble in water; it is decomposed by the least heat when in a moist state, with evolution of hydrogen, and is dissolved by ammonia, caustic alkalies, and alkaline carbonates, with evolution of hydrogen and production of an alkaline silicate. It is not acted upon by any acids except hydrofluoric acid, even concentrated nitric acid being without action. It decomposes when heated above 300° C.

Silicon hexachloride and hexiodide are decomposed by water in a similar manner, being first converted into the hydroxide $Si_2(OH)_6$, which then furnishes siliconoxalic acid, $Si_2O_2(OH)_2$. This is a white substance, and when heated is decomposed, like the preceding compound, with evolution of hydrogen, leaving a residue of silica; it is also decomposed with evolution of hydrogen by even the weakest bases. It rapidly reduces potassium permanganate in the cold, but is only slowly oxidized by chromic acid, and is without action on solutions of gold chloride or selenious acid. On decomposing the chloride, Si_2Cl_4, however, by water an hydrated oxide is obtained, which not only reduces potassium permanganate and chromic acid, but also gold chloride and selenious acid. The behavior of siliconoxalic acid on oxidation is precisely similar to that of its carbon analogue oxalic acid, $C_2O_2(OH)_2$, which, however, is a crystalline, strongly acid body, which dissolves readily in water, and furnishes stable salts.

By the action of anhydrous alcohol, silicon tetrachloride is converted into tetrethylorthosilicate, $Si(OC_2H_5)_4$, which is a colorless liquid boiling at 166° C.; it is gradually decomposed by water, being converted into alcohol and gelatinous silica. By the joint action of zinc ethyl and sodium on this compound, it is possible to displace in succession each of the groups (OC_2H_5) by ethyl, thus—

$$2Si(OC_2H_5)_4 + Zn(C_2H_5)_2 + 2Na$$
$$= 2Si(C_2H_5)(OC_2H_5)_3 + 2NaOC_2H_5 + Zn.$$

In this manner the following compounds have been prepared—

	Boiling Point
$Si(C_2H_5)(OC_2H_5)_3$	166° C.
$Si(C_2H_5)_2(OC_2H_5)_2$	159°
$Si(C_2H_5)_3(OC_2H_5)$	155°
$Si(C_2H_5)_4$	153°
$Si(C_2H_5)_3H$	107°

These compounds are all colorless liquids, insoluble in water, and stable in the air; the first only is decomposed when allowed to remain in contact with water. Silicon ethyl, $Si(C_2H_5)_4$, may also be obtained by the action of zinc ethyl on silicon tetrachloride; and from the latter compound and zinc methyl silicon methyl, $Si(CH_3)_4$, has been prepared; similarly, the hexiodide is converted into the corresponding ethyl derivative $Si_2(C_2H_5)_6$ by the action of zinc ethyl. These silicon hydrocarbons exhibit the closest resemblance to their analogues the paraffins. Thus by the action of bromine on silicon triethylhydride, $Si(C_2H_5)_3H$, the bromide $Si(C_2H_5)_3Br$ is produced, which may be converted by the action of aqueous ammonia into the silicon alcohol triethylsilicol, $Si(C_2H_5)_3.OH$; this method of formation is precisely analogous to that by which the hydrocarbon $C(CH_3)_3H$ is converted into the alcohol $C(CH_3)_3.OH$. Triethylsilicol also resembles the corresponding alcohol triethylcarbinol, $C(C_2H_5)_3.OH$, in properties; thus, both are colorless, viscid liquids, having a

strong camphor-like odor, difficultly soluble in water; the former boils at 154° C., the latter at 141° C.; they dissolve sodium with evolution of hydrogen, being converted into corresponding sodium derivatives $Si(C_2H_5)_3.ONa$ and $C(C_2H_5)_3.ONa$; and both are acted upon by acetic chloride in a similar manner—

$$Si(C_2H_5)_3.OH + C_2H_3OCl = Si(C_2H_5)_3Cl + C_2H_4O_2.$$
$$C(C_2H_5)_3.OH + C_2H_3OCl = C(C_2H_5)_3Cl + C_2H_4O_2.$$

The most important difference is in their behavior on oxidation,—triethylsilicol remaining unattacked, while triethylcarbinol is readily converted into acids containing fewer atoms of carbon.

Silicon ethyl is converted by the action of chlorine into a chlorinated derivative $Si(C_2H_5)_3(C_2H_4Cl)$, from which the silicon alcohol $SiC_8H_{19}.OH$ may be prepared, corresponding to the yet unknown carbon alcohol $C_9H_{19}.OH$. It is a liquid insoluble in water, smelling like camphor, and boiling at 190° C.

By heating the compound $Si(C_2H_5)(OC_2H_5)_3$ with hydriodic acid solution it is converted into siliconpropionic acid—

$$\underset{\text{Triethyl siliconortho-propionate.}}{C_2H_5.Si(OC_2H_5)_3} + 3HI = \underset{\text{Siliconpropionic acid.}}{C_2H_5.SiO(OH)} + 3C_2H_5I + H_2O.$$

In a similar manner, siliconacetic acid, $CH_3.SiO(OH)$, may be prepared from the corresponding methyl compound. But although these silicon acids correspond in composition to acetic acid, $CH_3.CO(OH)$, and propionic acid, $C_2H_5.CO(OH)$, they exhibit very different properties; thus, they are white amorphous substances, insoluble in water, although soluble in alkaline solutions, from which they are precipitated by the addition of acids, whereas acetic and propionic acids are colorless liquids, soluble in water, and boil respectively at 119° C. and 140° C.

When the vapor of carbon disulphide is passed over a heated mixture of silica and carbon, silicon disulphide, SiS_2, is produced; it crystallizes in white silky needles, which quickly decompose in moist air into hydrogen sulphide and amorphous silica.

From the foregoing description of the silicon compounds, it will be evident that while closely allied both in composition and in many of their properties to the carbon compounds, they nevertheless differ from them in numerous important particulars. Thus, carbon dioxide is gaseous, and silicon dioxide is a non-volatile solid; the chlorides of carbon are stable in presence of water except perhaps at relatively very high temperatures, but the chlorides of silicon are with the greatest readiness decomposed by water; carbon disulphide is a volatile liquid not affected by water, while silicon disulphide is a solid which cannot exist in presence of water; and obviously the representatives of the carbon compounds oxalic acid, acetic acid, and propionic acid in the silicon series possess very different properties. In many respects silicon bears considerable resemblance to boron, the resemblance being especially noticeable between the elements themselves, and in the behavior of their haloid compounds with water, and also in the property which the fluorides of both elements possess of combining with hydrogen fluoride. It is of interest to note that much more heat is developed in the formation of the oxides of boron and silicon than in the formation of carbon dioxide, which alone is gaseous; thus—

$(B_2, O_3) = 317{,}200$ units of heat.
$(C, O_2) = 93{,}600$ "
$(Si, O_2) = 219{,}200$ "

In the case of the corresponding chlorides the order of volatility is reversed; thus—

	BCl_3	CCl_4	$SiCl_4$
Boiling Point.....	17°	78°	50°

In discussing the remaining elements it will suffice to indicate the general nature of their relations to each other, as a full description of the more important will be given under other headings. It will be convenient in the first instance to consider those elements together which are most closely related in properties, and afterwards to indicate the manner in which the elements generally are related to each other.

METALS OF THE ALKALIES.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Melting point ° C.	Electric conductivity at 20°–21°·5 C.
Lithium	Li	7	·59	11·8	180	19·00
Sodium	Na	23	·97	23·7	97	37·43
Potassium	K	39	·86	45·3	62	20·83
Rubidium	Rb	85·2	1·52	56·0	58	...
Cæsium	Cs	132·7	...	...	...	...

The elements of this class are white metals, volatile at high temperatures; lithium is softer than lead but harder than sodium, while sodium is harder than potassium, and potassium harder than rubidium, the last mentioned being as soft as wax. They may all be separated from their chlorides by electrolysis, and apparently also by strongly heating mixtures of their carbonates with charcoal in iron retorts; the latter method is employed in the manufacture of sodium and potassium, and rubidium has been prepared by it. Cæsium has not yet been obtained in a pure state, but an amalgam of cæsium may be procured by submitting its chloride to electrolysis, employing a globule of mercury as the negative electrode.

Cæsium is the most electro-positive element yet discovered; the remaining members of the group follow it in this respect in the order of their atomic weights. They are easily fusible (see table above), and their compounds with other elements are all fusible.

The metals of this group and their compounds furnish characteristic spectra, which are distinguished from those of most other elements by their simplicity. Lithium and its salts communicate a beautiful red color to flame, sodium salts an intense yellow, and potassium, cæsium, and rubidium salts a violet color.

According to Troost and Hautefeuille, when potassium is heated to 350°–400° C. in an atmosphere of hydrogen, it is converted into a hydride of the composition K_2H; and the corresponding hydride, Na_2H, may be prepared in a similar manner from sodium. Lithium, however, manifests but little tendency to combine with hydrogen, absorbing only 17 times its volume of the gas at 500° C. The hydrides are white bodies resembling silver in appearance; potassium hydride is very brittle, but sodium hydride is as soft as sodium, although it becomes brittle when heated; the former takes fire spontaneously in air, but the latter is much more stable. The compounds of lithium, sodium, and potassium with hydrocarbon radicles are only known in combination with the zinc compounds; thus, the body obtained by the action of sodium on zinc ethyl has the composition $ZnNa(C_2H_5)_3$.

The haloid compounds of the elements of this group may be formed by the direct combination of the metals with halogens; their affinity for halogens, however, appears to be inversely proportional to their atomic weights. Thus, it is requisite to heat sodium to a moderately high temperature in an atmosphere of chlorine in order to secure its conversion into the chloride NaCl; but potassium inflames in chlorine at the ordinary temperature. Similarly, sodium may be preserved unchanged in contact with bromine, and is scarcely affected even when heated with it to 200° C.; potassium, however, causes a violent explosion when thrown on bromine. Sodium may also be fused with iodine without appreciable reaction occurring, but potassium at once combines with it with explosive violence.

The metals of this group all decompose water in the cold with evolution of hydrogen and production of a solution of the hydroxide; for example—

$$2Na + 2OH_2 = H_2 + 2Na.OH.$$

Lithium does not fuse when thrown on water, and sodium fuses but does not inflame; potassium and rubidium, however, not only fuse but also take fire and burn with a violet colored flame. According to Thomsen's determinations, more heat is developed in the decomposition of water by lithium or sodium than by potassium; thus—

$(Li, Aq) = 49{,}080$ units of heat.
$(Na, Aq) = 48{,}100$ "
$(K, Aq) = 43{,}450$ "

The difference in their behavior when thrown on water is, perhaps, due to the circumstance that the action proceeds more rapidly with potassium than with sodium

All the metals of this group attract oxygen with avidity on exposure to air, but lithium is much less oxidizable than sodium or potassium, rubidium takes fire spontaneously in air, and cæsium amalgam is much more readily oxidized than rubidium amalgam; so that their affinity for oxygen, as for the halogens, is proportional to their atomic weights. Only one oxide of lithium, Li_2O, has been obtained, but two oxides of sodium, Na_2O, and Na_2O_2, and three oxides of potassium, K_2O, K_2O_2, and K_2O_4, are known; the oxides of the remaining elements have not been investigated. The oxides of the form M'_2O are white deliquescent solids, which readily dissolve in water with the development of much heat, forming solutions of the corresponding hydroxides, M'.OH; they are the most powerfully basic oxides known. The oxides of the form $M_2'O_2$ dissolve in water, but corresponding salts are unknown; potassium tetroxide dissolves in water with evolution of oxygen. The hydroxides M'.OH, or alkalies, are white fusible solids of remarkable stability, volatilizing at high temperatures apparently without undergoing decomposition; they are very soluble in water, furnishing strongly alkaline solutions, soapy to the touch.

The metals of the alkalies appear to act uniformly as monads, and the salts derived from them are all formed on the types M'Cl, $M_2'SO_4$, &c. Their salts are colorless excepting those derived from colored acids; and the corresponding salts of the several metals are isomorphous. Their chlorides, carbonates, sulphates, and phosphates are soluble in water, and the chlorides and sulphates furnish neutral solutions. Their sulphates form characteristic double salts called "alums" with sulphate of aluminium and the sulphates of allied elements. The alums all crystallize with the same number of molecules of water, and correspond in composition to ordinary alum, $K_2Al_2(SO_4)_4$, $24H_2O$; they are also isomorphous.

Although the general resemblance between the metals of this group is very great, it will be obvious that they differ in many important respects. The properties of potassium, rubidium, and cæsium, which are very closely related, are especially different from those of lithium and sodium, which are also closely related. For instance, the normal lithium and sodium salts of chloroplatinic acid, H_2PtCl_6, the acid lithium and sodium salts of tartaric acid, $H_2.C_4H_4O_6$, and the lithium and sodium alums are readily soluble in water, whereas the corresponding salts of potassium, rubidium, and cæsium are difficultly soluble. Lithium, however, in many of its properties is more closely allied to magnesium and calcium than to sodium; and it may be noticed that its chloride, like that of magnesium, dissolves in water with considerable development of heat.

The reactions involved in the formation of a few compounds of lithium, sodium, and potassium have been investigated by Thomsen, with the following results:—

Reaction.	R = Li.	R = Na.	R = K.	
R, Cl	93,810	97,690	105,610	Formation of the crystalline salts from their elements.
R, Br	...	85,730	95,310	
R, I	...	69,080	80,130	
RCl, Aq	8,440	−1,180	−4,440	Heat developed on dissolving the crystalline salts.
RBr, Aq	...	−150	−5,080	
RI, Aq	...	1,220	−5,110	
R, Cl, Aq	102,250	96,510	101,170	Formation in aqueous solution.
R, Br, Aq	...	85,580	90,230	
R, I, Aq	...	70,300	75,020	
R, O, H	...	102,030	104,000	Solid hydroxide.
ROH, Aq	...	9,780	12,460	Heat of dissolution.
R, O, H, Aq	117,440	111,810	116,460	Formation in aqueous solution.
R_2, O, Aq	166,520	155,260	164,560	
R, S, H, Aq	...	60,450	65,100	
R_2, O, SO_3Aq	197,810	186,640	195,850	

METALS OF THE ALKALINE EARTHS.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Electric conductivity at 20° C.
Calcium	Ca	39·9	1·57	25·4	22·14
Strontium	Sr	87·2	2·50	34·8	6·71
Barium	Ba	136·8	?4·0	34·2	...

The members of this group are strongly positive elements which act uniformly as dyads; the relations between them are similar to those which obtain in the preceding group, the element with the highest atomic weight being the most positive. Strontium, however, in some respects appears to be more closely related to barium than to calcium. They are best prepared by the voltaic decomposition of their fused chlorides; their chlorides are not reduced by sodium, but calcium may be obtained by heating calcium iodide with sodium.

Calcium is a yellow metal of the color of gold largely alloyed with silver; in hardness it is intermediate between lead and gold, and it is very ductile. It melts at a red heat. Strontium closely resembles calcium, but has a deeper color; little is known of barium, but it appears to resemble strontium and calcium. The behavior of these elements with halogens is apparently similar to that of the metals of the preceding group with low atomic weights.

They decompose cold water with evolution of hydrogen, but less readily than the alkali metals; it is remarkable that concentrated nitric acid is almost without action on calcium and strontium even when heated to boiling, although the diluted acid dissolves them rapidly.

They are less easily oxidized than the alkali metals, calcium being the least, and barium apparently the most oxidizable; in dry air calcium and strontium remain untarnished for a considerable period. They burn with great brilliancy when ignited in air.

Each metal furnishes two oxides,—a monoxide such as barium oxide, BaO, and a dioxide such as barium peroxide, BaO_2; these oxides are white, earthy, infusible substances; the dioxides are decomposed into the monoxides and oxygen at a red heat. Their monoxides are powerfully basic, but apparently the dioxides are almost destitute of basic properties; the action of acids on the two classes of oxides is illustrated by the following equations:—

$$BaO + 2HCl = BaCl_2 + H_2O$$
$$BaO_2 + 2HCl = BaCl_2 + H_2O_2.$$

Barium monoxide is converted into the dioxide when heated to dull redness in an atmosphere of oxygen, but the dioxides of strontium and calcium cannot be prepared in this manner. By the action of water the monoxides are converted with development of much heat into the corresponding hydroxides which are strongly alkaline. Barium hydroxide, $Ba(OH)_2$, is dissolved by water, although to a less extent than the hydroxides of the alkali metals; it separates from water in crystals of the composition $Ba(OH)_2$, $8H_2O$; it is not decomposed even by prolonged ignition. Strontium hydroxide, which also crystallizes with 8 molecules of water, is much less soluble than the barium compound; it is not decomposed by ignition. Calcium hydroxide, $Ca(OH)_2$, however, requires about 700 parts of cold water to dissolve it, the crystals of strontium hydroxide requiring only 50 parts, and is decomposed into calcium oxide and water by prolonged ignition. When barium hydroxide solution is added to hydrogen dioxide a hydrated barium peroxide, BaO_2, $6H_2O$, is precipitated in crystalline scales; the corresponding strontium and calcium compounds, SrO_2, $8H_2O$ and CaO_2, $8H_2O$, may be prepared in a similar manner, and are converted into the anhydrous oxides by heating to 100° C.

Barium and strontium carbonates are practically insoluble in water, and are not decomposed on ignition; calcium carbonate, $CaCO_3$, is only very slightly soluble in water, and is slowly converted into calcium oxide and carbon dioxide on ignition. In this respect lithium carbonate, Li_2CO_3, closely resembles calcium carbonate, as it is only sparingly soluble in water, and decomposes on ignition; whereas the carbonates of the other alkali metals are very soluble, and are not decomposed by heat.

Calcium sulphate, $CaSO_4$, crystallizes with two molecules of water, and is slightly soluble in water; but strontium and barium sulphates form anhydrous crystals, and are practically insoluble in water. Similarly, calcium nitrate crystallizes in deliquescent, very soluble monoclinic prisms of the composition $Ca(NO_3)_2$, $4H_2O$, and an apparently isomorphous salt of similar composition, but efflorescent, may be obtained by crystallizing strontium nitrate at a low temperature; but from a hot solution strontium nitrate separates in anhydrous octahedra isomorphous with barium nitrate, which crystallizes without water. The chlorides of calcium and strontium are deliquescent crystalline substances, very soluble in water, and also soluble in alcohol; barium chloride is very much less soluble in water, and is insoluble in alcohol, and does not deliquesce. The chlo-

rides of barium, strontium, and calcium furnish perfectly neutral solutions. Barium salts communicate an apple-green color to flame, strontium salts a brilliant crimson, and calcium salts an orange-red; the spectra of the three elements are comparatively simple.

GLUCINUM—MAGNESIUM—ZINC—CADMIUM—MERCURY.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	F. P. °C.	B. P. °C.	Electric conductivity.
Glucinum	G	9·3	2·1	4·4	...	...	...
Magnesium	Mg	23·9	1·74	13·7	...	...	25·47 at 17°
Zinc	Zn	64·9	7·15	9·1	412	1040	29·02 at 0°
Cadmium	Cd	111·6	8·65	12·9	228	860	23·72 at 0°
Mercury	Hg	199·8	13·56	14·7	−38·8	357	1·63 at 23°

Glucinum, or beryllium, obtained by the action of sodium on its chloride, is a white, malleable metal fusible below the melting-point of silver; it does not burn in air or oxygen, but becomes coated with a layer of oxide which seems to protect it from further change. When heated in an atmosphere of chlorine it is converted into the chloride GCl_2. It does not decompose water even when heated to whiteness. It is easily dissolved by dilute hydrochloric and sulphuric acids; but nitric acid, even when concentrated, has little action on it. It is readily dissolved by a solution of potassium hydroxide.

Glucinum hydroxide, $G(OH)_2$, separates as a white bulky precipitate on the addition of an alkaline hydroxide to a solution of a glucinum salt; it exhibits pronounced acid properties, dissolving in solutions of the alkalies and even in those of alkaline carbonates. Glucinum oxide, GO, is a light, very bulky, white powder; when strongly heated it volatilizes without fusing. Glucinum chloride, GCl_2, crystallizes in silky needles; it is very deliquescent, and dissolves in water with a hissing noise and considerable rise of temperature. Glucinum hydroxide readily dissolves in acids, but the ignited oxide slowly; the glucinum salts are mostly soluble, and have a sweet, slightly astringent taste. Basic glucinum salts are obtained with great facility; thus by digestion with the hydroxide, glucinum nitrate, $G(NO_3)_2$, is converted into the basic nitrate, $G_3N_2O_8$, and the basic sulphate, G_3SO_6, may in a similar manner be obtained from the normal sulphate, GSO_4. Glucinum sulphate, GSO_4, $4H_2O$, is extremely soluble in water; it forms a double salt with potassium sulphate of the composition $GK_2(SO_4)_2$, $2H_2O$.

Magnesium, Zinc, Cadmium.—Magnesium is a white, malleable ductile metal about as hard as calcspar; it melts and volatilizes nearly as readily as zinc. It readily decomposes water below its boiling-point, but not in the cold, unless associated with a less positive metal such as copper. It is easily dissolved by dilute acids.

Zinc is a hard, white metal with a shade of blue; when pure it is very malleable, but it is usually brittle owing to the presence of impurities such as lead and iron. Commercial zinc, however, becomes malleable at 100°—150° C., and may then be rolled; at 210° C. it again becomes brittle, and may be easily reduced to powder at that temperature. Zinc decomposes vapor of water at a temperature below dull redness, and readily, even at ordinary temperatures, when it is associated with copper or other less positive metals. The pure metal dissolves very slowly in dilute acids, but ordinary zinc dissolves quickly, because the lead contained in it acts as an electro-negative element. Zinc dissolves in aqueous alkalies with evolution of hydrogen.

Cadmium is a bluish-white metal like zinc; it is soft, though harder and more tenacious than tin, and is very malleable and ductile. When heated to about 80° C. it becomes very brittle, and may be powdered with facility. It appears to decompose water at a high temperature, and dissolves when heated with slightly diluted hydrochloric or sulphuric acid, but its best solvent is dilute nitric acid.

Magnesium is usually prepared by heating its chloride with sodium; zinc and cadmium are readily obtained by reducing their oxides with charcoal. Magnesium, zinc, and cadmium are capable of being polished, and then assume a bright metallic lustre; they retain their lustre in dry air, but when exposed to moist air a film of oxide forms on the surface which protects them from further oxidation. Magnesium is the most positive metal of the three, as it precipitates zinc and cadmium from their salts, and zinc is more positive than cadmium. When heated in chlorine, or in the vapor of bromine or of iodine, they burn brilliantly, forming corresponding chlorides, bromides, or iodides, such as $MgCl_2$, $ZnBr_2$, CdI_2; if moistened with water, zinc and cadmium readily combine with the halogens at the ordinary temperature.

They are easily combustible in air or oxygen; the light emitted by burning magnesium is intensely brilliant and very rich in actinic rays; zinc also burns with a brilliant flame. They are thus converted into the oxides MgO, ZnO, CdO; magnesium and zinc oxides are white, but the latter becomes lemon yellow when heated; cadmium oxide is yellowish brown. These oxides are unalterable in the fire; they dissolve readily in acids, forming corresponding salts; *e.g.*: $MgO+H_2SO_4=MgSO_4+H_2O$. Magnesium oxide, when mixed with water, gradually combines with it, and forms the hydroxide $Mg(OH)_2$, but no sensible development of heat occurs during the hydration. Cadmium oxide also unites with water.

The hydroxides of magnesium, zinc, and cadmium separate as white amorphous precipitates, insoluble in water, on the addition of alkalies to solutions of the salts of these metals. Magnesium hydroxide alone exhibits a faint alkaline reaction; zinc hydroxide readily dissolves in alkalies; they are all dissolved by solutions of ammonium salts; they are easily resolved by heat into water and the oxide.

Cadmium also furnishes a suboxide, Cd_2O, which is a green powder; on treatment with acids it is resolved into metallic cadmium and the oxide CdO; in other words, a salt of the oxide CdO is produced, and cadmium remains.

The chlorides of these metals, like glucinum chloride, are volatile deliquescent solids; magnesium and zinc chlorides are extremely soluble in water, and their solutions are strongly acid, but cadmium chloride is less soluble; their dissolution in water is attended with development of heat, thus:—

$MgCl_2$, Aq = 35,920 units of heat.
$ZnCl_2$, Aq = 15,630 " "
$CdCl_2$, Aq = 3,010 " "

Their bromides and iodides are also soluble in water. The chlorides of magnesium, zinc, and cadmium form crystalline compounds with the chlorides of many other metals, the tendency to combine with other chlorides being especially marked in the case of cadmium chloride.

Their sulphates are soluble in water, especially those of magnesium and zinc, which are isomorphous; the sulphates of the three metals form isomorphous double salts with potassium sulphate. The composition of their sulphates and double sulphates with potassium is as follows:

$MgSO_4$, $7H_2O$	$MgK_2(SO_4)_2$, $6H_2O$
$ZnSO_4$, $7H_2O$	$ZnK_2(SO_4)_2$, $6H_2O$
$CdSO_4$, $4H_2O$	$CdK_2(SO_4)_2$, $6H_2O$

Zinc, like glucinum, manifests a great tendency to form basic sulphates.

The carbonates of magnesium, zinc, and cadmium are white and insoluble in water; they are without difficulty decomposed by heat into the oxide and carbon dioxide.

Glucinum sulphide is soluble in water without decomposition, but is decomposed by dilute acids; magnesium sulphide is converted by water into magnesium hydroxide with evolution of hydrogen sulphide: $MgS+2H_2O=Mg(OH)_2+H_2S$; zinc sulphide is insoluble in water, but is dissolved and decomposed by dilute mineral acids; lastly, cadmium sulphide is insoluble in water and dissolves with difficulty even in boiling dilute hydrochloric acid, though it is readily decomposed by concentrated hydrochloric acid even at ordinary temperatures. Cadmium sulphide is a brilliant yellow substance, the remaining sulphides are white.

Mercury.—This element is the only metal that is liquid at common temperatures, with the exception, possibly, of cæsium, and the recently-discovered element gallium. The latter element, indeed, appears to be closely allied to zinc in properties, but is less positive, and is probably a member of the aluminium group; its specific gravity is 5·95.

Mercury occurs native chiefly in the form of sulphide, from which it is separated either by distillation with slaked lime (calcium hydroxide), or by burning off the sulphur. It

is a highly lustrous metal, and in the solid state is malleable. It slowly combines with the halogens at ordinary temperatures, and also with sulphur if triturated with it; it does not tarnish, even in moist air, but slowly absorbs oxygen when heated to about 400° C., being converted into the red oxide HgO; this oxide is decomposed on ignition. Hydrochloric acid, whether cold or hot, is without action on mercury, but it is slowly dissolved by hydriodic acid; concentrated nitric acid dissolves it readily; it is also dissolved by hot concentrated sulphuric acid. It has no action upon water at any temperature. It is capable of uniting with most metals, forming liquid or solid compounds called amalgams; the solid amalgams appear for the most part to be of definite composition, but the two metals are held together by very feeble affinities.

Mercury unites with the halogens, with oxygen, and with sulphur in two proportions, forming the two series distinguished as mercurous and mercuric compounds; thus:—

Hg_2Cl_2	Hg_2O	Hg_2S
Mercurous chloride.	Mercurous oxide.	Mercurous sulphide.
$HgCl_2$	HgO	HgS
Mercuric chloride.	Mercuric oxide.	Mercuric sulphide.

The compounds of mercury with halogens, and mercury compounds generally, are difficultly soluble, or insoluble, in water. But the compounds with halogens dissolve readily in solutions of the haloid compounds of the alkali metals in consequence of the formation of double salts; the haloid compounds of mercury, in fact, exhibit a more marked tendency than those of any other metal of the group to form double salts with the haloid compounds of other metals, cadmium being most nearly allied to mercury in this respect; they unite also with the haloid acids, forming the compounds $HHgCl_3$, $HHgBr_3$, and $HHgI_3$.

Mercurous chloride or calomel, Hg_2Cl_2, is a white crystalline solid, insoluble in water; it blackens slowly on exposure to light, and is decomposed by heat into metallic mercury and mercuric chloride, $HgCl_2$. Mercuric chloride or corrosive sublimate is also white and crystalline, but soluble in water; it boils without decomposition at 295° C.; the density of its vapor corresponds with the formula $HgCl_2$. By the action of ammonia on the chlorides of mercury, one-half the chlorine is removed and displaced by the monad radicle amidogen: $Hg_2Cl_2 + 2NH_3 = Hg_2Cl(NH_2) + NH_4Cl$; the lower chloride is thus converted into black mercurous amidochloride, the higher chloride furnishing mercuric amidochloride or white precipitate, $HgCl(NH_2)$.

Mercury hydroxides are unknown, the chlorides of mercury being at once converted into corresponding oxides by the action of alkalies; but when mercury is associated with positive hydrocarbon radicles, it forms powerfully basic hydroxides such as $Hg(C_2H_5)OH$, which is a colorless oil. Mercurous oxide, Hg_2O, is a black substance which by mere exposure to light, or a very gentle heat, is converted into the metal and the red oxide. Mercuric oxide, HgO, when prepared by heating mercury in oxygen, forms red crystalline scales, but it is precipitated as a yellow powder on the addition of an alkali to a solution of mercuric chloride. These two forms of the oxide differ even in their chemical behavior, and are perhaps polymeric; thus, when the yellow oxide is boiled with a solution of potassium dichromate a basic mercuric chromate, Hg_3CrO_6, is formed, but the crystallized oxide forms a more basic salt, viz., Hg_4CrO_7, under similar circumstances. Mercuric oxide is dissolved by acids, forming mercuric salts such as mercuric nitrate, $Hg(NO_3)_2$; by digesting solutions of these salts with mercury they are converted into corresponding mercurous salts such as mercurous nitrate $Hg_2(NO_3)_2$. But mercuric oxide also exhibits feeble acid properties; thus it forms the compound K_2HgO_3 when dissolved in fused potassium hydroxide. Basic mercuric salts are also very readily produced; mercuric sulphate, $HgSO_4$, for example, is decomposed by water into a soluble acid salt and the insoluble basic sulphate Hg_3SO_6. Mercuric sulphide, HgS, is thrown down as a black precipitate on passing hydrogen sulphide through solutions of mercuric salts; it is not decomposed by hydrochloric acid; when heated it becomes red. Native cinnabar and vermilion consist of the red modification of mercuric sulphide.

No tendency to combine with hydrogen has been observed in the case of the metals of this group, but they have all been obtained in combination with hydrocarbon radicles Their organo-metallic derivatives correspond in composition to zinc ethyl, $Zn(C_2H_5)_2$; the attempt to convert mercurous chloride into a corresponding organo-metallic compound by the action of zinc ethyl has been unsuccessful, mercury ethyl, $Hg(C_2H_5)_2$, being formed instead and mercury separated; thus:—

$$Hg_2Cl_2 + Zn(C_2H_5)_2 = Hg(C_2H_5)_2 + Hg + ZnCl_2.$$

It would appear, in fact, that only mercurous compounds can exist in which mercury is associated with negative radicles.

It has been shown that the density of the vapor of each of the metals cadmium and mercury is the half of its atomic weight, in other words, the gaseous molecules of these elements are monatomic (p. 408). As we are not acquainted with the density of any other metal in the state of gas, it is impossible to say whether these metals are peculiar in this respect.

On comparing the properties thus briefly sketched of the elements of this group, the general resemblance will be at once noticed, but it will be remarked also, that, although in respect of many properties the variations are gradational in the same degree as the atomic weights, certain properties are not continuous, but recur periodically. Thus glucinum, zinc, and mercury, the first, third, and fifth terms of the group, have many characteristics in common which are apparently wanting in the case of magnesium and cadmium, the second and fourth terms. This is evidenced especially by certain of their physical properties, by the solubility of their hydroxides in alkalies, by the formation of basic salts, and by the behavior of their sulphides.

The elements of this group are in many respects closely related to the metals of the previous group, of which they may be regarded as forming a sub-group, the formulæ of their compounds being similar in most cases; the general behavior especially of magnesium and its compounds, it will be evident, is in close accordance with that of calcium and its compounds. But many important distinctions characterize the two groups. Thus the metals of the one group decompose cold water; their oxides are powerfully basic, and readily combine with water; their carbonates are extremely stable; and their sulphates are insoluble or very slightly soluble in water, and do not readily form double salts. The metals of the other group, however, either are without action on water, or decompose it only when heated; their oxides, although basic, exhibit little tendency to combine with water; their carbonates are comparatively unstable; and their sulphates are mostly very soluble in water, and readily form double salts. In the one group the positive character becomes more pronounced as the atomic weight increases, whereas in the other the positive character diminishes with increase of atomic weight.

Glucinum, apparently, is much less closely related to magnesium than is the latter to zinc, and mercury much less closely to cadmium than cadmium to zinc; but zinc and cadmium are more closely related than zinc and magnesium. These conclusions, which result chiefly from the comparison of what may be termed chemical properties, are entirely confirmed by Thomsen's thermochemical investigation of the reactions involved in the formation of a number of compounds of the metals of this group, as will be evident from the following tables:—

Reaction.	Units of heat developed or absorbed.		
	R = Mg.	R = Zn.	R = Cd.
Solid compounds—			
R, O	.....	85,430	.....
R, O, H_2O	148,960	82,680	65,680
R, O_2, H_2	217,320	.....	.....
R, Cl_2	151,010	97,210	93,240
R, O_2, SO_2, $7H_2O$	.....	181,660	158,290[1]
Aqueous solutions—			
RCl_2, Aq	35,920	15,630	3,010
RSO_4 + $7H_2O$, Aq	.....	−4,240	2,540[1]
R, Cl_2, Aq	186,930	112,840	96,250
R, O, SO_3Aq	180,180	106,090	89,500
RO, SO_3Aq	34,800	20,660	.....
R$(OH)_2$, SO_3Aq	31,220	23,410	23,820
R$(OH)_2$, 2HClAq	27,690	19,880	20,290
R$(OH)_2$, $2C_2H_4O_2$Aq	.....	18,030	.....

[1] These numbers refer to a sulphate of the composition $CdSO_4 + \frac{5}{3}H_2O$.

Reaction.	Units of heat developed or absorbed.	Reaction.	Units of heat developed or absorbed.
Solid substances—		Aqueous solutions—	
Hg_2, O.....	42,200	Hg_2O, $3NO_3HAq$...	5,790
Hg, O.....	30,660	Hg_2, O, $3NO_3HAq$	47,990
Hg_2, Cl_2.....	82,550	$HgCl_2$, Aq.....	−3,300
Hg_2, Br_2.....	68,290	$HgBr_4K_2$, Aq.....	−9,750
Hg_2, I_2.....	44,440	$HgCl_2$, 2KClAq....	−1,380
Hg, Cl_2.....	63,160	$HgBr_2$, 2KBrAq...	1,640
Hg, Br_2.....	50,550	HgI_2, 2KIAq	3,450
Hg, I_2.....	34,310	Hg, Cl_2, Aq.....	59,860
Hg, Br_4, K_2.....	242,400	HgO_2, 2HClAq.....	18,920

COPPER—SILVER—GOLD.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Electric conductivity.
Copper	Cu	63·3	8·9	7·1	96·4 at 13° C.
Silver	Ag	107·6	10·5	10·2	100·0 " 0° C.
Gold	Au	196·2	19·3	10·1	77·9 " "

These metals may be regarded as forming a sub-group to the metals of the alkalies.

Copper is a very tenacious, ductile, malleable metal, of red color, more easily fused than gold, but less fusible than silver. It is without action on water at a red heat, and does not oxidize in the air at ordinary temperatures, but when heated to redness it rapidly combines with oxygen forming a black oxide CuO; when in a finely divided state, it readily unites with chlorine at ordinary temperatures. Moderately diluted nitric acid dissolves copper with great facility, and it is also dissolved by heated concentrated sulphuric acid; hydrochloric acid, even when boiling, has little action on the massive metal, but slowly dissolves the finely divided metal.

Copper forms two chlorides,—cuprous chloride, Cu_2Cl_2, and cupric chloride, $CuCl_2$, but only one iodide Cu_2I_2. Cuprous chloride is a white crystalline substance insoluble in water, but it dissolves in hydrochloric acid or ammonia, forming colorless solutions. Cupric chloride is readily soluble; it is liver-colored, but its solution in water is blue; it forms crystalline double salts with the chlorides of the alkali metals. It is converted into cuprous chloride and chlorine at a red heat.

Cupric hydroxide, $Cu(OH)_2$, separates as a pale blue precipitate on the addition of an alkali to a solution of a cupric salt; in the dry state it is stable at 100° C., but at a slightly higher temperature it is converted into the black oxide. Cupric hydroxide, although insoluble in alkalies, is dissolved by ammonia to a deep blue solution; the production of deep blue-colored liquids on dissolution in ammonia is, in fact, characteristic of copper compounds. Cupric oxide, CuO, dissolves in acids, forming cupric salts, which are white when anhydrous, but furnish green or blue solutions; they are mostly soluble. Cupric sulphate crystallizes with 5 molecules of water, but it forms a double sulphate with potassium sulphate, $CuK_2(SO_4)_2$, $6H_2O$, isomorphous with the corresponding zinc and magnesium salts. Basic cupric salts are readily produced by digesting the normal salts with cupric hydroxide.

By igniting cupric oxide with metallic copper it is converted into red cuprous oxide, Cu_2O; this oxide may also be prepared by heating a solution of a cupric salt with an easily oxidizable substance, such as grape sugar, and an alkali. Most acids decompose cuprous oxide, forming a cupric salt and separating metallic copper; but it is converted into cuprous chloride by hydrochloric acid. A number of cuprous salts exist, but they are extremely unstable, and mostly absorb oxygen readily, becoming converted into cupric salts. Both oxides of copper are easily reduced by ignition with hydrogen or charcoal.

A black hydrated cupric sulphide is precipitated by hydrogen sulphide even from strongly acid solutions of cupric salts.

Cuprous hydride, Cu_2H_2, is deposited as a yellow precipitate when a solution of cupric sulphate mixed with hypophosphorous acid is heated to about 60° C.; it soon turns brown, and when heated to 70° C. suddenly decomposes, with evolution of hydrogen; hydrochloric acid converts it into cuprous chloride:—

$$Cu_2H_2 + 2HCl = Cu_2Cl_2 + 2H_2.$$

Silver is a white metal, inferior in malleability only to gold among the heavy metals; it is harder than gold, and softer than copper. It is the best-known conductor of heat and electricity. It may be distilled by the aid of the oxy-hydrogen flame. It is not oxidized by ordinary oxygen, and is incapable of decomposing water, but like mercury it is oxidized by ozone. Moderately diluted nitric acid dissolves it readily, and it is dissolved by heated concentrated sulphuric acid; it also resembles copper and mercury in its behavior with hydrochloric acid, and mercury in its behavior with hydriodic acid. It unites with the halogens at ordinary temperatures, and, like mercury, readily combines with sulphur, and is precipitated by hydrogen sulphide from strongly acid solutions of its salts as black sulphide, Ag_2S.

Silver forms two chlorides,—argentic chloride, AgCl, which is white, and insoluble in water, but readily soluble in ammonia, and a black argentous chloride, the composition of which is not known with certainty, but is probably Ag_2Cl_2. Corresponding bromides exist, but only the one iodide, AgI, is known. Argentic chloride becomes violet-colored on exposure to light, apparently owing to the formation of the lower chloride; the iodide does not alter in appearance, but acquires the property of attracting metallic silver, and hence its employment in photography. The subchloride is not changed by nitric acid, but is converted by ammonia into metallic silver and argentic chloride.

A brown argentous hydroxide, Ag (OH), is precipitated from solutions of argentic salts on the addition of an alkali; it is slightly soluble in water and its solution is faintly alkaline; it loses water at a temperature above 60° C., and is converted into argentic oxide, Ag_2O. Argentic oxide is a brown powder; it gives off a certain amount of oxygen, even at 100° C., and also when exposed to sunshine; it neutralizes the strongest acids, forming argentic salts such as argentic nitrate, $AgNO_3$. Argentic sulphate, Ag_2SO_4, is isomorphous with anhydrous sodium sulphate, and it also forms an alum, $Ag_2Al_2(SO_4)_4$, $24H_2O$, which, however, is extremely unstable.

Silver also forms a suboxide probably of the composition Ag_4O, and a peroxide of which the composition is uncertain, but probably is expressed by the formula Ag_2O_2. Both are extremely unstable; the former is decomposed by ammonia into metallic silver and argentic oxide, which dissolves, and acids act upon it in a similar manner.

Argentic carbonate is insoluble in water, and decomposes at 200° C. into the oxide and carbon dioxide.

Metallic silver is slowly precipitated from solutions of its salts by hydrogen at ordinary temperatures, so that it is a less positive element than hydrogen.

Gold is a metal of rich yellow color nearly as soft as lead when in a pure state. It exhibits no tendency to combine directly with oxygen, and is not dissolved by any single acid, except selenic acid, but it readily combines with the halogens, and therefore dissolves in a mixture of nitric and hydrochloric acids, which liberates chlorine (p. 404).

Gold is reduced from its compounds with extreme readiness, but varies in properties according to the nature of the compound from which it is separated; in fact, it appears to exist in several allotropic modifications. Thus, according to Thomsen, when a solution of auric chloride is reduced by sulphurous acid, the gold separates as a light-colored powder which readily cakes together, but from a solution of auric bromide it separates as an extremely fine dark-colored powder which exhibits no tendency to agglomerate; a third modification, also finely pulverulent, but lustrous, is obtained by reducing aurous bromide or iodide with sulphurous acid. Thomsen finds that the conversion of the second (Auα) and third (Auβ) of these modifications into that obtained from auric chloride (Au) would involve development of heat, and of different amounts in the two cases; thus:—

$$Au\beta = Au + 4700 \text{ units of heat.}$$
$$Au\alpha = Au + 3210 \quad " \quad "$$

By the action of chlorine, reduced gold is converted into the chloride, Au_2Cl_4; this is decomposed by water into aurous chloride, Au_2Cl_2, and auric chloride, $AuCl_3$. Auric chloride is soluble in water, but aurous chloride is insoluble; in contact with water, especially on warming, the latter decomposes into metallic gold and auric chloride. Auric

chloride is readily converted into aurous chloride when heated to 185° C. The gold bromides may be obtained in a similar manner, and exhibit similar properties, but are less stable. Aurous and auric iodides, Au_2I_2 and AuI_3, are both insoluble, and still less stable. The auric compounds combine with the haloid acids, and with the haloid compounds of most other metals, forming crystalline so-called double salts; these double salts, however, may be regarded as salts of the acids formed by the union of the haloid acids with the auric halogen compounds; the double chloride of gold and potassium, for example, $KCl.AuCl_3$, as the potassium salt of the acid $HAuCl_4$.

On treating aurous chloride with a solution of potassium hydroxide, a dark-green substance is obtained, which is probably the corresponding hydroxide; it decomposes spontaneously into metallic gold and auric hydroxide. Auric hydroxide, $Au(OH)_3$, is precipitated by alkalies from a solution of auric chloride as a dark-brown powder, which is quickly reduced on exposure to light. A third gold hydroxide, derived from the oxide Au_2O_2, appears also to exist.

The hydroxides of gold exhibit very feeble basic properties; in fact, the salts formed on dissolving auric hydroxide in nitric and sulphuric acids are so unstable that they have not been isolated. Auric hydroxide, however, possesses marked acid properties, and is dissolved by a solution of potassium hydroxide,—potassium aurate, a crystalline salt of the composition $KAuO_2$, $3H_2O$, separating from the solution on concentration. On digesting auric hydroxide with ammonia it is converted into the so-called fulminating gold, which is obtained in the form of a yellowish-brown powder easily exploded by percussion or heat; it is somewhat uncertain what is the composition of this body, but it is not improbable that it is represented by the formula $Au(NH_2)\begin{cases}OH\\ONH_4\end{cases}$.

The distinctions between copper, silver, and gold are obviously very marked; yet they resemble each other in many respects, the relation being especially evident when the cuprous and aurous compounds are compared with the argentic compounds. It is to be noted that their hydroxides and many other of their compounds are acted on by ammonia in a characteristic manner, both silver and gold hydroxides being converted into highly explosive bodies; the nature of the products has not been ascertained with certainty, but apparently they are allied in composition. The ammoniacal derivatives of copper correspond in composition to those formed from nickel, a metal which in many respects is allied to copper.

As in the magnesium group of metals, the positive character diminishes with increase of atomic weight, but to a much greater extent.

Silver is the only element of the group which exhibits marked analogy with the metals of the alkalies,—being connected with them by the isomorphism of its sulphate with that of sodium, by the formation of an alum, by the alkalinity of its hydroxide, and by its color. Thermo-chemical investigation also indicates a marked analogy between silver and the metals of the alkalies, the sulphates of silver, sodium, and potassium dissolving in water with absorption of heat, whereas nearly as much heat is developed on dissolving copper sulphate as when the equivalent amount of sulphuric acid is added to water, copper sulphate resembling in this respect the sulphates of magnesium and zinc; thus:—

Ag_2SO_4, Aq =	− 4,480	units of heat.
K_2SO_4, Aq =	− 6,380	" "
Na_2SO_4, Aq =	− 60	" "
$CuSO_4$, Aq =	16,300	" "
$ZnSO_4$, Aq =	18,500	" "
$MgSO_4$, Aq =	20,300	" "

The existence of double salts such as $CuK_2(SO_4)_2$, $6H_2O$, isomorphous with those derived from the sulphates of magnesium and zinc, and the readiness with which basic salts of copper are formed, are confirmatory of the conclusion that copper is allied to zinc and magnesium.

The results of the thermo-chemical investigation of copper, silver, and gold are of considerable interest, as will be evident from the following tables. To illustrate the application of the values in these tables, it may be pointed out that the stability of the oxides of copper and the instability of silver oxide and of auric hydroxide are explained by the fact that much heat is developed in the formation of the oxides of copper from their elements, whereas the formation of silver oxide would involve but a slight development of heat, and the formation of auric hydroxide would even involve a large expenditure of energy. Then it will be noticed that, in the formation of cuprous iodide, heat is developed to the extent of 32,520 units per molecule, and that the formation of an aqueous solution of cupric iodide would involve the development of only 10,410 units per molecule; hence it follows that the conversion of two molecules of cupric iodide into a molecule of cuprous iodide and a molecule of iodine would be attended by the development of no less than $32520-(2\times 10410)=11700$ units of heat. This explains the fact that a mixture of cuprous iodide and iodine, and not cupric iodide, is obtained on adding potassium iodide to a solution of cupric sulphate:—

$$2CuSO_4+4KI=Cu_2I_2+I_2+2K_2SO_4.$$

Again, the superior affinity of auric bromide for hydrogen bromide as compared with that of auric chloride for hydrogen chloride is shown by the development of 7700 units of heat in the formation of the compound $AuBr_4H$, and of only 4530 units in the formation of the corresponding chlorine compound $AuCl_4H$; and that the latter is almost completely decomposed and converted into the former on treatment with hydrobromic acid is evidenced by the development of 13,800 units of heat in the reaction, complete decomposition requiring the development of 14,300 units.

Reaction.	Units of heat developed.	Reaction.	Units of heat developed.
Cu, O	37,160		
Cu_2, O	40,810	Ag_2, O	5,900
Cu, Cl_2	51,630		
$CuCl_2$, Aq	11,080		
Cu, Cl_2, Aq	62,710		
Cu, Br_2, Aq	40,830		
Cu, I_2, Aq	10,410		
Cu_2, Cl_2	65,750	Ag, Cl	29,380
Cu_2, Br_2	49,970	Ag, Br	22,700
Cu_2, I_2	32,520	Ag, I	13,800
Cu_2O, 2HCl	49,300	Ag_2O, 2HCl	77,220
Cu_2O, 2HBr	60,640	Ag_2O, 2HBr	90,980
Cu_2O, 2HI	72,150	Ag_2O, 2HI	102,140
Cu_2O, 2HClAq	14,660	Ag_2O, 2HClAq	42,580
Cu_2O, 2HBrAq	20,760	Ag_2O, 2HBrAq	51,100
Cu_2O, 2HIAq	33,730	Ag_2O, 2HIAq	63,720
CuO, 2HClAq	15,270		
$Cu(OH)_2$, 2HClAq	14,910		
CuO, N_2O_5Aq	15,250	Ag_2O, N_2O_5Aq	10,880
$Cu(OH)_2$, N_2O_5Aq	14,890		
CuO, SO_3Aq	18,800	Ag_2O, SO_3Aq	14,490
$Cu(OH)_2$, SO_3Aq	18,440		

Reaction.	Units of heat developed or absorbed.	Reaction.	Units of heat developed or absorbed.
Au, Cl_3	22,820	$AuCl_4HAq$, 4HBrAq	13,800
Au, Br_3	8,850	$AuBr_4HAq$, 4HClAq	− 510
Au, Cl	5,810	$AuCl_3$, Aq	4,450
Au, Br	− 80	$AuBr_3$, Aq	− 3,760
Au, I	− 5,520	$AuBr_4H+5H_2O$, Aq	− 11,400
Au_2O_3, $3H_2O$	− 13,190	Au, Cl_3, Aq	27,270
$Au(OH)_3$, 3HClAq.	18,440	Au, Br_3, Aq	5,090
$Au(OH)_3$, 3HBrAq.	29,180	Au, Cl_3, HClAq	31,800
$AuCl_3$Aq, HClAq	4,530	Au, Br_3, HBrAq	12,790
$AuBr_3$Aq, HBrAq.	7,700		

The values in this table have reference to the modification of gold obtained by reducing a solution of auric chloride with sulphurous acid.

THALLIUM—LEAD.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Electric conductivity at 0° C.
Thallium	Tl	203·6	11·8	17·2	9·36
Lead	Pb	206·4	11·4	18·1	8·32

Thallium is a heavy crystalline metal, resembling cadmium in appearance; it is extremely soft, even lead scratching it readily. It melts at 294° C., and boils below a white heat; the liquid metal can hardly be distinguished from mercury. It is reduced from solutions of its salts by zinc, but not by cadmium. It readily dissolves in concentrated nitric acid, and is also dissolved by dilute sulphuric acid, especially if it be in contact with a piece of platinum, but it is only slowly attacked even by boiling hydrochloric acid; it decomposes water at a red heat. It combines with the halogens at ordinary temperatures. When exposed to the air it oxidizes almost as readily as the more positive alkali metals, chiefly thallious oxide, Tl_2O, being formed; and when heated to redness and plunged into oxygen it burns brilliantly with a pure green light, chiefly thallic oxide, Tl_2O_3, being produced.

Four chlorides of thallium have been described, viz., TlCl or Tl_2Cl_2, Tl_2Cl_4, Tl_4Cl_6, and $TlCl_3$ or Tl_2Cl_6; corresponding bromides, and the two iodides, TlI or Tl_2I_2, and TlI_3 or Tl_2I_6, have also been obtained. Thallious chloride, TlCl or Tl_2Cl_2, separates as a white precipitate scarcely distinguishable at first sight from silver chloride, on the addition of hydrochloric acid to a solution of a thallious salt; but in properties it more nearly resembles lead chloride, $PbCl_2$, being slightly soluble in boiling water, from which it separates again on cooling in crystals, and scarcely more soluble in aqueous ammonia than in water. Thallium sesquichloride, Tl_4Cl_6, formed by melting thallious chloride in a stream of chlorine, crystallizes in brilliant orange-yellow plates, moderately soluble without decomposition in water slightly acidulated with hydrochloric acid. Thallic chloride. $TlCl_3$ or Tl_2Cl_6, is formed on dissolving thallic oxide in hydrochloric acid; it crystallizes from hydrochloric acid in colorless prisms of the composition $TlCl_3$, H_2O or Tl_2Cl_6, $2H_2O$. Little is known of the chloride Tl_2Cl_4, but the corresponding bromide is obtained on adding thallious bromide to a hot solution of thallic bromide, separating from the hot liquid in yellow shining needles. Thallious bromide is nearly insoluble in water, but thallic bromide is very soluble and deliquescent; the bromide Tl_2Br_4 is decomposed by water into thallious and thallic bromide and the bromide Tl_4Br_6, which crystallizes in orange-red laminæ. This last compound is also decomposed by water, with separation of thallious bromide. Thallious iodide, TlI or Tl_2I_2, has a brilliant yellow color, and is almost insoluble in water, and scarcely more soluble in a solution of potassium iodide; when heated it becomes scarlet, but its yellow color is restored by friction. It is therefore opposite in character to mercuric iodide, HgI_2, which is scarlet, but becomes yellow when heated, and is readily soluble in potassium iodide solution, although insoluble in water. Thallic iodide is an extremely unstable compound, and, like cupric iodide, readily decomposes into iodine and thallious iodide.

Thallious oxide is almost black in color; like litharge, PbO, the corresponding lead oxide, it fuses readily, and the fused oxide is absorbed by bone-ash so that a silver thallium alloy may be cupelled like a silver-lead alloy. It dissolves readily in water, forming a colorless, powerfully alkaline solution, greasy to the touch, of thallious hydroxide, Tl(OH) or $Tl_2(OH)_2$. The latter compound may be obtained in pale-yellow prismatic crystals; it is reconverted into the oxide by mere exposure over sulphuric acid in a vacuum at the ordinary temperature. The solution of thallious hydroxide has nearly all the properties characteristic of sodium hydroxide; but it has a slight tendency to absorb oxygen. Thallic hydroxide, $Tl(OH)_3$ or $Tl_2(OH)_6$, separates as a brown gelatinous precipitate on the addition of alkalies to a solution of a thallic salt; by heating to about 260° C. it is converted into thallic oxide, Tl_2O_3. This oxide is a dark brown powder fusible with difficulty; it is reduced to the lower oxide at a red heat. It has much less marked basic properties than thallious oxide, but dissolves readily in acids, forming thallic salts; it is insoluble in water. Thallious salts are not precipitated by hydrogen sulphide in presence of strong acids, but the thallium is completely precipitated as a brown sulphide from solutions of salts of weak acids, such as thallious acetate, and by alkaline sulphides.

Thallious hydroxide readily absorbs carbon dioxide, forming thallious carbonate, Tl_2CO_3. This salt crystallizes in prisms, and is soluble in about four times its weight of boiling water, forming an alkaline solution; it is fusible, but decomposes when heated to dull redness. Thallious sulphate, Tl_2SO_4, is isomorphous with potassium sulphate; it also forms an alum, $Tl_2Al_2(SO_4)_4$, $24H_2O$, and double salts such as $Tl_2Mg(SO_4)_2$, $6H_2O$, isomorphous with the corresponding potassium salts. A large number of thallious salts, in fact, are isomorphous with the corresponding sodium, potassium, and ammonium salts. Thallic sulphate, $Tl_2(SO_4)_3$, $7H_2O$, is decomposed even by cold water; it forms an anhydrous double sulphate with potassium sulphate quite different from the alums in composition, viz., $Tl_2(SO_4)_3$, $2K_2SO_4$.

Lead is a bluish-white, extremely soft metal; it fuses at 325° C. It is readily dissolved by nitric acid, and is slowly acted on when boiled with hydrochloric or dilute sulphuric acid, hydrogen being evolved. Although it tarnishes in the air, the oxidation is only superficial, but it readily absorbs oxygen when heated. Its oxides are very easily reduced.

Only one stable chloride of lead, $PbCl_2$, is known; when, however, the oxides Pb_2O_3 and PbO_2 are dissolved in hydrochloric acid at a low temperature, solutions are formed which apparently contain the corresponding chlorides Pb_2Cl_6 and $PbCl_4$, as the oxides may be reprecipitated by alkalies, but the slightest heat causes chlorine to be evolved. Lead chloride is difficultly soluble in water, from which it crystallizes in delicate white needles. Lead iodide, PbI_2, crystallizes in brilliant yellow plates sparingly soluble in water.

Lead forms a suboxide, Pb_2O, a monoxide, PbO, a dioxide or peroxide, PbO_2, and a fourth oxide, Pb_3O_4, which may be regarded as a compound of the monoxide and dioxide. The suboxide is black; like the corresponding oxides of mercury and silver, it furnishes the metal and a salt derived from the monoxide on treatment with acids. The monoxide, PbO, ordinarily known as litharge, is prepared on the large scale by the oxidation of lead in air; the pure oxide has a lemon-yellow color, and is insoluble in water; it fuses at a heat below redness. The corresponding hydroxide, $Pb(OH)_2$, is obtained on adding ammonia to a solution of a lead salt such as lead nitrate, $Pb(NO_3)_2$, as a white amorphous precipitate, which absorbs carbon dioxide on exposure to air; it is converted into the oxide when heated above 100° C. The oxide and hydroxide are readily acted on by acids, and form stable salts; but they are also soluble in alkalies. Lead nitrate is easily soluble, but lead sulphate and carbonate are insoluble in water; they may be obtained in crystals isomorphous with those of the corresponding barium salts. The carbonate is readily decomposed when heated, and on heating the sulphate with lead sulphide metallic lead is obtained: $PbSO_4 + PbS = 2Pb + 2SO_2$.

Lead sesquioxide, Pb_2O_3, is little known; it has a brown color, and is converted into the monoxide and oxygen when heated. Lead dioxide, PbO_2, also has a brown color; it may be obtained by passing chlorine into water in which lead oxide is suspended. It unites directly with sulphur dioxide, forming lead sulphate, sufficient heat being developed to cause the mass to glow; it is converted into the monoxide when heated; it is insoluble in most acids, but is dissolved by acetic acid, and apparently converted into a corresponding acetate; by fusing it with potassium hydroxide, potassium plumbate is produced, which may be obtained in crystals of the composition K_2PbO_3, $3H_2O$.

By carefully heating lead monoxide to low redness in air it is converted into the red oxide or minium, the most usual composition of which is represented by the formula Pb_3O_4. On treating this oxide with acids—nitric acid, for example—it furnishes lead nitrate and lead dioxide.

Lead is precipitated by hydrogen sulphide, as a black sulphide, even from strongly acid solutions of its salts.

Although no stable chloride of lead exists containing more than two atoms of chlorine, a stable tetraethyl derivative, $Pb(C_2H_5)_4$, the existence of which affords conclusive evidence that lead may function as a tetrad element, is obtained by the action of zinc ethyl on the chloride $PbCl_2$(?Pb_2Cl_4). The hydroxide, $Pb(C_2H_5)_3$. OH, is powerfully basic.

Compounds of thallium with hydrocarbon radicles only have not yet been obtained; a thallium diethylchloride, $Tl(C_2H_5)_2Cl$, is known, however. It is a crystalline body of remarkable stability, and is readily converted into the hydroxide, $Tl(C_2H_5)_2$. OH, which is also crystalline and very soluble in water; the solution is strongly alkaline, nevertheless the hydroxide does not exhibit the slightest tendency to attract carbon dioxide, although it readily forms salts with other acids.

The relation of thallium to lead will be sufficiently evident from the above sketch of the properties of some of the more important compounds of the two elements; it will be noticed also that thallium has strong points of resemblance with the metals of the alkalies, and that it is in some respects related to mercury. Its relation to the alkali metals is especially indicated by the extreme readiness with which it is oxidized, by the properties of thallious hydroxide, and by the isomorphism of many thallious compounds with the corresponding potassium and sodium compounds. Thermochemical investigation entirely confirms these conclusions, as will be evident from the following tables, the heat of neutralization of thallium hydroxide being equal to that of the hydroxides of potassium and sodium, but the affinity of thallium for oxygen being only about equal to that of mercury and copper, and somewhat less than that of lead. The heat of neutralization of thallic hydroxide exceeds that of aluminic hydroxide.

	Reaction.	Units of heat developed or absorbed.	Remarks.
Formation of the solid compounds.	Tl_2, O	42,240	
	Tl_2O, H_2O	3,230	
	Tl_2, O, H_2O	45,470	
	Tl, O, H	56,915	
	Tl_2, O_3, $3H_2O$	86,010	
	Tl, Cl	48,580	
	Tl, Br	41,295	
	Tl, I	30,180	
	Tl, O, NO_2	60,140	Formation of the salts from the metal, oxygen, and gaseous nitric peroxide or sulphur dioxide.
	Tl_2, O_2, SO_2	149,900	
Formation of aqueous solutions.	Tl, O, H, Aq	53,760	
	Tl_2, O, Aq	39,160	
	Tl_2, O, N_2O_5Aq	66,540	The salts are produced from the metal, oxygen, and dilute aqueous solutions of the acids.
	Tl_2, O, SO_3Aq	70,290	
	Tl, Cl, Aq	38,480	
	Tl, Cl_3, Aq	89,000	
	Tl, Br_3, Aq	56,180	
	Tl, I_3, Aq	10,550	
	Tl_2O, O_3, $3H_2O$	43,770	Thallious oxide and hydroxide are converted into thallic hydroxide by oxygen and water.
	Tl(OH), O, H_2O	20,270	
	Tl(OH)Aq, O	23,425	Oxidation of an aqueous solution.
	2Tl(OH)Aq, H_2SO_4Aq	31,130	
	Tl(OH)Aq, HNO_3Aq	13,690	
	Tl(OH)Aq, HClAq	13,760	The chloride being retained in solution.
	TlO_3H_3, 3HBrAq	30,570	
	Tl(OH)Aq, HClAq	23,860	The haloid thallious compound being entirely precipitated.
	Tl(OH)Aq, HBrAq	27,510	
	Tl(OH)Aq, HIAq	31,610	
	Tl_2O, 2HClAq	44,640	
	Tl_2O, 2HBrAq	51,940	
	Tl_2O, 2HIAq	60,140	
	Tl_2O, 2HCl	79,280	
	Tl_2O, 2HBr	91,820	
	Tl_2O, 2HI	98,560	
	Tl_2O, Aq	− 3,080	
	TlOH, Aq	− 3,155	
	$TlNO_3$, Aq	− 9,970	
	Tl_2SO_4, Aq	− 8,280	
	TlCl, Aq	−10,100	

Reaction.	Units of heat developed.	Remarks.
Pb, O	50,300	Formation of the solid compounds.
Pb, Cl_2	82,770	
Pb, Br_2	64,450	
Pb, I_2	39,670	
PbO, 2HCl	56,830	
PbO, 2HBr	65,630	
PbO, 2HI	69,810	
PbO, 2HClAq	22,190	The products being entirely precipitated.
PbO, 2HBrAq	25,750	
PbO, 2HIAq	31,390	
PbO, SO_3 Aq	23,500	
PbO, N_2O_5Aq	17,770	
PbO, 2HClAq	15,390	The chloride and bromide being dissolved.
PbO, 2HBrAq	15,710	
PbO, $2C_2H_4O_2$Aq	15,460	
Pb, O_3Aq	73,800	The sulphate being precipitated.
Pb, O, N_2O_5Aq	68,070	
Pb, Cl_2, Aq	75,970	
Pb, Br_2, Aq	54,410	Solutions being formed.
$Pb(NO_3)_2$, Aq	− 7,600	
$PbCl_2$, Aq	− 6,800	
$PbBr_2$, Aq	−10,040	

Boron—Aluminium—Indium.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Electric conductivity.
Boron	B	11	2·6	4·2	
Aluminium	Al	27·3	2·6	10·5	33·76 at 20° C.
Indium	In	113·4	7·4	15·3	

The first of these elements has already been described. Aluminium is related not only to boron but also to silicon among the non-metals, and to magnesium among the metals. Its oxide is one of the most stable known, and, like silicon and boron oxides, cannot be reduced by charcoal alone. The metal is usually obtained by heating the double chloride of sodium and aluminium, $2NaCl,Al_2Cl_6$, with sodium. Aluminium is a white malleable metal, nearly resembling zinc in color and hardness; it fuses at a lower temperature than silver, but does not volatilize. It is rapidly dissolved by hydrochloric acid, but only slowly acted on by heated nitric and sulphuric acids; it is readily dissolved by solutions of the alkalies. In a finely-divided state it appears to decompose water almost as easily as magnesium, but when in mass, even if heated to full redness in steam, it decomposes water but slowly, owing to the formation of a coating of oxide on its surface which protects the metal; on this account also it may be heated intensely in air without undergoing more than a superficial oxidation, but in the form of powder it burns brightly when heated to redness in air or oxygen. Aluminium takes fire when heated in chlorine gas, and is converted into the chloride, which is also produced on passing chlorine over an ignited mixture of alumina and charcoal.

Aluminium forms only one chloride, the density of which in the state of vapor corresponds with the formula Al_2Cl_6; it also forms only a single oxide, Al_2O_3. Aluminium chloride is a colorless, crystalline, volatile substance; it is deliquescent and dissolves readily in water, much heat being developed, forming a strongly acid solution. Aluminium hydroxide, $Al_2(OH)_6$, separates as an almost colorless gelatinous precipitate on the addition of alkalies to a solution of an aluminium salt; it is readily soluble in acids, forming salts such as aluminium sulphate, $Al_2(SO_4)_3$. Aluminium sulphate is extremely soluble in water; it is very readily converted into basic salts; it combines with the sulphates of the alkali metals forming characteristic double salts—the so-called alums.

Aluminium hydroxide also possesses marked acid properties, being soluble in alkalies, and furnishing salts such as sodium aluminate, $Na_6Al_2O_6$. On ignition aluminium hydroxide is converted into aluminium oxide or alumina, Al_2O_3; if it has been exposed only to a moderate red heat the alumina is a soft, white, light powder like magnesium oxide, and is soluble in acids; but after strong ignition it becomes very hard and insoluble, or difficultly soluble, in acids. Alumina occurs native as corundum in crystals isomorphous with the corresponding oxides of chromium and iron; in the crystalline state it is the hardest substance known next to the diamond, and insoluble in all acids, but like silica it is dissolved on fusion with alkalies.

The only reactions which, in the case of aluminium, have been submitted to thermochemical investigation are—

Reaction.	Units of heat developed.
Al_2, Cl_6	321,870
Al_2Cl_6, Aq	153,690
Al_2, 6HClAq	239,640
Al_2, O_3, $3H_2O$	388,800
Al_2, O_6, H_6	593,880
$Al_2(OH)_6$, 6HClAq	55,920
$Al_2(OH)_6$, $3SO_3$Aq	62,970

The resemblance of aluminium to boron, silicon, and magnesium is most evident when the oxides and chlorides are compared. Thus, their oxides are all bodies of great stability, and, excepting magnesium oxide, possess marked acid properties; and their chlorides behave similarly when added to water, boron and silicon chlorides being entirely decomposed, and aluminium and magnesium chlorides at least partially, the reaction in each case being attended by the development of a very considerable amount of heat; thus, according as quantities are taken which are as the molecular weights of the chlorides, or which contain the same amount of chlorine, we have—

$SiCl_4$, Aq = 81,640	$\frac{3}{4}$ $SiCl_4$, Aq = 61,230
BCl_3, Aq = 79,200	BCl_3, Aq = 79,200
Al_2Cl_6, Aq = 153,690	$\frac{1}{2}$ Al_2Cl_6, Aq = 76,845
$MgCl_2$, Aq = 35,920	$1\frac{1}{2}$ $MgCl_2$, Aq = 53,780

It may be remarked also that magnesium and aluminium both form very soluble sulphates, which readily combine with other sulphates.

Indium is easily reduced from its oxide by hydrogen, and is precipitated from solutions of its salts by cadmium and zinc. It is an extremely rare metal, and occurs always associated with zinc. It is a soft, ductile, white metal, destitute of crystalline structure, much resembling lead in appearance. It rapidly dissolves in concentrated hydrochloric acid, slowly in dilute nitric and sulphuric acids. It melts at 176° C., but is much less volatile than cadmium, and may be melted in the air without oxidizing; at a bright red heat it burns with a violet flame forming a yellow oxide, In_2O_3.

Indium chloride, In_2Cl_6, sublimes without fusion at an incipient white heat, condensing in soft white laminæ. Indium oxide, In_2O_3, is not volatile even at a white heat; it is readily soluble in acids. It is stated that by heating in a stream of hydrogen the oxides In_7O_9, In_4O_5, and InO_2 are in succession formed from it, but their existence as definite compounds has not been satisfactorily established. Indium hydroxide separates as a white gelatinous precipitate on the addition of ammonia to cold solutions of indic salts; it is soluble in alkalies, and on ignition is converted into the oxide In_2O_3. Indium sulphate forms with ammonium sulphate a double sulphate $In_2(NH_4)_2(SO_4)_4$, $24H_2O$, isomorphous with the alums; when heated only to 36° C., however, this salt is converted into one containing only 4 molecules of water of crystallization.

On passing hydrogen sulphide into solutions of indium a yellow precipitate is obtained, which is decomposed by hydrochloric acid; no precipitate is produced when aluminium salts are similarly treated, aluminium sulphide being at once decomposed by water and converted into the hydroxide.

CHROMIUM—MANGANESE—IRON—COBALT—NICKEL.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.	Electrical conductivity.
Chromium	Cr	52·4	6·8	7·7	
Manganese	Mn	54·8	8·0	6·7	
Iron	Fe	55·9	7·8	7·1	16·81 at 0° C.
Cobalt	Co	58·6	8·9	6·5	17·22
Nickel	Ni	58·6	8·2	7·1	13·11

The general resemblance between these metals is very great, but each exhibits properties which serve to distinguish it readily from the others. They are also related to many other elements; thus, chromium and iron are closely allied to aluminium, and chromium is also allied to sulphur and its congeners; manganese manifests some analogy with the halogens; nickel has properties in common with copper; and iron, cobalt, and nickel are closely related to the so-called platinum metals.

The oxides of chromium and manganese are reduced by charcoal only at a white heat; the oxides of the remaining metals are easily reduced on ignition with hydrogen or carbon.

The properties of chromium appear to differ considerably according to the manner in which it is prepared. Thus, by heating its chloride with potassium it is obtained as a dark grey powder, which oxidizes readily, taking fire in the air at a heat below redness, and dissolving in dilute sulphuric and hydrochloric acids. By heating its chloride with sodium, however, it is obtained in hard, shining crystals, insoluble in all acids. The metal prepared by reducing the oxide with charcoal is shining, has a steel-grey color, and is hard enough to scratch glass.

Manganese is a soft, brittle, greyish-white metal, which oxidizes quickly on exposure to the air, decomposes water slowly at ordinary temperatures, and dissolves easily in acids; it is feebly magnetic.

The properties of iron are too well known to need description. It dissolves readily in acids, and decomposes water rapidly at a red heat; it does not alter in dry air, but rapidly oxidizes in moist air; especially in presence of carbonic acid.

Cobalt has a steel-grey color; nickel is silver-white. Both are hard, ductile, malleable metals, of great tenacity, somewhat more fusible than iron; they decompose water at a red heat, and like iron dissolve without difficulty in acids. They are not altered by the combined action of air and water at ordinary temperatures, but if previously heated burn in oxygen like iron. Nickel appears to be less oxidizable than cobalt. They are both magnetic metals.

Each of these metals forms several oxides; and hydroxides and chlorides, or fluorides, corresponding to most of their oxides are known, as will be evident from the following list:—

Oxides.

	Cr_3O_4	Cr_2O_3		CrO_3
Mn_2O_2	Mn_3O_4	Mn_2O_3	MnO_2	...
Fe_2O_2	Fe_3O_4	Fe_2O_3	...	...
Co_2O_2	Co_3O_4	Co_2O_3	...	...
Ni_2O_2	...	Ni_2O_3	...	...

Hydroxides.

$Cr_2(OH)_4$	$Cr_2(OH)_6$
$Mn_2(OH)_4$	$Mn_2(OH)_6$
$Fe_2(OH)_4$	$Fe_2(OH)_6$
$Co_2(OH)_4$	$Co_2(OH)_6$
$Ni_2(OH)_4$	$Ni_2(OH)_6$

Chlorides.

Cr_2Cl_4	Cr_2Cl_6		CrF_6
Mn_2Cl_4	Mn_2Cl_6	$MnCl_4$	? MnF_6
Fe_2Cl_4	Fe_2Cl_6	...	...
Co_2Cl_4	Co_2Cl_6	...	...
Ni_2Cl_4	...	...	...

Their chlorides, and, in fact, their halogen compounds generally, are all easily soluble in water, with the exception of sublimed chromic chloride, Cr_2Cl_6, which is insoluble in cold, and is only slowly dissolved by boiling water; but if the cold solution contains a minute quantity of chromous chloride, Cr_2Cl_4, the chromic chloride dissolves immediately with development of heat, forming a green solution identical with that produced by dissolving chromic hydroxide in hydrochloric acid; this effect is, perhaps, due to the formation in the first instance of an intermediate chloride, or combination of the two chlorides, which is decomposable by water. The chlorides which correspond in composition to ferrous chloride, Fe_2Cl_4, are all perfectly stable, and volatilize without decomposition; chromic and ferric chlorides are also highly stable bodies, but the remaining chlorides are exceedingly unstable. Chromium hexafluoride, CrF_6, is a very volatile blood-red liquid which is decomposed by water.

Their oxides, with the exception of chromium trioxide or chromic anhydride, CrO_3, and hydroxides are all insoluble in water, but readily dissolve in acids. Chromic oxide, Cr_2O_3, is green, and chromium trioxide has a magnificent scarlet color. Ferric oxide, Fe_2O_3, has a reddish-brown color; the oxides of manganese are brownish-black; and the oxides of nickel and cobalt are all intensely black like cupric oxide. Chromic and ferric oxides form crystals isomorphous with those of aluminic oxide, Al_2O_3.

The affinity of chromium to oxygen is so great that chromous oxide, Cr_2O_2, is apparently incapable of existing, and it is difficult to obtain ferrous oxide, Fe_2O_2, on account of the readiness with which it is oxidized to ferric oxide, Fe_2O_3. Ferric oxide, like chromic oxide, Cr_2O_3, is a body of great stability, but unlike the latter it is converted into a lower oxide, ferroso-ferric oxide, Fe_3O_4, on ignition. The most stable oxide of manganese is the corresponding oxide, Mn_3O_4; but manganous oxide, Mn_2O_2, is less readily oxidized than ferrous oxide, and manganic oxide is less stable than ferric oxide; manganese is the only metal of the iron group which forms a dioxide, or, as it is usually termed, a peroxide. Cobaltous oxide, Co_2O_2, absorbs oxygen when heated to dull redness in air, and is converted into the oxide Co_3O_4, but when more strongly heated this oxide is reconverted into cobaltous oxide, which is also obtained on igniting cobaltic oxide, Co_2O_3. Nickelous

oxide, Ni_2O_2, exhibits no tendency to absorb oxygen, and the higher oxide is very readily decomposed by heat. From this it will be evident that the affinity to oxygen diminishes rapidly from chromium to nickel.

Similar differences are noticeable between their hydroxides. Thus, the tendency of chromous hydroxide, $Cr_2(OH)_4$, to become converted into chromic hydroxide, $Cr_2(OH)_6$, is so great that it decomposes water even at ordinary temperatures with evolution of hydrogen : $Cr_2(OH)_4 + 2OH_2 = Cr_2(OH)_6 + H_2$. Ferrous hydroxide does not decompose water in this manner, but in presence of both air and water it is quickly converted into ferric hydroxide : $2Fe_2(OH)_4 + 4OH_2 + O_2 = 2Fe_2(OH)_6 + 2OH_2$; manganous hydroxide behaves similarly, but oxidizes much less rapidly; cobaltous hydroxide manifests but little tendency to form the higher hydroxide, and nickelous hydroxide is unaffected, when placed in contact with air and water. The two last named hydroxides, however, may be converted into the higher hydroxides by treatment with a solution of sodium hypochlorite.

Their hydroxides are without difficulty converted into the corresponding oxides, giving off water when very gently heated; the behavior of chromous hydroxide is peculiar, as, when ignited, it is converted into chromic oxide with evolution of hydrogen: $Cr_2(OH)_4 = Cr_2O_3 + OH_2 + H_2$. Many hydroxides are known intermediate in composition between the oxides and the highest hydroxides,—such, for example, as are represented by the formulæ $Fe_2O(OH)_4$ and $Fe_2O_2(OH)_2$, which obviously are intermediate in composition between ferric oxide, Fe_2O_3, and ferric hydroxide, $Fe_2(OH)_6$.

With the exception of chromium trioxide, the oxides and hydroxides of the metals now under consideration all exhibit marked basic properties; but chromic hydroxide, like aluminic hydroxide, also has feeble acid properties, dissolving in solutions of the alkalies; and cobaltous and nickelous hydroxides, like cupric hydroxide, readily dissolve in ammonia, the solution of the former being brownish-red, and that of the latter blue. The oxides and hydroxides which correspond in composition with ferrous oxide and hydroxide furnish stable salts such as ferrous sulphate, $Fe_2(SO_4)_2$. The chromous salts, however, are but little known; they form either red or blue solutions, which absorb oxygen with avidity, and dissolve nitric oxide gas, forming dark brown solutions. The ferrous salts form pale green solutions, which slowly absorb oxygen, and readily dissolve nitric oxide (p. 444). The manganous salts are of a pale pink color, and their solutions are scarcely altered in contact with oxygen. Solutions of cobaltous salts have a rose-red color, unless they are very concentrated or mixed with a strong acid, in which case they are blue. Nickelous salts are green. The solutions of cobaltous and nickelous salts are permanent in air.

A second series of chromium and iron salts corresponding to the oxides Cr_2O_3 and Fe_2O_3 are readily obtained, as they are of great stability. Solutions of chromic salts are green or violet; solutions of ferric salts are yellow. Chromic salts such as chromic sulphate, $Cr_2(SO_4)_3$, for example, are reduced to chromous salts by the action of the nascent hydrogen produced when zinc is immersed in their solutions, but they cannot be thus reduced by the aid of iron; ferric salts, however, are readily reduced to ferrous salts even by feeble reducing agents such as hydrogen sulphide. Manganic and cobaltic salts corresponding to the chromic and ferric salts may be obtained, but they are extremely unstable, and nickelic salts appear to be incapable of existing, so that on treating the higher oxides and hydroxides of manganese, &c., with acids, salts derived from manganous oxide and its congeners are usually obtained. Thus, nickelic oxide, Ni_2O_3, is converted by the action of sulphuric acid into nickelous sulphate, with evolution of oxygen; similarly, when manganic oxide, Mn_2O_3, manganic peroxide, MnO_2, or cobaltic oxide, Co_2O_3, is carefully dissolved in hydrochloric acid, solutions are obtained which apparently contain the corresponding chlorides, Mn_2Cl_6, $MnCl_4$, and Co_2Cl_6, but these rapidly decompose with evolution of chlorine, leaving manganous chloride, Mn_2Cl_4, or cobaltous chloride Co_2Cl_4. The oxides which correspond in composition to ferroso-ferric oxide, Fe_3O_4, behave with acids as if mixtures of the two oxides. Salts corresponding to chromium trioxide are not obtainable, for on treatment with sulphuric acid it is converted into chromic sulphate, with evolution of oxygen; and by the action of hydrochloric acid it is converted into chromic chloride, with evolution of chlorine. Like all feebly positive metals, the metals of the iron group form numerous basic salts, iron and chromium being especially characterized by the formation of basic chromic and ferric salts; a remarkable series of ferric and chromic "mixed salts," such, for example, as ferric tetraceto-dinitrate, $Fe_2(NO_3)_2(C_2H_3O_2)_4$, and chromic pentacetonitrate, $Cr_2(NO_3)(C_2H_3O_2)_5$, have been obtained by dissolving the hydroxides in mixtures of two acids in various proportions. Like aluminic sulphate, chromic, ferric, and manganic sulphates form double salts with the sulphates of the alkali metals, which correspond both in composition and crystalline form with the alums. The chrome alums are almost as stable as the true alums, but the iron alums are much less stable, and the manganese alums are so unstable that water decomposes them into their component salts. Ferrous, manganous, cobaltous, and nickelous sulphates form double sulphates with the sulphates of the alkali metals, corresponding in composition and isomorphous with double sulphates such as $K_2Zn(SO_4)_2$, $6H_2O$ and $K_2Cu(SO_4)_2$, $6H_2O$.

The relation of chromium to sulphur and the allied elements is indicated by the existence of the trioxide CrO_3; this oxide, however, is not merely analogous in composition to sulphuric anhydride, but also resembles it in properties. Thus, it dissolves readily in water, forming a strongly acid, yellow solution of chromic acid, H_2CrO_4; and the salts of this acid are not only analogous in composition to the corresponding sulphates, but are also isomorphous with them, and are similar to them in many respects, the chromates of metals which form insoluble or difficultly soluble sulphates being as a rule also insoluble or difficultly soluble. But although the chromates are stable salts, chromic acid is not known except in solution, chromic anhydride, CrO_3, being obtained when the solution is evaporated; moreover, chromic acid very readily parts with oxygen, and on this account is a most valuable oxidizing agent. Acid salts of chromic acid corresponding to the acid sulphates apparently cannot exist, for when a solution of a chromate is rendered acid the color changes from pale yellow to orange-yellow, the chromate being converted into an anhydrochromate or dichromate, which is formed from two molecules of the acid chromate by the withdrawal of the elements of a molecule of water; thus—

$$\underset{\text{Potassium chromate.}}{\begin{matrix}CrO_2(OK)_2\\CrO_2(OK)_2\end{matrix}} + 2HCl = O\left\{\begin{matrix}CrO_2.OK\\CrO_2.OK\end{matrix}\right. + 2KCl + H_2O.$$
$$\text{Potassium anhydrochromate.}$$

The anhydrochromates are mostly orange-red, the corresponding chromates being yellow; they are very stable, and unlike the anhydrosulphates (p. 439), to which they correspond in composition, dissolve in water unchanged.

The relation of chromium to sulphur is also indicated by the existence of an oxychloride, CrO_2Cl_2, corresponding to sulphuric chloride (p. 438), SO_2Cl_2; it is a blood-red colored liquid, which is violently decomposed by water, and boils at 118° C. The determination of the vapor density of this compound shows that it is correctly represented by the formula CrO_2Cl_2.

On fusing an oxide of manganese with potassium nitrate, a deep green-colored mass is formed, from which potassium manganate, K_2MnO_4, may be separated in crystals isomorphous with potassium sulphate. A concentrated solution of this salt is decomposed merely by dilution, and the solution cannot be boiled; on adding an acid the color changes from green to purple-red, the manganate being converted into permanganate :—

$$\underset{\text{Potassium manganate.}}{4K_2MnO_4} + O_2 + 2OH_2 = \underset{\text{Potassium permanganate.}}{2K_2Mn_2O_8} + 4KOH$$

The permanganates are much more stable than the manganates, and their solutions may be boiled without their decomposing; but they readily part with oxygen, and are therefore most powerful oxidizing agents.

As the manganates and sulphates are isomorphous it is probable that the two classes of compounds are analogous in constitution; and from the manner in which the permanganates are formed from the manganates it is probable that the former contain at least two atoms of manganese in the molecule, and that potassium permanganate, for example, is represented by the formula $\begin{matrix}O.MnO_2(OK)\\O.MnO_2(OK)\end{matrix}$. But potassium permanganate is isomorphous with potassium perchlorate and

periodate; it therefore appears probable that, as already pointed out (p. 431), the formula $K_2Cl_2O_8$ for the former salt is preferable to the simpler formula $KClO_4$, by which it is usually represented. The isomorphism of potassium permanganate with potassium perchlorate and periodate is, however, chiefly of interest as an indication that manganese is related to the halogens.

Iron is also capable of yielding a compound analogous to potassium manganate, but much less stable, termed potassium ferrate, K_2FeO_4; it is produced by fusing an oxide of iron with nitre. The solution has a cherry-red color, and on the addition of acids is at once decomposed with evolution of oxygen. The most characteristic compounds of iron, however, are the so-called ferrocyanides and ferricyanides. Potassium ferrocyanide, $K_8Fe_2(CN)_{12}$, is produced on adding potassium cyanide to a solution of a ferrous salt in sufficient amount to redissolve the precipitate which at first forms; it crystallizes from the concentrated solution in beautiful yellow plates. The tendency to form this salt is so great that metallic iron is rapidly dissolved when heated with an aqueous solution of potassium cyanide:—

$$12KCN+2Fe+4H_2O=K_8Fe_2(CN)_{12}+4KHO+2H_2.$$

Not only is the presence of iron in this compound not discoverable by the ordinary tests, but on treatment with hydrochloric acid it furnishes hydroferrocyanic acid, $H_8Fe_2(CN)_{12}$, and is not, like most double cyanides, decomposed with evolution of hydrocyanic acid. Potassium ferricyanide, $K_6Fe_2(CN)_{12}$, is produced by the action of chlorine on the ferrocyanide: $K_8Fe_2(CN)_{12} + Cl_2 = K_6Fe_2(CN)_{12}+2KCl$; it crystallizes in red prisms, and like the ferrocyanide is an extremely stable compound. Other ferro- and ferri-cyanides may be prepared from the potassium compounds by double decomposition.

Cobalticyanides, such as $K_6Co_2(CN)_{12}$, isomorphous with the ferricyanides, are readily obtained, and are equally stable; but the cobaltocyanides are very unstable. Chromicyanides and mangano- and mangani-cyanides, isomorphous with the corresponding iron compounds are also known, but they are much less stable than the latter. Nickel does not furnish compounds of this kind, but like copper forms double cyanides, such as $Ni(CN)_2, 2KCN$, which are readily decomposed by acids with evolution of hydrocyanic acid.

Nickel, although of the same atomic weight as cobalt, it will be manifest, is possessed of very different properties, being in many respects much more nearly related to copper than to cobalt, iron, &c.; it is noteworthy that nickel and copper are the only metals whose compounds form blue solutions with ammonia. The relation of chromium, iron, manganese, and cobalt to one another, and of the first two especially to aluminium, will be sufficiently evident without further remark; the relation of iron, cobalt, and nickel to the platinum metals will be referred to later on.

Manganese and iron are the only elements of this group which have been submitted to thermochemical investigation. Many of the results are of considerable interest; thus, it will be noticed, on reference to the following tables, that much more heat is developed in the formation of manganous chloride, $MnCl_2$ or Mn_2Cl_4, than in that of the corresponding chloride of iron; this is of interest in connection with, and may perhaps serve to explain, the great instability of the higher chlorides of manganese.

Reaction.	Units of heat developed.	Remarks.
Mn, Cl_2	111,990	Formation of the anhydrous chloride, manganous hydroxide, manganic hydroxide, $MnO(OH)_2$, and potassium permanganate.
Mn, O, H_2O	94,770	
Mn, O_2, H_2O	116,280	
Mn_2, O_8, K_2	389,650	
$MnCl_2, Aq$	16,010	Dissolution of the salts in water.
$MnSO_4 + 4H_2O, Aq$	1,770	
$MnSO_4 + 5H_2O, Aq$	40	
$Mn_2O_8K_2, Aq$	−20,790	
$Mn(OH)_2, SO_3Aq$	26,480	Neutralization of manganous hydroxide.
$Mn(OH)_2, 2HClAq$	22,950	
Mn, O, SO_3Aq	121,250	Formation in aqueous solution.
Mn, Cl_2, Aq	128,000	
$2Mn(OH)_2, O_5, 2KOHAq$	14,760	Formation of solution of permanganate from manganous and manganic hydroxide.
$2MnO(OH)_2, O_5, 2KOHAq.$	−28,260	
Fe, Cl_2	82,050	Formation of the anhydrous compounds.
Fe_2, Cl_6	192,060	
$2FeCl_2, Cl_2$	27,960	
Fe, O, H_2O	68,280	
$Fe_2, O_3, 3H_2O$	191,130	
$2Fe(OH)_2, O$	54,570	
$FeCl_2, Aq$	17,900	Dissolution of the salts in water.
Fe_2Cl_6, Aq	63,360	
$FeSO_4 + 7H_2O, Aq$	−4,510	
$Fe(OH)_2, SO_3Aq$	24,920	Neutralization of ferrous and ferric hydroxide.
$Fe(OH)_2, 2HClAq$	21,390	
$Fe_2(OH)_6, 3SO_3Aq$	33,750	
$Fe_2(OH)_6, 6HClAq$	33,450	
$Fe_2(OH)_6, 3N_2O_5Aq$	33,600	
$Fe_2(OH)_6, 6C_2H_4O_2Aq$	23,970	
Fe, Cl_2, Aq	99,950	Formation of the chlorides and sulphates in aqueous solution.
Fe_2, Cl_6, Aq	255,420	
$2FeCl_2Aq, Cl_2$	55,520	
Fe, O, SO_3Aq	93,200	
$Fe_2, O_3, 3SO_3Aq$	224,880	

The only two compounds of the metals of the iron group of which the vapor density has been determined are ferric chloride and chromium oxychloride; the density of the former corresponds to the formula Fe_2Cl_6, and that of the latter to the formula CrO_2Cl_2. Hence the composition of ferric chloride is similar to that of aluminic chloride, the density of which corresponds to the formula Al_2Cl_6, and it is therefore probable that chromic chloride, which is in all respects analogous to aluminic and ferric chlorides, is similarly constituted, and that its formula is Cr_2Cl_6.

The majority of the formulæ employed to represent chemical compounds which cannot be converted into gas are merely the simplest expressions of their composition in terms of the atomic weights of their constituent elements. Thus it is usual to express the composition of the lower chlorides of chromium, iron, manganese, &c., by the simple formulæ $CrCl_2$, $MnCl_2$, $FeCl_2$, and the corresponding oxides by the similar formulæ CrO, MnO, FeO; there are reasons, however, which lead us to suppose that in many cases the less simple formulæ, such as Cr_2Cl_4, Cr_2O_2, are to be preferred, and that the lower chlorides and oxides of iron, &c., like the higher chlorides and oxides, contain at least two atoms of the metal in the molecule. For example, the lower chlorides of chromium and iron are readily converted into the higher chlorides by the action of chlorine; now if the formula of ferrous chloride is $FeCl_2$, that of ferric chloride being Fe_2Cl_6, the conversion of the former into the latter by the action of chlorine involves the extremely improbable assumption that a molecule of the ferric compound is formed from two molecules of the ferrous compound:—

$$2FeCl_2 + Cl_2 = Fe_2Cl_6.$$

Chlorine is not known ever to produce an effect of this kind, that is to say, directly to cause the formation of a more complex from a less complex molecule; but its action is frequently to produce an effect the very reverse of this, many instances of simplification of the molecule by the action of chlorine being known. By adopting the formula Fe_2Cl_4 for ferrous chloride a natural interpretation of its conversion into ferric chloride is at once possible, however:—

$$\begin{matrix} FeCl_2 \\ \| \\ FeCl_2 \end{matrix} \quad + \quad Cl_2 \quad = \quad \begin{matrix} FeCl_3 \\ | \\ FeCl_3 \end{matrix}$$

Ferrous chloride. Ferric chloride.

Corresponding formulæ may be assigned to the lower chlorides of chromium, manganese, cobalt, and nickel, on account of their resemblance to ferrous chloride; and from the general resemblance which the nickel compounds bear to the cupric compounds it appears probable that, if nickel chloride has the formula Ni_2Cl_4, cupric chloride has the formula Cu_2Cl_4.

The argument may be extended much further, and from the more or less perfect resemblance of silver chloride to cuprous chloride, mercurous chloride, and other chlorides which certainly contain at least two atoms of chlorine in their molecules, we may infer that the formula Ag_2Cl_2 is probably a more correct expression than that commonly employed. The existence of a subchloride and a suboxide

of silver indicates that silver is not uniformly a monad element, and if we regard copper, silver, and gold as triad elements (although the last mentioned is undoubtedly capable of assuming pentad functions) we may represent their lower chlorides by similar formulæ, and thus, in a measure, account for the similarity in their properties:—

CuCl	AgCl	AuCl
||	||	||
CuCl	AgCl	AuCl
Cuprous chloride.	Argentic chloride.	Aurous chloride.

But it has been pointed out that certain of the silver compounds are isomorphous with the corresponding sodium and potassium compounds, and as there is no reason to suppose that the argentic compounds generally are not of similar constitution to argentic chloride, the conclusion that there are two atoms of silver in the molecule of argentic chloride would appear to necessitate the assumption that the compounds of the alkali metals also contain at least two atoms of the metal in their molecules;—that the formula of sodium nitrate, for example, is $Na_2(NO_3)_2$, and not $NaNO_3$. The existence of a compound of sodium ethyl with zinc ethyl, $NaZn(C_2H_5)_3$, from which the former cannot even be separated, appears to show that sodium does not invariably function as a monad.

Speculations of this kind are extremely hazardous, but, as no method is known enabling us to ascertain the molecular composition of compounds which cannot be volatilized, they possess a certain interest and, moreover, point to the necessity of investigation in this direction.

Ruthenium—Rhodium—Palladium—Osmium—Iridium—Platinum.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.
Ruthenium	Ru	103·5	11·4	9·1
Rhodium	Rh	104·1	12·1	8·6
Palladium	Pd	106·2	12·0	8·8
Osmium	Os	198·6	22·4	8·8
Iridium	Ir	196·7	22·4	8·7
Platinum	Pt	196·7	21·5	9·7

These metals always occur in the native state, and are usually associated together. The relation between ruthenium, rhodium, and palladium, and between osmium, iridium, and platinum, is similar to that which obtains between iron, cobalt, and nickel; they are indeed very closely related to these last elements,—the resemblance in properties being greatest between iron, ruthenium, and osmium; between cobalt, rhodium, and iridium; and between nickel, palladium, and platinum. Palladium and platinum also manifest much analogy to silver and gold, and ruthenium and osmium exhibit properties which connect them with the elements molybdenum and tungsten.

They are white, or nearly white, hard metals, of high specific gravity, osmium being the heaviest of the elements; they may be melted, but only at a very high temperature with the aid of the oxyhydrogen blowpipe, with the exception of osmium, which does not melt, but volatilizes, palladium being more fusible, and rhodium, ruthenium, and iridium much less fusible, than platinum. Palladium is soluble in concentrated nitric acid, and platinum in nitrous acid, as well as in aqua-regia; the remaining metals are difficultly soluble or are insoluble in aqua-regia. They are all attacked on fusion with alkalies and potassic nitrate. Most of them possess in a high degree the property to which allusion has already been made of condensing gases on their surfaces, especially when in a finely divided state; thus, finely divided platinum at ordinary temperatures absorbs about 240 times its volume of hydrogen, and finely divided palladium at 200° C. absorbs nearly 700 times its volume of hydrogen. When heated in an atmosphere of the gas platinum and palladium also occlude hydrogen when in a compact state. The latter metal, according to Troost and Hautefeuille, forms a definite compound with hydrogen of the composition Pd_2H, which is further capable of absorbing hydrogen in considerable quantity; the density of the pure compound is 11·06, that of the melted metal from which it was prepared being 12, and, therefore, if it be supposed that the elements unite without condensation, that is to say, that the hydrogen has the same density as it would have if solidified in the free state, the density of solidified hydrogen is ·62, or slightly higher than that of lithium. Iron, cobalt, and nickel also possess the property of occluding hydrogen, although only in a slight degree.

The following chlorides and oxides of the platinum metals are known:—

Chlorides.

Ru_2Cl_4	Ru_2Cl_6	$RuCl_4$
Os_2Cl_4	Os_2Cl_6	$OsCl_4$
.....	Rh_2Cl_6	.....
.....	Ir_2Cl_6	$IrCl_4$
Pd_2Cl_4	.....	$PdCl_4$
Pt_2Cl_4	.....	$PtCl_4$

Oxides.

Ru_2O_2	Ru_2O_3	Ru_2O_4
Os_2O_2	Os_2O_3	Os_2O_4
Rh_2O_2	Rh_2O_3	Rh_2O_4
Ir_2O_2	Ir_2O_3	Ir_2O_4
Pd_2O_2	.....	Pd_2O_4
Pt_2O_2	.....	Pt_2O_4

Ruthenium absorbs oxygen at a red heat, and is converted into the oxide, Ru_2O_3, which is its most stable oxide, whereas the dioxide is the most stable oxide of osmium. Ruthenium tetroxide, RuO_4, is a golden-yellow crystalline substance, sparingly soluble in water, which melts at 58° C., and boils a little above 100° C.; hydrochloric acid converts it into the chloride Ru_2Cl_6, with evolution of chlorine. The solution of this chloride is decomposed by boiling, the hydroxide $Ru_2(OH)_6$ being precipitated; like ferric chloride, it is reduced to the chloride Ru_2Cl_4 by hydrogen sulphide, the color changing from orange-yellow to blue.

Osmium, in the compact state, is slowly converted into the tetroxide, OsO_4, when roasted in air, but the pulverulent metal obtained by reducing this oxide by hydrogen oxidizes spontaneously in the air. Osmium tetroxide is a white, crystalline, extremely volatile substance; it melts considerably below 100° C., and boils at a temperature a little above its melting point. The vapor density determination shows that it is correctly represented by the formula OsO_4. Its vapor has an intolerably pungent odor, and is excessively poisonous. It is dissolved by water, and is a powerful oxidizing agent, but does not evolve chlorine on treatment with hydrochloric acid; most metals, even silver and mercury, excepting gold and the platinum metals, partially reduce its solution and cause the separation of osmium; it is decomposed by ammonia, being converted into the hydroxide $Os(OH)_4$, with evolution of nitrogen: $3OsO_4+4NH_3=3Os(OH)_4+2N_2$. A lower hydroxide of osmium, $Os_2(OH)_4$, is known, which like ferrous hydroxide rapidly oxidizes on exposure to the air.

The tetroxides of ruthenium and osmium are apparently perfectly neutral bodies, possessing neither basic nor acid properties; the remaining oxides exhibit only feeble basic properties, and furnish unstable salts, of which very little is known. The oxides of ruthenium are readily reduced when heated in hydrogen; osmium tetroxide is reduced at a red heat, but the lower oxides of osmium are reduced by hydrogen at ordinary temperatures.

Ruthenium and osmium furnish ruthenio- and osmiocyanides, such as $K_8Ru_2(CN)_{12}$ and $K_8Os_2(CN)_{12}$, isomorphous with the corresponding ferrocyanides, from which the acids $H_8Ru_2(CN)_{12}$ and $H_8Os_2(CN)_{12}$, may be prepared; the compounds analogous to the ferricyanides are not known. On heating the metals with potassium nitrate, compounds analogous in composition to potassium ferrate, but more stable, are formed; potassium rutheniate, K_2RuO_4, is apparently much less stable than potassium osmate, K_2OsO_4, which may be obtained in large rose-colored crystals; their solutions are at once decomposed by acids, the former yielding the hydroxide $Ru_2(OH)_6$ with evolution of oxygen, and the latter the hydroxide $Os(OH)_4$ and osmium tetroxide.

The chlorides of ruthenium and osmium form numerous double salts, but the most important are the ruthenio- and osmio-chlorides, such as K_2RuCl_6 and K_2OsCl_6, which are isomorphous with the corresponding platinochlorides.

Iridium and rhodium are insoluble in aqua-regia, and even when in a finely divided state are only slowly oxidized at a red heat; the most stable oxide of iridium is the dioxide, and the tendency of iridium is always to form compounds which correspond to this oxide in composition,

but compounds corresponding to the oxide Rh_2O_3 are more often produced from rhodium, this being apparently its most stable oxide. The oxides of rhodium are reduced when heated in an atmosphere of hydrogen, but the oxides of iridium are reduced at ordinary temperatures. The difference between the two metals is therefore similar to that between ruthenium and osmium, which they much resemble in their general behavior, although neither furnishes a tetroxide, and rhodium forms only one stable chloride, the hydroxide $Rh(OH)_4$ being dissolved by hydrochloric acid with evolution of chlorine. Iridium tetrachloride forms double chlorides or iridiochlorides isomorphous with the corresponding platinochlorides. Like cobalt, rhodium and iridium form compounds which are not only analogous in composition to the ferricyanides, but also isomorphous with them. A number of rhodium salts corresponding to the oxide Rh_2O_3 are known, but they crystallize with difficulty; the hydroxides of iridium are soluble in acids, but no definite oxygen salts of iridium have been obtained. The hydroxides $Rh_2(OH)_6$ and $Ir_2(OH)_6$ manifest feeble acid properties, dissolving in alkalies. Rhodium and iridium are precipitated from solutions of their salts by most metals, but not by silver or gold.

In many of their properties palladium and platinum more nearly resemble silver and gold than the preceding metals, just as nickel is more closely allied to copper than to cobalt and iron. Palladium is superficially oxidized at a lower temperature than silver, but its oxide is decomposed at a red heat; platinum is not in the least affected when heated in air or oxygen. The most stable compounds of palladium are the palladious compounds, a solution of palladic chloride, $PdCl_4$, being decomposed when heated, with evolution of chlorine, Pd_2Cl_4 being produced; the most stable compounds of platinum, however, are those which correspond in composition to platinic chloride. Palladium, like silver, is stained by iodine, which is without action on platinum, owing to the formation of palladious iodide, which is also obtained on adding potassium iodide to a solution of a palladious salt; it is a black powder insoluble in water but soluble in ammonia, and also, like silver iodide, in a solution of potassium iodide. Both platinous and platinic chlorides, like auric chloride, readily unite with hydrochloric acid, forming chloroplatinous and chloroplatinic acids, H_2PtCl_4 and H_2PtCl_6; salts of these acids are produced by the combination of platinous and platinic chlorides with the chlorides of other metals. Palladious and palladic chlorides, and the corresponding chlorides of the other platinum metals, as already pointed out, form similar compounds, those which correspond in composition being in all cases isomorphous. Although platinum and palladium do not furnish compounds analogous to the ferro- or ferri-cyanides, they form a distinct series of very beautiful and highly stable salts termed platinocyanides and palladiocyanides, which are analogous in composition to the chloroplatinites, and from which the corresponding acids may be obtained by decomposing the silver salts, for example, with hydrogen sulphide; thus:—

K_2PtCl_4 — Potassium platinochloride.

$K_2Pt(CN)_4$ — Potassium platinocyanide.

$K_2Pd(CN)_4$ — Potassium palladiocyanide.

The palladiocyanides are isomorphous with the corresponding platinocyanides. These salts combine with the halogens, forming compounds such as potassium platinichlorocyanide, $K_2PtCl_2(CN)_4$, which are analogous to the chloroplatinates such as K_2PtCl_6. A somewhat similar series of bodies may be obtained from gold, *e.g.*, potassium auricyanide, $KAu(CN)_4$, and potassium aurichlorocyanide, $KAuCl_2(CN)_2$.

The oxides and hydroxides of platinum and palladium are somewhat more stable than the silver and gold compounds, but are entirely decomposed on ignition; they dissolve in acids, but the resulting salts have little stability, although they are considerably more stable than those of gold. The hydroxides appear all to possess acid properties, platinic hydroxides dissolving readily in solutions of alkalies, forming metallic derivatives which may be obtained in crystals. Platinic hydroxide, like auric hydroxide, is converted into a fulminating compound by the action of ammonia.

Cobalt and the platinum metals are especially characterized by the readiness with which they enter into reaction with ammonia, forming salts of cobalt and platinum bases, which are often extremely complex in composition. Thus, a solution of platinous chloride in warm, moderately strong ammonia, concentrated by evaporation, on cooling deposits yellow crystals of platinodiammonium chloride, $PtN_4H_{12}Cl_2$, H_2O; by treating a solution of this salt with silver sulphate it is converted into the sulphate $PtN_4H_{12}(SO_4)$, from which the corresponding hydroxide $PtN_4H_{12}(OH)_2$ may be procured by adding to the solution the equivalent quantity of barium hydroxide. Platinodiammonium hydroxide may be obtained in crystals; it is a powerfully alkaline, caustic substance, and, according to Thomsen, its heat of neutralization is as great as that of the alkalies and the hydroxides of barium, strontium, and calcium. When platinodiammonium hydroxide is heated as long as it gives off ammonia and water, it is converted into platinoammonium oxide, PtN_2H_6O, from which salts such as platinoammonium chloride, $PtN_2H_6Cl_2$, may be prepared by the action of acids; on passing chlorine into water in which the latter is suspended it is converted into chloroplatinoammonium chloride, $PtCl_2N_2H_6Cl_2$.

The relation of these compounds to platinous chloride and to one another may be expressed by the following formulæ:—

$PtCl_2$	$Pt[NH_2Cl(NH_4)]_2$	$Pt(NH_3Cl)_2$	$PtCl(NH_3Cl)_2$
‖	‖	‖	|
$PtCl_2$	$Pt[NH_2Cl(NH_4)]_2$	$Pt(NH_3Cl)_2$	$PtCl(NH_3Cl)_2$
Platinous chloride.	Platinodiammonium chloride.	Platinoammouium chloride.	Chloroplatino-ammonium chloride.

Similarly, when a solution of cobaltous chloride in ammonia is exposed to the air, the liquid assumes first a brown and then a red color, and if the reddened liquid is mixed with hydrochloric acid a brick-red precipitate is produced; by recrystallizing this from hot water containing hydrochloric acid it is obtained in beautiful ruby-red crystals of the composition $Co_2N_{10}H_{30}Cl_6$. The relation of this compound, which is termed purpureocobaltic chloride, to cobaltous and cobaltic chlorides may be expressed as follows:—

$CoCl_2$	$CoCl_3$	$Co\begin{cases} NH_3Cl \\ [NH_2Cl(NH_4)]_2 \end{cases}$
‖	|	|
$CoCl_2$	$CoCl_3$	$Co\begin{cases} [NH_2Cl(NH_4)]_2 \\ NH_3Cl \end{cases}$
Cobaltous chloride.	Cobaltic chloride.	Purpureocobaltic chloride.

Nickel and copper appear to form similar compounds, but they are mostly very soluble and far less complex, these elements having little or no tendency to function as hexads.

TITANIUM—ZIRCONIUM—TIN.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.
Titanium	T	48	.....	.....
Zirconium	Zr	90	4·1	21·9
Tin	Sn	117·8	7·3	16·1

Titanium and zirconium are closely related to silicon, and, therefore, to carbon, and occupy an intermediate position between these elements and the true metals. Titanium and tin, however, are more nearly related than either titanium and zirconium or tin and zirconium,—zirconium more closely resembling silicon, especially in the properties of its oxide.

Titanium and zirconium apparently resemble silicon closely in their physical properties, and exist both in the amorphous and crystalline state. In the amorphous state they burn with great brilliancy when heated to redness in oxygen, and they take fire when heated to redness in chlorine; titanium also unites directly with nitrogen at high temperatures, and it is stated forms the three nitrides Ti_3N_2, Ti_3N_4, TiN_2. Titanium is said to be soluble in warm hydrochloric acid, but zirconium is only slowly attacked by ordinary acids, although it readily dissolves even in cold hydrofluoric acid. Crystalline zirconium is very hard, and resembles antimony in color, lustre, and brittleness; it is less fusible than silicon.

Tin is a soft, very malleable, white metal, with a tinge of yellow, and is a tolerably good conductor of electricity, titanium and zirconium being non-conductors of electricity. It fuses at about 230° C. It scarcely tarnishes at ordinary temperatures, but at a red heat it rapidly oxidizes, and readily decomposes water. It is only slowly dissolved by

warm hydrochloric acid, which converts it into stannous chloride, Sn_2Cl_4, but is rapidly acted on by moderately concentrated nitric acid; chlorine acts readily on the melted metal, converting it into stannic chloride, $SnCl_4$. Two chlorides of titanium are known, Ti_2Cl_6 and $TiCl_4$, but only one chloride of zirconium, $ZrCl_4$. Titanium and tin tetrachlorides are colorless liquids, which boil respectively at 135° and 115° C.; their lower chlorides are solids, and are powerful reducing agents. Zirconium chloride is a white, crystalline solid; its vapor density corresponds with the formula $ZrCl_4$. When titanium and tin tetrachlorides are mixed with a small quantity of water, much heat is developed, and they dissolve, probably forming chlorhydrins; but a large quantity of water causes their conversion into the corresponding hydroxides, which separate as white gelatinous precipitates. Zirconium chloride is dissolved even by a large quantity of water, but the hydroxide $Zr(OH)_4$ separates as a gelatinous, bulky, white precipitate on the addition of alkalies.

Titanium, zirconium, and tin tetrafluoride unite with metallic fluorides, forming crystalline salts which correspond in composition to the silicofluorides or fluosilicates (p. 452), with which they are isomorphous; thus:—

K_2SiF_6	K_2TiF_6	K_2ZrF_6	K_2SnF_6.
Potassium fluosilicate.	Potassium fluotitanate.	Potassium fluozirconate.	Potassium fluostannate.

Titanic oxide, TiO_2, has a reddish-brown color; stannic oxide, SnO_2, is white or yellowish-white, but assumes a transient dark yellow or brown color when heated; zirconic oxide, ZrO_2, is white. They may be obtained in crystals which are isomorphous. Zirconic oxide is infusible, and titanic oxide melts only at the heat of the oxyhydrogen blowpipe; stannic oxide is somewhat more fusible, although very difficult to fuse. Titanic oxide is reduced by charcoal at a white heat, and stannic oxide at a full red heat; zirconic oxide, however, appears entirely to resist reduction; by ignition with charcoal in an atmosphere of chlorine they are converted into the corresponding chlorides. After ignition they are insoluble in acids, except concentrated sulphuric acid; they are dissolved on fusion with alkalies. By dissolving the oxides or the corresponding hydroxides in acids, salts such as stannic sulphate, $Sn(SO_4)_2$, are produced; the titanium and tin salts are so unstable, however, that their solutions are decomposed by boiling; the zirconium salts are somewhat more stable. Stannic hydroxide readily dissolves in alkaline solutions, but titanic and zirconic hydroxides are insoluble. The salts which are formed from the hydroxides or oxides by the action of alkalies are mostly analogous to the silicates of the form $M_2'SiO_3$; thus:—

Na_2SiO_3	Na_2TiO_3	Na_2ZrO_3	Na_2SnO_3.
Sodium silicate.	Sodium titanate.	Sodium zirconate.	Sodium stannate.

When tin is heated with concentrated nitric acid it is converted into white, insoluble, metastannic acid; the air-dry substance has the composition Sn_5O_{10}, $10H_2O$, but on drying at 100° C. it is converted into the compound $H_{10}Sn_5O_{15}$; metastannic acid has feeble acid properties, and furnishes salts which all correspond in composition to potassium metastannate, $K_2H_8S_5O_{15}$. On boiling a solution of titanic hydroxide in hydrochloric acid an apparently similar compound is precipitated.

Stannous hydroxide, $Sn_2(OH)_4$, like stannic hydroxide, exhibits both basic and acid properties, dissolving in acids and also in alkalies; it gradually absorbs oxygen on exposure to the air. When a solution of titanic hydroxide in hydrochloric acid is digested with metallic copper, it becomes violet-blue, and on the addition of an alkali a dark brown precipitate separates, which probably is the hydroxide corresponding to the chloride Ti_2Cl_6. Tin is the only element of this group which may be precipitated as sulphide by hydrogen sulphide.

Vanadium—Arsenic—Niobium—Antimony—Tantalum—Bismuth.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.
Vanadium	V	51·2	5·5	9·3
Arsenic	As	74·9	5·7	13·9
Niobium	Nb	94	(?) 6·3	14·9
Antimony	Sb	122	6·7	18·1
Tantalum	Ta	182	(?) 10·8	16·8
Bismuth	Bi	207·5	9·8	21·1

These elements belong to the same group as nitrogen and phosphorus, but the relation between them is in a marked degree periodic, the resemblance being greatest in many respects between arsenic, antimony, and bismuth, and between vanadium, niobium, and tantalum. Vanadium is the only member of the group, excepting niobium and, perhaps, tantalum, which furnishes colored compounds, and in this respect resembles titanium and chromium, to both of which it is about equally related. Relationship may also be traced between arsenic and selenium; between niobium and zirconium, and niobium and molybdenum; between antimony and tin, and antimony and tellurium; and between tantalum and tungsten.

The following chlorides and oxides of the elements of this group are known:—

Chlorides.

	(?) NCl_3		
	PCl_3		PCl_5
V_2Cl_4	V_2Cl_6	(?) V_2Cl_8	.....
.....	$AsCl_3$	.....	.....
.....	.....	.....	$NbCl_5$
.....	$SbCl_3$	.....	$SbCl_5$
.....	.....	.....	$TaCl_5$
Bi_2Cl_4	$BiCl_3$	.....	.....

Oxides.

N_2O	NO	N_2O_3	N_2O_4	N_2O_5
.....	.....	P_2O_3	.....	P_2O_5
.....	V_2O_2	V_2O_3	V_2O_4	V_2O_5
.....	.....	$(As_2O_3)_2$	.....	As_2O_5
.....	.....	.....	.....	Nb_2O_5
.....	.....	? $(Sb_2O_3)_2$	.....	Sb_2O_5
.....	.....	.....	Ta_2O_4	Ta_2O_5
.....	.....	Bi_2O_3	.....	Bi_2O_5

Arsenic, antimony, and bismuth are readily reduced from their oxides, but the oxides of vanadium, niobium, and tantalum are not reduced to the metallic state by ignition with charcoal; vanadium may be obtained by the reduction of its dichloride in hydrogen at a bright-red heat. Arsenic has a brilliant, dark steel-grey lustre; antimony has a bluish-white, and bismuth a reddish-white color; they are hard, and extremely brittle, and bad conductors of electricity. Arsenic begins to volatilize at 180° C. without fusing; antimony fuses at about 450° C., and bismuth at about 265° C. They are but little altered on exposure to the air at ordinary temperatures, but readily oxidize when heated. They are readily acted upon by moderately concentrated nitric acid, but are only very slowly dissolved by boiling hydrochloric acid.

Vanadium has been obtained as a whitish-grey powder, which under the microscope appears as a brilliant, crystalline, metallic mass possessing a silver-white lustre. It does not oxidize at ordinary temperatures, but when heated in air it rapidly absorbs oxygen, and is finally converted into the pentoxide. It is not attacked by boiling hydrochloric acid, but nitric acid of all strengths readily dissolves it. It is converted into a mononitride when heated in nitrogen gas.

Niobium and tantalum have been obtained only in an impure state as black powders. Like vanadium, these elements have a great tendency to unite with nitrogen. Vanadium dichloride crystallizes in apple-green colored plates, and vanadium trichloride forms peach-blossom colored tables; vanadium tetrachloride is a reddish-brown liquid, which boils at 154° C. An oxychloride of vanadium, $VOCl_3$, corresponding to phosphorus oxychloride, $POCl_3$, is also known; it is a yellow liquid, which boils at 126° C. The vapor density of the tetrachloride, according to Roscoe, corresponds with the formula VCl_4, but as it is resolved into the trichloride and free chlorine on boiling, and even undergoes the same decomposition at ordinary temperatures, it may be doubted whether the density observed was really that of the tetrachloride, and not that of a mixture of a lower chloride and chlorine, especially as from the analogy which vanadium presents to chromium the formula V_2Cl_8 appears to be more probable than the simpler formula.

The vanadium chlorides are dissolved and decomposed by water, the tetrachloride forming a blue, the trichloride a green, the dichloride a lavender-colored, and the oxychloride a yellow liquid; the solution of the dichloride is a most powerful reducing agent, and the solutions of the tri- and tetra-chloride also exhibit reducing properties,

owing to the tendency of the dissolved compounds to combine with oxygen to form vanadic acid.

Vanadium pentoxide or vanadic anhydride, V_2O_5, corresponds in composition and properties to phosphoric anhydride; it has a brownish-red color, and fuses at a red heat; it dissolves sparingly in water, forming a yellow, strongly acid solution of vanadic acid. By the combination of vanadic anhydride with basic oxides in various proportions salts corresponding to the three series of phosphates, as well as salts of a more complex character, are obtained; thus:—

Sodium metaphosphate, $NaPO_3$
" orthophosphate, Na_3PO_4
" pyrophosphate, $Na_4P_2O_7$
" metavanadate, $NaVO_3$
" orthovanadate, Na_3VO_4
" pyrovanadate, $Na_4V_2O_7$

Isomorphism has been observed between several corresponding phosphates and vanadates. The tetroxide and trioxide of vanadium also possess feeble acid properties and unite with basic oxides. The vanadium oxides dissolve in acids, mostly forming salts such as the sulphate $V_2O_2(SO_4)_2$, in which the hydrogen of the acid is displaced by the radical VO; the formation of salts of this kind is characteristic of all the metalloids included in this group, and apparently of the metalloids generally. A solution of vanadium pentoxide in sulphuric acid, which is red, becomes blue on treatment with sulphurous acid or hydrogen sulphide, the salt of the pentoxide being reduced to a salt of the tetroxide; by the aid of magnesium the reduction may be carried a stage further, and a salt of the trioxide is formed, the solution becoming green; and if zinc, cadmium, or sodium amalgam is employed, the solution finally becomes lavender-colored, and contains a salt of the dioxide.

Arsenic trichloride, $AsCl_3$, the only known chloride of arsenic, is a heavy, colorless, oily liquid, which boils at 132° C.; it is dissolved by water, probably as a chlorhydrin, as its solution in the smallest possible quantity of water deposits after some days crystals of the composition $AsCl(OH)_2$.

Antimony trichloride is a crystalline compound which boils at 223° C.; its vapor density corresponds with the formula $SbCl_3$. Antimony pentachloride, $SbCl_5$, is a heavy yellowish liquid, which cannot be distilled without decomposition. These chlorides are dissolved by hydrochloric acid or a small quantity of water, but a large quantity of water converts the trichloride into an insoluble oxychloride, SbOCl, and the pentachloride into a compound which corresponds in composition to pyrophosphoric acid, viz., $H_4Sb_2O_7$. No oxychloride of arsenic or antimony corresponding to phosphorus oxychloride is known, but a crystalline antimony sulphochloride, $SbSCl_3$, exists.

Bismuth trichloride is a very fusible, volatile, deliquescent, colorless compound; its vapor density corresponds with the formula $BiCl_3$; water converts it into an insoluble oxychloride, BiOCl; when heated in hydrogen it furnishes an unstable dichloride, Bi_2Cl_4.

Niobium pentachloride, $NbCl_5$, is a yellow, easily fusible, crystalline substance, which boils at 240° C.; niobium oxychloride, $NbOCl_3$, is a white, infusible, but volatile, crystalline compound. The formulæ of these bodies have been established by the determination of their vapor densities; both are decomposed by water. The solution of niobium chloride in hydrochloric acid becomes blue when a plate of zinc is immersed in it. Tantalum pentachloride is a yellow, fusible, crystalline substance, which boils at about 242° C.; its vapor density corresponds with the formula $TaCl_5$; it is decomposed by water.

Both oxides of arsenic are white; the trioxide sublimes at about 200° C. without fusing; the pentoxide, when suddenly heated to redness, fuses and is decomposed into the trioxide and oxygen. The vapor density of the trioxide corresponds with the formula As_4O_6. Arsenious trioxide is sparingly soluble in cold water, more readily in hot water, and freely in hot hydrochloric acid; the aqueous solution reddens litmus. The pentoxide is deliquescent and easily soluble in water, forming a solution of arsenic acid, H_3AsO_4; on evaporating the solution, however, even at ordinary temperatures, crystals of an acid corresponding in composition to pyrophosphoric acid, $H_4As_2O_7$; are obtained, which is converted into the pentoxide when heated at about 260° C. Arsenic acid furnishes a series of salts analogous in composition to and isomorphous with the corresponding phosphates. Arsenic trioxide is almost destitute of basic properties, and the salts formed by its union with basic oxides are not very stable, so that it differs greatly from the corresponding oxide of phosphorus; thermo-chemical investigation confirms this conclusion. Thus, on inspection of the following table, which shows the amounts of heat which are developed on adding sodium hydroxide solution to solutions of the acids of phosphorus and arsenic, it will be evident that, whereas the behavior of arsenic acid is similar to that of phosphoric acid, the behavior of a solution of arsenic trioxide is altogether different from that of a solution of phosphorus trioxide (phosphorous acid), the molecule of arsenic trioxide regarded as As_2O_3, like boron oxide, evidently existing in solution as a dibasic acid; it is not known whether the molecular composition of phosphorus trioxide is correctly represented by the formula P_2O_3, and whether therefore the difference between the phosphorus and arsenic compounds is to be referred to the existence of a difference similar to that exhibited by the formulæ P_2O_3 and As_4O_6.

NaOH.	PO_3H.	PO_2H_3.	PO_3H_3.	PO_4H_3.	AsO_4H_3.	$P_2O_7H_4$.	As_2O_3.
½ mol.	7,100	7,700	7,430	7,330	7,360	.....	.....
1 "	14,380	15,160	14,830	14,830	14,990	14,380	7,300
2 "		15,270	28,370	27,080	27,580	28,640	13,780
3 "			28,940	34,030	35,920	.....	.....
4 "				.....	.....	52,740	15,070
6 "				35,280	37,400	54,480	15,580

It will be evident also on comparing the following table with that on p. 449 that much less heat is developed in the formation of the arsenic compounds than in the formation of the corresponding phosphorus compounds:—

Reaction.	Units of heat developed.	Remarks.
As_2, O_3.....	154,580*	Formation of the solid compounds.
As_2, O_5.....	219,380	
As, O_4, H_3.....	215,630	
As_2, O_5, Aq.....	225,380	Formation of the compounds in aqueous solution.
As_2, O_3, Aq.....	147,030	
As, O_4, H_3, Aq.....	215,230	
As_2O_3, O_2.....	64,800	Oxidation of the trioxide when dry, and in solution.
As_2O_3Aq, O_2.....	78,350	
$As_2O_5, 3H_2O$.....	6,800	
As_2O_5, Aq.....	6,000	Dissolution of the trioxide and pentoxide and of arsenic acid in water.
As_2O_3, Aq.....	−7,550	
AsO_4H_3, Aq.....	−400	

The oxides of antimony are white or yellowish; the trioxide is fusible and volatile, and is partly converted into the tetroxide when heated in air; the tetroxide is infusible, and unalterable by heat; the pentoxide is converted into the tetroxide at a red heat. The vapor density of the trioxide has not been determined, but as it may be obtained in crystals isomorphous with those of arsenic trioxide its formula is probably Sb_4O_6. The oxides of antimony all exhibit feeble acid properties, dissolving in alkalies, but the salts mostly have little stability; the most stable salts apparently are those which correspond to the potassium salt of the formula $K_2Sb_4O_{11}$. The oxides of antimony are soluble in hydrochloric and concentrated sulphuric acids; the trioxide may thus be converted into the sulphate, $Sb_2(SO_4)_3$, which is decomposed by water into an acid and a basic salt.

The bismuth oxides are yellow or brown, and are devoid of acid properties, but they dissolve in acids; the pentoxide is decomposed and converted into the tetroxide when heated to about 220° C., and the latter is reduced to the trioxide at a somewhat higher temperature. Bismuth sulphate, $Bi_2(SO_4)_3$, like antimony sulphate, is decomposed by water into an acid and a basic salt.

On boiling a solution of acid potassium tartrate, $HKC_4H_4O_6$, with antimony trioxide the so-called tartar emetic $(SbO)KC_4H_4O_6$, is formed, the oxygenated radicle SbO displacing an atom of hydrogen in the potassium tartrate; corresponding arsenic and bismuth compounds are formed in a similar manner.

Niobium and tantalum pentoxides are white and infusible; they do not volatilize; after ignition they are insoluble in all acids, but dissolve on fusion with alkalies. They exhibit marked acid properties, combining with basic oxides in various proportions. The hydrated oxides obtained on decomposing the chlorides by water are acid to litmus, and are soluble in hydrochloric and hydrofluoric acids. The fluorides of niobium and tantalum, and niobium oxyfluoride, readily form double salts with other fluorides, which in many cases are isomorphous with certain titanium, zirconium, tin, and tungsten compounds which do not exactly correspond to them in composition, but in which apparently fluorine and oxygen displace one another isomorphously; thus, the following pairs of compounds are isomorphous:—

K_2NbF_7	HK_3SnF_8	$(NH_4)_2NbOF_5$	$(NH_4)_3ZrF_7$
K_2TaF_7	HK_3NbOF_7	$(NH_4)_2WO_2F_4$	$(NH_4)_3NbOF_6$

Arsenic and antimony, like phosphorus and nitrogen, form gaseous trihydrides, AsH_3 and SbH_3, and arsenic is said to furnish also a solid dihydride, As_2H_4. Arsine and stibine, AsH_3 and SbH_3, are formed whenever hydrogen is evolved in presence of an arsenic or antimony compound; they are extremely unstable compounds, especially the latter, and are entirely devoid of basic properties. The corresponding compounds of arsenic and antimony with positive hydrocarbon radicles, however, like the analogous nitrogen and phosphorus compounds, are far more stable and combine readily with other elements. Thus, triethylamine $N(C_2H_5)_3$, and triethylphosphine, $P(C_2H_5)_3$, combine with acids, forming salts corresponding to the ammonium salts such as the chloride $PH(C_2H_5)_3Cl$; the triethylphosphonium salts, moreover, are stable in presence of water, which at once decomposes phosphonium iodide. Triethylstibine, $Sb(C_2H_5)_3$, decomposes hydrochloric acid with evolution of hydrogen, forming $Sb(C_2H_5)_3Cl_2$; trimethylarsine, however, does not react with acids, but with chlorine forms the compound $As(CH_3)_3Cl_2$, the existence of which furnishes a proof that arsenic may function as a pentad element. The phosphorus, antimony, and arsenic compounds absorb oxygen with great avidity, forming powerfully basic oxides such as $PO(C_2H_5)_3$. They also furnish hydroxides such as $N(C_2H_5)_4.OH$, $P(C_2H_5)_4.OH$, &c. (p. 442), which exhibit the closest resemblance to the alkalies; Thomsen, indeed, has shown that the heat of neutralization of the hydroxide $N(CH_3)_4.OH$ is equal to that of the alkalies. The existence of these hydroxides, and their behavior, afford the strongest reason for believing that a solution of ammonia at least partially consists of ammonium hydroxide, $NH_4.OH$ (p. 442).

Molybdenum—Tungsten—Uranium.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.
Molybdenum	Mo	95·8	8·6	11·1
Tungsten	W	184	18·2	10·1
Uranium	U	(?) 180	18·4	9·8

Molybdenum and tungsten are closely related to chromium. They may be obtained by reducing their oxides at a high temperature in a stream of hydrogen. Molybdenum, after fusion, is white, and has a silvery lustre; the powder obtained by reducing tungsten trioxide has a grey color, and strong lustre. Both are difficult of fusion, and insoluble in most acids except nitric acid; when heated in air or oxygen they are finally converted into the trioxides MoO_3 and WO_3. They form the following chlorides and oxides:—

Mo_2Cl_4	Mo_2Cl_6	$MoCl_4$	$MoCl_5$	
W_2Cl_4	.....	WCl_4	WCl_5	WCl_6
	Mo_2O_3	Mo_2O_4	.....	MoO_3
	.....	W_2O_4	.....	WO_3

Molybdenum pentachloride is the highest chloride obtained by heating molybdenum in chlorine gas; it is a black, crystalline substance, which forms a colorless solution when dissolved in a considerable quantity of water; when heated in air it is converted into a colorless oxychloride, MoO_2Cl_2; according to Debray its vapor-density corresponds with the formula $MoCl_5$. The remaining chlorides are not distinctly crystalline; the tetrachloride is brown, the trichloride red, and the dichloride yellow; the molecular formulæ of these chlorides are undetermined. In an atmosphere of carbon dioxide the dichloride bears a bright red heat without melting or volatilizing, the trichloride is resolved into di- and tetra-chloride, and the latter when again heated, splits up into pentachloride which sublimes, and trichloride which remains; the di- and tri-chlorides are insoluble, but the tetrachloride is readily soluble in water.

Tungsten is converted by chlorine at a moderate heat into a hexachloride, WCl_6, which forms black-violet crystals; it melts at 275° C., and boils at 341° C.; from the determination of its vapor-density it appears that it undergoes decomposition when heated. When pure it is insoluble in water below 60° C., but if the slightest trace of oxychloride be present it is decomposed by water even in the cold. Tungsten pentachloride crystallizes in black, highly deliquescent needles; it melts at 248° C., and boils at 376° C., and its vapor density at 350° C. corresponds with the formula WCl_5. It has already been pointed out that the existence of pentachlorides of tungsten and molybdenum, and of a vanadium tetrachloride, is apparently anomalous; at present, these chlorides, chlorine dioxide, ClO_2, nitrogen monoxide and dioxide, and, perhaps, uranium pentachloride are the only instances known to us in which apparently an odd number of affinities are disengaged (see p. 410).

Tungsten tetrachloride is a crystalline, greyish-brown substance; when strongly heated it decomposes into the volatile pentachloride and the non-volatile dichloride, which is a loose grey powder, destitute of crystalline structure. Tungsten also forms two oxychlorides, $WOCl_4$ and WO_2Cl_2; the former is obtained in beautiful ruby-red, and the latter in yellow crystals. The formula of the monoxychloride, $WOCl_4$, has been established by determining its vapor density.

Molybdenum trioxide has marked acid properties, but the remaining oxides are feebly basic; both oxides of tungsten exhibit acid functions. Solutions of molybdous salts corresponding to the oxide Mo_2O_3 are almost black, and solutions of molybdic salts corresponding to the oxide Mo_2O_4 are reddish-yellow; the molybdates are mostly white. Molybdenum trioxide, MoO_3, melts at a red heat to a dark yellow liquid, which on cooling forms a straw-yellow mass, breaking up into crystalline scales; it is scarcely soluble in water, but dissolves in hydrochloric, nitric, and sulphuric acids. Like silica and other feebly acid oxides it combines with basic oxides in a large number of different proportions, forming molybdates. Tungsten trioxide, WO_3, is a canary-yellow substance, insoluble in water and in most acids; it melts at a high temperature, and, like molybdenum trioxide, may be volatilized by heat; it dissolves in alkaline solutions, forming tungstates, of which a great variety may be obtained by the union of tungsten trioxide with basic oxides in various proportions. The tungstates are mostly colorless. When a hot solution of an alkaline tungstate is mixed with an acid a yellow precipitate of tungstic acid, H_2WO_4, is obtained, which is insoluble in water, and forms insoluble salts with all metals, except the alkali metals; but by decomposing tungstates by the stronger acids at ordinary temperatures a soluble variety of the acid, called metatungstic acid, is produced, which forms soluble salts with nearly all metals.

Uranium.—The atomic weight of uranium has not yet been ascertained, and its position among the elements is therefore uncertain, especially as it does not exhibit marked analogy to any other element. The generally received atomic weight is 120, but Mendeljeff has proposed to double this; L. Meyer, however, considers that from the high specific gravity of the metal it is more probable that its atomic weight is 180, and that it occupies a position in the series near to tungsten. A redetermination of the equivalent of this element and an investigation of its compounds are much required.

Uranium is like iron in color; it tarnishes when exposed to the air, and in the pulverulent state takes fire at a comparatively low temperature, and burns with great brilliancy, forming a green oxide, U_3O_8; it is dissolved by hydrochloric acid, forming a green solution, which has powerful reducing properties. The highest oxide has the composition UO_3. Uranium forms a volatile stable tetrachloride, UCl_4, which crystallizes in dark-green octahedra, and an unstable chloride regarded as the pentachloride, UCl_5; both are dissolved and decomposed by water.

When uranium, or either of its oxides, is dissolved in

nitric acid, a solution of uranic nitrate is formed from which the salt may be crystallized in beautiful yellow prisms of the composition $(UO_2)(NO_3)_2, 6H_2O$; on the addition of potassium hydroxide to a solution of uranic nitrate a yellow insoluble precipitate of potassium uranate of the composition $K_2U_2O_7$ is produced. An oxychloride, UO_2Cl_2, corresponding to the nitrate, is obtained on passing chlorine over an ignited mixture of charcoal with an oxide of uranium. In all these formulæ, U = 240.

Lanthanum—Cerium—Didymium—Yttrium—Erbium—Thorium.

Name.	Symbol.	At. wt.	Sp. gr.	At. vol.
Lanthanum	La	139	6·1	22·6
Cerium	Ce	141	6·7	21·0
Didymium	Di	147	6·5	22·6
Yttrium	Y	(?) 89·5	.....	.....
Erbium	Er	(?) 170·5	.....	.....
Thorium	Th	(?) 178·5	7·7	23·1

Excepting thorium, these elements are closely related in properties; their compounds are of extremely rare occurrence. Lanthanum, cerium, and didymium are always associated together, and on account of their occurrence in the mineral cerite are usually termed cerite metals; they appear to occupy a position intermediate between the alkaline earth metals and the metals of the aluminium group. The atomic weights of yttrium and erbium, the so-called gadolinite metals, have not been determined; their compounds much resemble these of the cerite metals. The atomic weight of thorium is also unknown; from the properties of its compounds, however, it is not improbable that it is a member of the aluminium group.

Lanthanum, cerium, and didymium have been obtained by the electrolysis of their chlorides. Cerium is an extremely ductile metal, resembling iron in color and lustre; it melts more readily than silver, but much less readily than antimony. It retains its lustre for a considerable period in dry air, but takes fire much more readily than magnesium, and burns with great brilliancy. It slowly decomposes cold water, and rapidly dissolves in hydrochloric acid.

Lanthanum and didymium closely resemble cerium in their general chemical behavior. Lanthanum is a slightly harder, less ductile metal than cerium, and appears to melt nearly at the same temperature. It readily oxidizes superficially even in dry air, although it takes fire at a much higher temperature than cerium. Didymium more closely resembles lanthanum than cerium, but has a distinct yellowish color.

Only one oxide of lanthanum is known, namely, La_2O_3; it is white, and unalterable by heat, and combines directly with water, forming the hydroxide $La_2(OH)_6$, which is a soft, white powder resembling calcium hydroxide. The lanthanum salts of colorless acids are all colorless.

Cerium forms the two oxides Ce_2O_3 and Ce_2O_4. Cerous oxide, Ce_2O_3, has a (?) greyish-blue color, and on exposure to the air is converted into yellow ceric oxide, Ce_2O_4. Cerous hydroxide, $Ce_2(OH)_6$, precipitated from the solution of a cerous salt by an alkali, is white; on exposure to the air it is converted into a mixture of cerous carbonate and ceric hydroxide; the latter is also obtained on passing chlorine into water in which cerous hydroxide is suspended. Ceric hydroxide dissolves in hydrochloric acid with evolution of chlorine, forming a solution of cerous chloride, Ce_2Cl_6, but it forms with sulphuric acid a brown-red solution of ceric sulphate, which is a powerful oxidizing agent. Cerous salts in solution are colorless, but a few possess a pale rose color in the solid state.

Two oxides of didymium corresponding to the two oxides of cerium are known. The lower oxide, Di_2O_3, is white, and in contact with water is slowly converted into the hydroxide, $Di_2(OH)_6$; didymium hydroxide resembles aluminium hydroxide in appearance, but has a pale rose color, and the salts formed by dissolving it in acids have either a pure rose or violet color. By gently heating the oxide Di_2O_3 in air it is converted into the higher oxide Di_2O_4, which has a dark brown color; it dissolves in hydrochloric acid with evolution of chlorine, and in oxy-acids with evolution of oxygen, forming the same salts as are produced on dissolving the lower oxide.

Yttrium and erbium each form only one oxide, and like lanthanum, cerium, and didymium only one corresponding chloride. Yttrium oxide, Y_2O_3, is white, and erbium oxide, Er_2O_3, has a pale rose color; the former is readily soluble in acids, even after ignition, but the latter dissolves with great difficulty. The yttrium salts are colorless; but the salts of erbium have a beautiful rose color, and their solutions give an absorption spectrum, which is not the case with yttrium salts. When erbium oxide is strongly heated it glows with an intense green light, which in the spectroscope exhibits a continuous spectrum intersected by a number of bright bands corresponding in position to the dark bands in the absorption spectrum of solutions of erbium salts. Didymium oxide behaves similarly, and solutions of didymium salts give an absorption spectrum by which they are readily distinguished from erbium salts.

The chlorides, nitrates, and sulphates of the cerite and gadolinite metals are readily soluble in water, but their carbonates are insoluble; the solutions of their salts all possess a sweet astringent taste. The most conclusive evidence that lanthanum, cerium, didymium, and yttrium are closely allied to the alkaline earth metals is afforded by thermochemical investigation, the amounts of heat developed on neutralizing their hydroxides being for hydrochloric acid according to Thomsen's experiments, inferior only to that developed on neutralizing the hydroxides of the alkali and alkaline earth metals, as shown by the following examples:—

Name of Hydroxide.	Units of heat developed on neutralizing with Sulphuric acid.	Hydrochloric acid.	Difference.
Hydroxides of alkali and alkaline earth metals.....	31,300	27,600	3,700
Lanthanum hydroxide.....	27,470	25,020	2,450
Cerium "	26,030	24,160	1,870
Didymium "	25,720	23,980	1,740
Yttrium "	25,070	23,570	1,500
Manganous "	26,480	22,950	3,530
Ferrous "	24,920	21,390	3,530
Cadmium "	23,820	20,290	3,530
Glucinum "	16,100	13,640	2,460

Metallic thorium has been obtained as a dark-grey powder of the specific gravity 7·65 to 7·79, easily soluble in nitric acid, but difficultly soluble in hydrochloric acid. Its oxide, Th_2O_3 (if Th = 178·5), is white, and after ignition is insoluble in all acids except concentrated sulphuric acid; it appears to be destitute of acid properties as it does not expel carbon dioxide when fused with alkaline carbonates. Thorium hydroxide is precipitated from solutions of thorium salts by alkalies as a gelatinous mass, soluble in most acids, but insoluble in alkalies. Thorium chloride, Th_2Cl_6, is a white crystalline substance, which dissolves in water with rise of temperature. Thorium sulphate $Th_2(SO_4)_3$, is crystalline, and, like the sulphates of the cerite and gadolinite metals, is more soluble in cold than in hot water.

Periodic Relations of the Elements.

The foregoing description of the elements and of some of their more important compounds will be sufficient to show that, while each element manifests certain characters which distinguish it from all others, many of the elements are more or less closely related in properties, as indeed we have already frequently had occasion to point out.

Elements which exhibit similar properties often differ in atomic weight to the same or nearly the same extent; for example, the difference between the atomic weights of potassium and rubidium is about 46, and of rubidium and cæsium 47·5, since K = 39, Rb = 85·2, and Cs = 132·7. As these three elements are closely related in properties, rubidium differing from potassium to about the same extent that cæsium differs from rubidium, we are led to suspect a connection between the atomic weight of an element and its properties, especially as with very few exceptions the elements all possess different atomic weights. Many instances of relation between atomic weight and properties, similar in character to that which obtains in the case of potassium, rubidium, and cæsium, have been commented on from time to time by various chemists, but the connection between the atomic weights of the elements generally and their

properties was not recognized until Mendeljeff in 1869 pointed out that the latter are periodic functions of the former. In other words, if the elements are grouped in the order of their atomic weights, it will be found that nearly the same properties recur periodically throughout the entire series. Hence the whole of the elements may be arranged in a number of groups, each group consisting of members of the same natural family following each other in the same order. The elements are arranged in this manner in the following table, although, in order to retain elements which are undoubtedly members of the same natural family in the same vertical series, a few departures from the order of atomic weights are necessary, but probably they are necessary merely because the atomic weights are incorrectly determined; thus, tellurium is placed before iodine, and osmium, iridium, and platinum before gold. *If* the position assigned to uranium be correct, the number at present accepted as its atomic weight is much too low.

	H 1												
1.	Ll 7·0	...	G 9·3	...	...	B 11·0	C 12	N 14·0	O 16	F 19·1	...	...	...
2.	Na 23·0	Mg 24	...	...	...	Al 27·3	Si 28	P 31	S 32	Cl 35·4	...	...	...
3.	K 39	Ca 40	...	...	...	...	Ti 48	V 51·2	Cr 52.4	Mn 55	Fe 56	Co 58·6	Ni 58·6
4.	Cu 63·3	Zn 65	...	...	...	Ga ?	...	As 75	Se 79	Br 79·8	...	...	...
5.	Rb 85·2	Sr 87·2	Yt ? 80·5	...	...	...	Zr 90	Nb 94	Mo 95·8	...	Ru 103·5	Rh 104	Pd 106
6.	Ag 107·7	Cd 111·6	...	...	...	In 113·4	Sn 117·8	Sb 122	Te 128·1	I 126·5	...	...	...
7.	Cs 132·7	Ba 136·8	La 139	Ce 141	Dl 147	...	...	...	...	...	...	....	...
8.	...	...	Er ? 170·5	...	...	Th ? 178·5	...	Ta 182	W 184	U ? 180	Os 198·6	Ir 196·7	Pt 196·7
9.	Au 196·2	Hg 199·8	...	Tl 203·6	Pb 206·4	...	...	Bl 207·5	...	...	...	...	...

The position of hydrogen at the head of a series of metals is in accordance with Graham's conclusion that this element possesses the characters of a metal, a conclusion which many chemists are inclined to accept on account of the striking analogies to the metals which it exhibits in its relation to the halogens, oxygens, &c. As the properties of alloys are usually similar to those of their constituent metals, whereas the compounds of metals with non-metallic elements are in most cases widely different from those of the elements which enter into their composition, the fact that Troost and Hautefeuille's sodium and potassium hydrides (? sodium-hydrogen and potassium-hydrogen alloys) (p. 454) retain the metallic character of sodium and potassium affords evidence confirmatory of the assumption that hydrogen has metallic properties.

We leave it to the reader to trace out the alteration in properties which accompanies alteration in atomic weight; but we may point out as an instance that the power to combine with other elements is subject to periodic variation; thus, the composition of the highest chlorides and oxides of the elements in the first and second horizontal series in the above table is as follows:—

Chlorides.

LiCl	GCl_2	BCl_3	CCl_4	(?) NCl_3	OCl_2	?
NaCl	$MgCl_2$	Al_2Cl_6	$SiCl_4$	PCl_5	SCl_4	Cl_2

Oxides.

Li_2O	GO	B_2O_3	CO_2	N_2O_5	O_3	?
Na_2O_2	MgO	Al_2O_3	SiO_2	P_2O_5	SO_3	Cl_2O_3

The chlorides and oxides of the elements of each of the following horizontal series exhibit similar differences in composition. With very few exceptions, only the elements which are included in the same vertical series as carbon, nitrogen, oxygen, and fluorine form compounds with hydrogen, the stability of which diminishes with increase of atomic weight; but the composition of these hydrides is subject to periodic variation, as is shown by the following list:—

CH_4	NH_3	OH_2	FH
SiH_4	PH_3	SH_2	ClH
.....	AsH_3	SeH_2	BrH
.....	SbH_3	TeH_2	IH

The periodic character of the relation between the properties of the elements and their atomic weights is especially evident in their physical properties, which are more readily compared than the so-called chemical properties, as they admit of measurement, although, on account of our imperfect knowledge, comparison is at present possible only to a very limited extent. One of the few physical properties which has been determined for most of the elements is the specific gravity in the solid state; now, on comparing the specific gravities of the various elements we find that they do not increase progressively with increase of atomic weight, but that they increase and diminish periodically. Hence, as Lothar Meyer has shown, on taking the atomic volumes, or quotients of the atomic weights of the elements divided by their specific gravities in the solid state, as abscissæ, and the atomic weights as ordinates, a curve is obtained which exhibits a series of maxima and minima, viz., five maxima and five minima in the portion which includes barium and the elements of lower atomic weight. The most electro-positive elements, lithium, sodium, potassium, rubidium, and cæsium form the five maxima; but with increase of atomic weight the height to which the curve rises also rapidly increases, namely, in the proportion

$$Li : Na : K : Rb : Cs = 12 : 24 : 46 : 57 : 79.$$

The remaining physical properties of the elements, so far as they are known to us, appear to be subject to similar periodic variation, but for a full discussion of the connection between the atomic weights of the elements and their properties the reader is referred to L. Meyer's work, *Die modernen Theorien der Chemie* (Breslau).

The establishment of the periodic law may truly be said to mark an era in chemical science, and we may anticipate that its application and extension will be fraught with the most important consequences. It reminds us how important above all things is the correct determination of the fundamental constants of our science—the atomic weights of the elements, about which in many cases great uncertainty prevails; it is much to be desired that this may not long remain the case. It also affords the strongest encouragement to the chemist to persevere in the search for new elements. (H. E. A.)

ORGANIC CHEMISTRY.

As has been already explained (p. 451) it was at one time thought that certain chemical compounds were producible only through the agency of living things, and the name "organic chemistry" was in consequence conferred upon this branch of the science. The progress of discovery has, however, served to break down the barrier that was supposed to exist between those and purely inorganic compounds, since it has been found possible to build up artificially a very large number of compounds formerly regarded as essentially organic. Nor must it be forgotten that many living things elaborate compounds which can in no sense be regarded as organic—such as the silica of grasses, the carbonate of calcium secreted by molluscs, &c., and the tricalcic phosphate forming the bones of the higher animals.

Although the number of elements entering into the composition of organic compounds is comparatively small, yet these compounds far exceed inorganic bodies both in number and complexity of composition. It is indeed the vast and ever-increasing numbers of the organic compounds that render it necessary to form a separate branch of the science for their study, and not any real *chemical* difference between the matter forming these and mineral compounds.

Definition and Character of Organic Compounds.—Carbon is an invariable constituent of organic bodies, so that this branch of the science is sometimes defined as "the chemistry of the carbon compounds." The best chemical definition of organic compounds, however, is that proposed by Frankland, viz., "compounds the molecules of which consist of one or more atoms of carbon *directly* combined either with carbon, nitrogen, or hydrogen."

After carbon, the elements of most frequent occurrence in organic compounds are hydrogen, oxygen, and nitrogen. Sulphur, phosphorus, the halogens, silicon, boron, and the metals are of comparatively rare occurrence. The number of atoms entering into the composition of organic molecules is often very great—far exceeding the atoms of the most complex molecule of a mineral substance. Thus, stearin contains 173 atoms, and albumin no less than 226. Chemical bodies that are possessed of great complexity of composition are generally distinguished by the facility with which they split up under the influence of the physical forces and chemical reagents; thus organic compounds are as a class characterized by their instability.

Ultimate Analysis of Organic Compounds.

Before the formula of an organic compound can be determined, it is necessary to ascertain the amounts of its

several constituents—that is to say, to make a quantitative analysis of it. The elements carbon and hydrogen being of paramount importance are generally first determined. The method employed depends upon the fact that all organic compounds undergo combustion when heated with easily reducible oxidizing substances, their carbon being oxidized to carbon dioxide and their hydrogen to water. These two products of combustion being collected in suitable apparatus and weighed, the necessary data for calculating the amounts of carbon and hydrogen are obtained. The following is a brief description of the process.

Determination of Carbon and Hydrogen.—A tube of Bohemian hard glass of about 10 or 14 millimetres internal

Fig. 1.—Combustion Tube.

o–a, pure cupric oxide; *a–b*, mixture of substance and CuO; *b–c*, rinsings from mixing wire; *c–d*, pure CuO; *d–e*, metallic copper; *e–f*, plug of asbestos.

diameter, after being scrupulously cleaned and dried, is drawn off in the blowpipe flame so as to leave a tailed extremity of the form shown in figure 1. The open end of the tube is then held in the flame of the blowpipe till the sharp edge of the glass is rounded off. This tube, known as the *combustion tube*, is from 500 to 800 millimetres in length, according as the substance contains little or much carbon.

The substance generally employed to effect the combustion of carbon compounds is cupric oxide (CuO), and as this oxide is of a somewhat hygroscopic nature, it is necessary to dry it thoroughly before use, and then exclude it carefully from the air. Should these precautions not be observed, the oxide absorbs water from the air, and when heated in the combustion tube this water distils over and is weighed with that produced by the combustion of the substance. It is therefore found convenient in practice to have another glass tube sealed at one end and closely corked at the other for the reception of the cupric oxide. This tube is of sufficient capacity to contain enough cupric oxide to fill the combustion tube, and its diameter is such as to allow it to be introduced into the open end of the combustion tube.

The substance for analysis, after being finely powdered, is dried in a water oven at 100° C. till it ceases to lose weight, or, if decomposed by heat, in a vacuum over some water-absorbing substance, such as strong sulphuric acid or calcium chloride. When dry it is transferred to a small stoppered bottle or corked tube, sealed at one end, and of about 40 or 50 millimetres in length.

The apparatus for absorbing the carbon dioxide is a series of light glass bulbs (figs. 2 and 3) containing a solution of caustic potash (KHO) of sp. gr. 1·27, through which the gases evolved during the combustion are obliged to pass. It is customary to attach to one end of the potash bulbs a small glass tube drawn to a point at its free end, and containing a small piece of solid potash enclosed between plugs of cotton wool. This appendage is for the purpose of retaining any trace of carbon dioxide or moisture carried over from the bulbs by the escaping gases.

Fig. 2.—Liebig's Potash Bulbs.

Fig. 3.—Geissler's Potash Bulbs.

The water formed by the combustion is collected in a tube (fig. 4) filled with fragments of dried calcium chloride or pumice stone wetted with strong sulphuric acid.

The combustion tube when charged is heated in a furnace which consists essentially of a row of gas burners constructed so as to burn a mixture of coal gas and air, and thus obtain a non-luminous but very hot flame. Two forms of furnace are in common use in laboratories. In Hofmann's furnace a clay cylinder perforated by a large number of very fine holes is fitted over the end of each gas burner, thus dividing the escaping gas into a number of fine streams, and so ensuring its perfect combustion. In Griffin's furnace the burners are constructed on Bunsen's principle, that is, each burner is perforated by holes at its lower end so that a mixture of gas and air escapes from its upper extremity. The combustion tube is supported on a thin iron trough lined with asbestos, the whole being enclosed by unglazed tiles.

Fig. 4.—Calcium Chloride Tube.

The cupric oxide intended for use is first heated to redness in a crucible, and transferred while still hot to its tube, wherein it is allowed to cool. When sufficiently cool the cork is withdrawn, and enough cupric oxide poured into the combustion tube to occupy about $\frac{1}{5}$th of its length. The tube or bottle containing the dried pulverized substance having been weighed, about half a gramme is then introduced into the combustion tube, and a small quantity of cupric oxide is poured down after it. The bottle being again weighed gives the exact weight of the substance employed. The substance in the combustion tube is thoroughly mixed with cupric oxide by stirring it about with a long wire with corkscrew point.

More cupric oxide is now added till the tube is filled nearly to its open end, and a plug of freshly ignited asbestos is finally introduced. The tube is then gently tapped while in a horizontal position so as to cause a slight

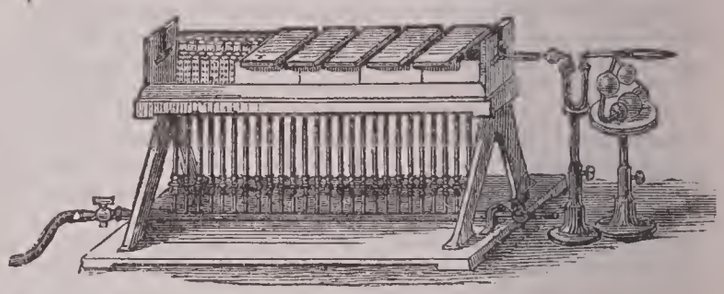


Fig. 5.—Apparatus arranged for a Combustion.

subsidence of the contents, thus allowing a free passage for gas throughout its whole length. The calcium chloride tube is fitted into the open end of the combustion tube by means of a tightly-fitting cork or caoutchouc stopper, and the potash apparatus is attached to the calcium chloride tube by means of a short piece of caoutchouc tubing bound tightly round with thin copper wire. Both the potash bulbs and calcium chloride tube are carefully weighed before being attached. The whole apparatus as arranged for the combustion is shown in fig. 5.

The front part of the tube is first heated to redness, and the gas-burners are then gradually turned on so as to cause the slow combustion of the substance. When no more bubbles pass into the potash solution the gas burners are turned out, the point of the tail of the combustion tube is broken off, and dry air passed through the whole system to sweep out the last traces of carbon dioxide and water vapor lingering in the tube. In cases where great accuracy is required it is desirable to sweep out the combustion tube first with a current of pure oxygen and then with air. This ensures the complete oxidation of any trace of carbon that may have escaped the first combustion.

When the operation is completed the potash bulbs and calcium chloride tube are allowed to cool down to the atmospheric temperature and then again weighed. The increase in weight gives the respective amounts of carbon dioxide and water produced. Since carbon dioxide contains in 11 parts by weight 3 of carbon ($CO_2 = 12 + \overline{2 \times 16} = 44$), $\frac{3}{11}$ of the weight of the CO_2 obtained is due to carbon. Similarly $\frac{1}{9}$ of the weight of the water found is due to hydrogen ($H_2O = \overline{2 \times 1} + 16 = 18$). It is customary to express the results in parts per cent. In practice the hydrogen usually comes out a little too high, and the carbon a little too low.

Cupric oxide is sometimes replaced by lead chromate in cases where the substance is difficultly combustible, and more particularly when the compound contains chlorine, bromine, or sulphur. In these latter cases were cupric oxide employed, cupric chloride or bromide would be formed, and might volatilize over into the calcium chloride tube, thus unduly increasing its weight. Sulphur in presence of cupric oxide is oxidized to SO_2, and this gas if allowed to pass into the potash bulbs would be absorbed. These sources of error are avoided by the employment of lead chromate, because non-volatile lead chloride or bromide are formed, and sulphur is oxidized to SO_3, which is fixed as $PbSO_4$. When substances rich in nitrogen are burnt with cupric oxide, nitrogen dioxide is likely to be formed, and this on meeting the air and potash in the bulbs is absorbed, and increases the weight of the CO_2 apparatus. To obviate this source of error it is necessary when dealing with nitrogenous bodies to plug the end of the combustion tube with a roll of freshly reduced copper gauze. This being kept at a bright red heat during the entire operation decomposes the oxides of nitrogen, and retaining the oxygen, allows only nitrogen to escape.[1]

When the substance to be analyzed is a liquid, a known weight is sealed up in a small glass bulb (fig. 6).

Fig. 6.—Glass Bulb for the combustion of liquids (actual size).

After sealing and weighing (the weight of the empty bulb having been previously determined) the neck of the bulb is broken off, and the broken portion, together with the bulb itself, introduced into the combustion tube, which is afterwards filled up with cupric oxide, &c., in the usual manner. In burning liquids the anterior portion of the combustion tube is, as with solids, first heated to redness; the portion containing the bulb is then gradually warmed so as to expel the liquid, which is thus made to distil slowly over the red-hot cupric oxide which effects its combustion.

The analysis of gaseous organic compounds is effected in *eudiometers*, or in special apparatus, of which several forms have been devised. (See Bunsen's *Gasometry*, Sutton's *Volumetric Analysis*, Thorpe's *Quantitative Analysis*, &c.)

Determination of Nitrogen.—Two methods are in use for determining this element. Will and Varrentrapp's method depends upon the fact that many nitrogenous bodies when heated with caustic alkalies yield their nitrogen in the form of ammonia. A known weight of the substance is intimately mixed with soda-lime,[2] and then heated in a combustion tube, the ammonia being absorbed by dilute hydrochloric acid contained in a glass apparatus attached to the end of the tube. (See fig. 7.)

In conducting an operation of this kind some soda-lime

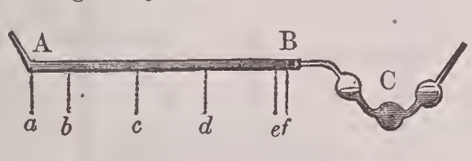


Fig. 7.—Determination of Nitrogen by Will and Varrentrapp's method.

A B, combustion tube; *a b*, soda-lime; *b c*, mixture; *c d*, rinsings; *d e*, soda-lime; *e f*, asbestos plug; C, acid bulbs.

is first introduced into the tube; the substance is then mixed intimately with more soda-lime in a mortar, and the mixture transferred to the tube; the mortar is next rinsed out with more soda-lime, and the rinsings are added to the contents of the tube, which is finally filled up with pure soda-lime. When charged the tube is tapped so as to secure a free passage for the escaping gas (as in the combustion for the determination of C and H), and after it is laid in the trough of the gas furnace, the acid bulb is attached to it by means of a tightly fitting cork. The combustion is performed in precisely the same manner as in the process of burning with cupric oxide; when it is completed the tail of the tube is broken off, and air drawn through the apparatus so as to draw the last traces of ammonia into the acid. If the substance contains much nitrogen it is advisable to mix it with some compound which gives off a large quantity of gas when heated in the tube. Sugar or starch are convenient substances for this purpose. This dilution of the ammonia prevents its too rapid absorption by the acid, and thus diminishes the risk of acid being drawn back into the hot tube.

Having by the above process obtained the nitrogen in the form of ammonium chloride, its quantity is determined by precipitation as ammonio-platinic chloride, $(NH_4)_2PtCl_6$, the analysis being performed in the same manner as in the quantitative determination of ammonium by means of platinic chloride. In calculating the results the requisite data are furnished by the facts that 223·2 parts of the double salt contain 14 of nitrogen, or 197·5 parts of platinum correspond to 28 of nitrogen. Thus, if w = weight of substance taken, W the weight of double salt obtained, P the weight of platinum, and N the weight of nitrogen, we have $N = \frac{W \times 14}{223{\cdot}2}$ or $\frac{P \times 28}{197{\cdot}5}$; also $\frac{100N}{w}$ for the percentage of nitrogen.

Instead of determining the ammonia gravimetrically it may be absorbed by a known quantity of dilute sulphuric acid of standard strength, and the amount of acid neutralized determined by adding litmus, and then a standard solution of soda till complete neutralization is effected as in ordinary acidimetrical determinations.

In cases where nitrogen-containing bodies do not yield the whole of that element as ammonia on ignition with soda-lime, Dumas's process is employed. This process depends upon the fact that all nitrogenous substances yield their nitrogen in the free state when burnt with cupric oxide, and in presence of ignited metallic copper. The method is thus carried out.

A combustion tube of suitable length is sealed off at one end, and about 2 or 3 inches of hydrogen sodium carbonate ($NaHCO_3$) introduced, after which a small quantity of cupric oxide is added. A known quantity of the substance, intimately mixed with cupric oxide, is next introduced, and then a further quantity of pure cupric oxide, the remainder of the tube being finally filled up with 3 or 4 inches of freshly reduced copper gauze plugging. No special precautions need be taken to keep the cupric oxide dry. A gas passage having been secured through the tube in the usual manner, a delivery tube is tightly adapted to the open end of the combustion tube.

The tube is placed in a gas furnace, and the end of the delivery tube plunged beneath the surface of mercury contained in a mercurial trough. The first proceeding is to expel the air from the apparatus. This is effected by heating a portion of the hydrogen sodium carbonate in the posterior part of the combustion tube till a bubble of the gas received into caustic potash solution is wholly absorbed. When the apparatus is entirely filled with carbon dioxide a graduated receiver containing about $\frac{1}{3}$ of its volume of caustic potash solution, the remainder being filled with mercury, is inverted over the end of the delivery tube as in ordinary cases of gas-receiving over the mercurial trough. The combustion is then proceeded with in the usual manner,—the anterior portion of the tube containing the metallic copper being first heated to redness, and the heat gradually carried back till the combustion is completed, when more of the $NaHCO_3$ in the posterior part is heated so as to expel the last traces of nitrogen. The CO_2 produced by the combustion and from the $NaHCO_3$ being absorbed by the potash solution, the graduated receiver contains only the whole volume of pure nitrogen. The receiver and its contents are accordingly transferred to a vessel of water—the mercury and potash solution allowed to be replaced by water, the receiver is raised till the pressure is equalized by the water being at the same level both inside and outside, and the volume of gas is read off, the temperature of the air of the room and the height of the barometer being at the same time noted.

If N = weight of nitrogen in grammes, $t°$ the temperature of the air, b the height of the barometer, e the ten-

[1] Although the principles upon which the determination of carbon and hydrogen in organic bodies depends remain unaltered, the process has received several modifications which it is unnecessary to describe in detail. Thus in some laboratories, instead of the potash bulbs, a tube filled with "soda-lime" is employed, and the substance, instead of being mixed with the CuO in the tube, is placed in a small boat of porcelain or platinum, and a slow stream of oxygen kept going during the whole process. Other oxidizers have been also proposed instead of cupric oxide, such as potassium perchlorate or a mixture of sulphuric acid and silver iodate, in which latter process the carbon is determined directly from the amount of CO_2 produced, and the hydrogen indirectly from the amount of oxygen consumed minus the quantity contained in the CO_2.

[2] Soda-lime is prepared by slaking quicklime with a strong solution of caustic soda, and then heating till thoroughly dry.

sion of aqueous vapor at the temperature $t°$, and V the volume of nitrogen in cubic centimetres—

$$N = V \cdot \frac{0{\cdot}0012562}{(1+0{\cdot}00367t°)760} \cdot b - e.$$

(0·0012562 being wt. of 1 c.c. of N at 0° C. and 760 mm. bar.).

Determination of the Halogen Elements, Sulphur, and Phosphorus.—The halogens are sometimes determined as silver salts, by burning a known weight of the substance with pure quicklime in a combustion tube, dissolving in dilute nitric acid, and adding silver nitrate. Sulphur and phosphorus may be determined by fusing a known quantity of the substance with a mixture of potassium hydroxide and nitrate in a silver dish. The sulphur is by this means oxidized to sulphuric and the phosphorus to phosphoric acid, and, on dissolving the fused mass and acidulating, these acids can be estimated.

By the method of Carius the halogens, sulphur, and phosphorus can be determined, if necessary, in one operation. A known weight of the substance is sealed up in a strong glass tube with about 20 times its weight of nitric acid (sp. gr. 1·4), and the tube then heated for some hours in an oil-bath to a temperature of 140°–300° C. The substance is completely oxidized by this operation, the sulphur and phosphorus being converted into their respective acids, so that their determination then becomes an operation of inorganic analysis. If halogens are present, it is customary to add a few crystals of silver nitrate before sealing up the tube. After the operation the haloid silver salt is filtered off, the excess of silver is removed from the filtrate by HCl, and H_2SO_4 or H_3PO_4 is determined in the ordinary way.

Determination of Oxygen.—Although several processes have been devised for the direct estimation of oxygen (by Baumhauer, Maumené, and Mitscherlich), they are seldom employed in laboratories. This element is usually determined by "difference," *i.e.*, by adding the percentages of the other elements, and subtracting the result from 100.

Formulæ and Constitution of Organic Compounds.

Empirical Formulæ.—Having by the above methods of analysis arrived at the percentage composition of a substance, the next step is to determine its formula. The empirical formula is obtained by dividing each percentage number by the atomic weight of its respective element. Thus, supposing an analysis of common alcohol gave the following percentage numbers:—

Carbon	52·15
Hydrogen	13·06
Oxygen (by difference)	34·79
	100·00

Dividing these by the respective atomic weights—

$$C = \frac{52{\cdot}15}{12} = 4{\cdot}3,\ H = \frac{13{\cdot}06}{1} = 13{\cdot}0,\ O = \frac{34{\cdot}79}{16} = 2{\cdot}2.$$

These numbers show that the atoms of C, H, and O are present in numbers having the ratios 2 : 6 : 1, since by the atomic theory the atoms of each element must exist in a compound in integral numbers. The differences between the integral and fractional numbers are justly assignable to the unavoidable "experimental errors" of analysis. Thus the simplest formula that can be given to alcohol from the foregoing analysis is C_2H_6O, and it is usual to express the results in the following manner:—

Theory C_2H_6O.		Found.	
$C_2 = 24$	= 52·17	C	52·15
$H_6 = 6$	= 13·04	H	13·06
$O = 16$	= 34·79	O (by difference)	34·79
46	100·00		100·00

This imaginary example may serve to show that the determination of empirical formulæ cannot be made according to any fixed set of rules. The errors of experiment are seldom so small as in the supposed illustration, and in cases where these are large, and where the substance contains a large number of atoms in its molecule, great difficulty is often experienced.

Molecular Formulæ.—The formulæ obtained by the method just described express simply the *ratios* existing between the numbers of atoms in the molecule of a substance, without regard to the *actual number* of atoms in such a molecule. Reasoning downwards from the law of Avogadro, which has been explained in the foregoing portions of this article, it will be seen that the volume of such molecules as do not undergo dissociation when heated is always equal to the volume of the molecule (2 parts by weight) of hydrogen. To ascertain molecular formula, therefore, all that is necessary is to determine the vapor-density of the substance as referred to hydrogen. Thus the analysis of benzene, a hydrocarbon obtained from coal tar, leads to the formula CH, but there is no evidence to show whether its molecular formula is CH, C_2H_2, C_3H_3, C_4H_4, C_5H_5, or C_nH_n. By experiment its vapor density is found to be 39, so that its molecular weight is 78. Dividing this number in the ratio C : H, *i.e.*, 12 : 1, we obtain 72 : 6 as the actual ratio of the weights of C and H existing in the molecule. Seventy-two parts of C correspond to $\frac{72}{12} = 6$ atoms, and 6 parts by weight of hydrogen correspond to $\frac{6}{1} = 6$ atoms, so that the molecular formula of benzene is C_6H_6.

Again, with respect to alcohol. The vapor density (H = 1) is 23, so that its molecular weight is 46. This number, however, agrees with the molecular weight of a substance having the formula C_2H_6O, since $\overline{12 \times 2 + 6 + 16} = 46$; hence this formula must be assigned to alcohol, and we have an illustration of a case in which the empirical and molecular formulæ are identical.

Determination of Vapor-density.

In practice, the vapor-density is determined by the methods of Dumas or Hofmann.

Dumas's Method.—In Dumas's process the weight of a known volume of vapor is ascertained in the following manner (see fig. 8).

A globular glass flask, as light as possible, with a neck fused into it, is first provided. The capacity of the globe may vary from $\frac{1}{20}$ to $\frac{1}{2}$ litre, according to the amount of substance to be operated upon. The neck is drawn out in the blowpipe flame to a capillary termination of about one millimetre diameter, and then bent up so as to project above the surface of the liquid of the bath in which the globe is to be immersed. The globe is first weighed full of air—the temperature and height of the barometer being noted.

By warming the globe, and plunging the point of the neck into some of the liquid of which the vapor-density is to be determined, a few grammes of the latter are introduced. The globe and its contents are then plunged into a bath of water, paraffin, or fusible metal kept at a constant temperature, at least 20° or 30° C. above the boiling-point of the substance. As soon as the vapor ceases to rush out of the capillary orifice of the neck, the point is sealed hermetically by the blowpipe flame, the height of the barometer and the temperature of the bath being observed.

The globe, after being cleaned and allowed to cool, is again

FIG. 8.—Dumas's Vapor-density Apparatus.

A, glass globe, supported by wire claw; *b*, projecting portion of neck; BB, bath; C, thermometer; D, gas-burner for heating bath.

weighed, the temperature and height of the barometer being at the same time observed. The capacity of the globe is measured by breaking the point of the neck under mercury, when the metal rushes in to supply the place of the condensed vapor. As the expulsion of air by the escaping vapor is seldom complete, there usually remains a bubble of residual air, which must be allowed for by running in a known quantity of mercury from a burette.

The total quantity of mercury is then poured out and its volume measured. The calculation is made from these data by the following approximative method:—

Let m = weight of globe + air at the temperature t of weighing and height of barometer b;
m' = weight of globo + vapor at the temperature t' of sealing and height of barometer b';
V = capacity of globe in cubic centimetres;
λ = weight of V cubic centimetres of air at t and b.
Then $m - \lambda$ = weight of vacuous globe;
$m' - (m - \lambda)$ = weight of substance.
Let H = wt. of V c.c. of hydrogen at t' and b', then the vapor-density (d) referred to hydrogen is

$$d = \frac{m' - (m - \lambda)}{H}.$$

When residual air (r) is found in the globe, $V - r$ = capacity of globe.

In very exact determinations corrections must be made for (1) the expansion of glass, (2) the difference of temperature and pressure between the first and second weighings of the globe, and (3) the difference in density between the drop of fluid remaining in the globe and the density of mercury. For most chemical purposes, however, the above-given approximation formula is sufficiently accurate.

For high temperatures the globe is immersed in the vapors of boiling mercury, cadmium, or zinc, and the apparatus is modified accordingly.

Gay-Lussac and Hofmann's Methods.—These methods have for their object the measurement of the volume of a known weight of vapor. Gay-Lussac's method, being available only for substances boiling below 100° C., has been gradually replaced by Hofmann's modification (fig. 9).

A glass tube about 1 metre in length and 20 mm. diameter, closed at one end, is graduated and calibrated. The tube being filled with mercury, and inverted in a vessel of the same liquid, is practically a barometer with an exaggerated Torricellian vacuum. Surrounding this tube is a wider tube, through which the vapor of any liquid boiling at a constant temperature can be passed, and thus the barometer tube and its contents kept at that temperature.

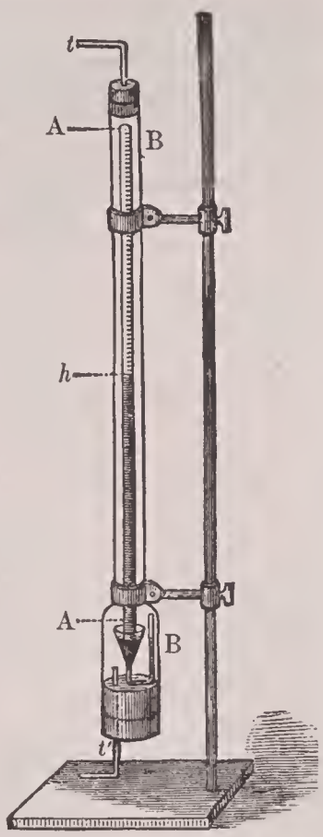


FIG. 9.—Hofmann's vapor-density Apparatus.

AA, graduated barometer tube standing in funnel; h, height of mercury column; BB, outer glass cylinder enclosing barometer tube; t, tube by which hot vapor is introduced; t', tube by which hot vapor and overflow of mercury escape; t is connected with the flask of boiling liquid, and t' with a condenser.

The substance of which the vapor-density is to be determined is weighed (about $\frac{1}{10}$ gram.) in a minute stoppered bottle, and passed up into the Torricellian vacuum. According to the boiling-point of the substance (which is, of course, much lowered by the reduced pressure), the vapor of alcohol, water, aniline, or amylic alcohol is passed through the space between the two tubes till the temperature and volume of vapor remain constant. The height of the mercury column, the temperature to which the vapor is heated, and the height of the barometer in the room being observed, all the necessary data are obtained.

Let m = weight of substance in grammes;
V = volume (in c.c.) occupied by vapor at temperature t;
h = height of mercury in tube above mercury in reservoir;
b = height of barometer in room.
Then $b - h$ = pressure upon vapor.
Let H = weight of V c.c. of hydrogen at a pressure $b - h$ and temperature t.
Then the vapor-density (d) referred to hydrogen is

$$d = \frac{m}{H}.$$

For exact determinations at high temperatures the tension of mercury vapor (e) at the temperature (t) must be allowed for, and the pressure upon the vapor then becomes $b - h - e$.

In some cases the substance of which the molecular formula is to be determined does not admit of vaporization, being decomposed by heat. With such substances, some method other than the determination of the vapor-density must consequently be resorted to. In the case of acid or basic compounds, the problem admits of easy solution. Thus, supposing we desired to determine the molecular weight of acetic acid without having recourse to a vapor-density determination. Having ascertained that the acid contains one atom of hydrogen replaceable by metals, or, in other words, that it is monobasic, the silver salt is prepared, and the amount of silver determined. All the necessary data are then obtained. Thus, supposing the analysis to give 64·67 per cent. of metal, the molecular weight of the salt, *i.e.*, the weight containing one atom of silver, will be given by the proportion—

$$64{\cdot}67 : 100 :: 108 : x.$$

Whence

$$x = 167.$$

The weight of the "acid-radicle" is therefore

$$167 - 108 = 59.$$

And as one atom of H is replaced by the Ag, the molecular weight of the acid is 60.

The empirical formula deduced from the ultimate analysis would be $CH_2O = 30$, so that the molecular formula is $2(CH_2O) = C_2H_4O_2$.

With polybasic acids the problem is somewhat more complex, but the solution is effected in a similar manner, *i.e.*, by estimating the metal in a normal salt. Silver salts are employed when obtainable, as they are generally anhydrous and easily purified by crystallization.

As a further illustration we now give an example of the determination of the molecular weight of a basic substance. Supposing an analysis of the base triethylamine to have given the following results:—

Carbon	71·29
Hydrogen	14·85
Nitrogen	13·86
	100·00

The base is monacid, forming a hydrochloride containing one molecule of HCl, and this hydrochloride forms a double platinum salt containing two molecules of the hydrochloride to one molecule of platinum; 100 parts of the platinum salt left, on ignition, 32·14 parts of platinum, so that, to find out the amount of salt containing one atom of platinum, we have—

$$32{\cdot}14 : 197{\cdot}5 :: 100 : x$$
$$\therefore x = 614{\cdot}5.$$

Putting x for the unknown molecular weight of the base, the molecular weight of the salt is—

$$\begin{aligned} 2HCl &= 73{\cdot}0 \\ Pt &= 197{\cdot}5 \\ Cl_4 &= 142{\cdot}0 \\ \hline & 2x + 412{\cdot}5 \end{aligned}$$

It was shown by analysis that 197·5 parts of platinum represented 614·5 parts of the double salt, so that—

$$2x + 412{\cdot}5 = 614{\cdot}5$$
$$\therefore x = 101.$$

Making use of the percentage numbers given by ultimate analysis, we have the following obvious proportions for finding the weights of the respective elements contained in this molecular weight—

$$100 : 101 :: 71{\cdot}29 : C$$
$$100 : 101 :: 14{\cdot}85 : H$$
$$100 : 101 :: 13{\cdot}86 : N$$

Whence C = 72·0, H = 14·9, N = 13·9, and the numbers of the atoms are:—

$$C = \frac{72{\cdot}0}{12} = 6,\ H = \frac{14{\cdot}9}{1} = 14{\cdot}9,\ N = \frac{13{\cdot}9}{14} = 0{\cdot}99.$$

By the atomic theory these numbers must be integral, so that the numbers of atoms are 6, 15, and 1; and the molecular formula is $C_6H_{15}N$.

When a base does not readily form double platinum salts, the molecular formula is deduced from the analysis of an anhydrous normal salt. In the case of compounds which are neither acid nor basic, and which do not admit of vaporization, the molecular formula can only be indirectly arrived at by considering the chemical transformations of the compound and its relationship to known substances. A molecular formula obtained by this means implies that, could the substance be vaporized, its molecular volume would correspond to the molecular volume of hydrogen.

Rational, Constitutional, or Structural Formulæ.—The molecular formula of an organic compound simply expresses the fact that the molecule of such compound contains so many atoms of each of its constituent elements, and in the earlier stages of the science chemists were contented with such representation of their analytical results. As the science developed, however, it soon became evident that substances might have the same percentage composition, or even the same molecular formula, and yet exhibit under the influence of the same reagents totally distinct characters. These facts, which will be more fully discussed in a subsequent part of this article, led to the necessity of devising some method by which organic formulæ could be made to represent the behavior of the respective compounds under the influence of decomposing agents—in other words, the manner in which the compound was capable of splitting up or of being resolved, and, as a necessary result, the converse fact of representing the manner in which the elements of a compound were grouped together. These *rational, constitutional,* or *structural* formulæ must be regarded solely from a chemical point of view; they are symbolic representations of chemical facts, and in no way represent the physical grouping of the atoms in space. They may be most conveniently defined as artificial epitomes of the reactions of compounds, indicating that when decomposed the compounds separate into such and such groups, and that when it is possible to bring these groups or radicles together, the compound can in most cases be built up or synthesized.

Let us now, by way of illustration, proceed to consider the method of arriving at the constitutional formula of some typical compound.

The molecular formula of acetic acid, as previously shown by its ultimate analysis and the determination of silver in its silver salt, is—

$$C_2H_4O_2.$$

Being a monobasic acid, one of its hydrogen atoms is replaceable by metals. This fact is expressed, as in the case of inorganic acids, by the formula—

$$H.C_2H_3O_2.$$

But this formula does not express the whole of the decompositions possible to the acid; the residue $C_2H_3O_2$ being capable of further subdivision, the formula may be further developed. Thus, acetic acid may be formed by the action of acetyl chloride upon water, according to the reaction—

$$C_2H_3O.Cl + OH_2 = C_2H_3O_2.H + HCl.$$

Thus the radicle *acetyl* C_2H_3O is shown to enter into the composition of acetic acid, and the formula therefore becomes—

$$H.O.C_2H_3O.$$

In confirmation of this formula several reactions might be mentioned in which the acetyl group is left unchanged, while the hydroxyl, HO, is withdrawn and replaced by other elements or radicles. For example—

$$\underset{\text{Acetic acid.}}{H.O.C_2H_3O} + \underset{\text{Phosphoric chloride.}}{PCl_5} = \underset{\text{Acetyl chloride.}}{C_2H_3O.Cl} + \underset{\text{Hydrochloric acid.}}{HCl} + \underset{\text{Phosphorus oxytrichloride.}}{POCl_3}$$

$$\underset{\text{Acetic acid.}}{5(H.O.C_2H_3O)} + \underset{\text{Phosphorus pentasulphide.}}{P_2S_5} = \underset{\text{Thiacetic acid.}}{5(H.S.C_2H_3O)} + \underset{\text{Phosphorus pentoxide.}}{P_2O_5}$$

$$\underset{\text{Sodium acetate.}}{Na.O.C_2H_3O} + \underset{\text{Acetyl chloride.}}{C_2H_3O.Cl} = \underset{\text{Acetic oxide.}}{C_2H_3O.C_2H_3O.O} + \underset{\text{Sodium chloride.}}{NaCl}.$$

Next with respect to acetyl itself. When acetic acid is electrolyzed, hydrogen is evolved at the positive pole and carbon dioxide and ethane (C_2H_6) at the negative. Now, ethane can be shown to be identical with di-methyl $(CH_3)_2$, so that the radicle methyl is thus shown to exist in acetic acid—a fact which receives confirmation from several reactions, two of which may now be considered.

When potassium cyanide acts upon methyl iodide, a substance known as *acetonitrile* ($CH_3.CN$) is produced—

$$\underset{\text{Methyl iodide.}}{CH_3I} + \underset{\text{Potassium cyanide.}}{KCN} = \underset{\text{Acetonitrile.}}{CH_3.CN} + \underset{\text{Potassium iodide.}}{KI}.$$

By heating acetonitrile with water or caustic potash solution, acetic acid and ammonia are formed, thus—

$$\underset{\text{Acetonitrile.}}{CH_3.CN} + \underset{\text{Water.}}{2OH_2} = \underset{\text{Acetic acid.}}{CH_3.CO.O.H} + \underset{\text{Ammonia.}}{NH_3}.$$

When barium acetate is submitted to dry distillation, it decomposes in the manner shown by the following equation:—

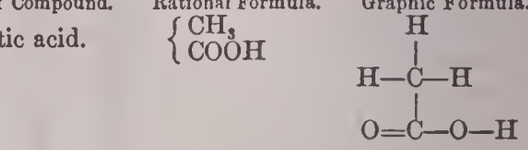
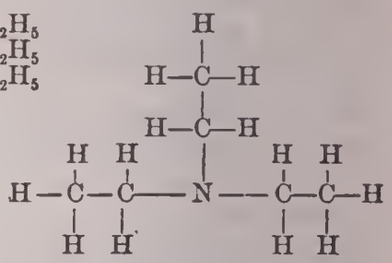
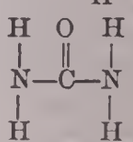
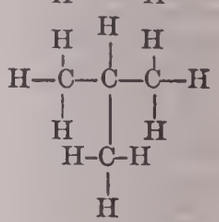
$$\underset{\text{Barium acetate.}}{Ba.O_2.(CH_3.CO)_2} = \underset{\text{Acetone.}}{CO.(CH_3)_2} + \underset{\text{Barium carbonate.}}{BaCO_3}.$$

Thus the most developed formula of acetic acid is $CH_3.CO.O.H$, or, as it is more conveniently expressed—

$$\left\{\begin{matrix}CH_3\\COOH\end{matrix}\right..$$

The bracket signifies that the two carbon atoms are directly united.

Graphic Formulæ.—Graphic formulæ having already been explained (see p. 410), it is here only necessary to illustrate their application to organic compounds. The following are typical examples:—

Name of Compound.	Rational Formula.	Graphic Formula.
Acetic acid.	$\left\{\begin{matrix}CH_3\\COOH\end{matrix}\right.$	
Triethylamine.	$N\left\{\begin{matrix}C_2H_5\\C_2H_5\\C_2H_5\end{matrix}\right.$	
Urea.	$CO\left\{\begin{matrix}NH_2\\NH_2\end{matrix}\right.$	
Trimethyl-methane.	$C\left\{\begin{matrix}H\\CH_3\\CH_3\\CH_3\end{matrix}\right.$	

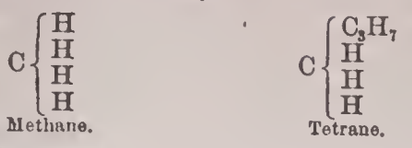
Isomerism.—It has been mentioned that organic substances may have the same percentage composition and molecular formula, and yet exhibit totally distinct chemical and physical characters. To this phenomenon the general term *isomerism* is applied, and the compounds are termed *isomerides*, or are said to be *isomeric*. The differences between isomeric bodies are well explained on the view that such bodies possess different constitutions, or that their elements are grouped in different ways. Constitutional formulæ are thus absolutely indispensable for the representation of isomerides. As will be seen subsequently, there can be several kinds of isomerism, but we shall here restrict the term to two classes of cases.

(1.) *Isomerism proper* or *Physical Isomerism.*—In these cases the substances are identical in their composition, vapor-density, and chemical behavior, but exhibit different physical properties. Thus there are several hydrocarbons, known as *terpenes*, having the formula $C_{10}H_{16}$, which exist in the oils of turpentine, lemon, bergamot, orange, &c., and which exhibit the same behavior under the influence of chemical reagents, differing only in their odor and action upon polarized light. Again, the empirical formula $C_4H_6O_6$ includes several organic acids (tartaric acid being one of the number) which are physical isomerides differing from one another only in their crystalline form and action upon polarized light.

(2.) *Chemical Isomerism.*—In these cases the compounds are identical in composition and in their molecular formulæ, but differ in physical properties and chemical behavior in certain reactions.

For instance, by taking one atom of hydrogen from the hydrocarbon propane (C_3H_8) we obtain the radicle propyl (C_3H_7), and if we suppose one atom of hydrogen in marsh

gas or methane (CH_4) to be replaced by propyl, we get the hydrocarbon tetrane or diethyl—



Methane. Tetrane.

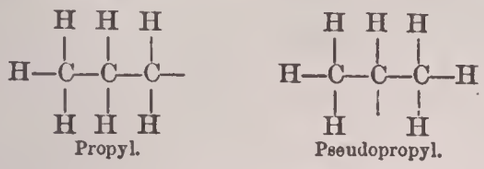
Now propyl can be written in two different ways, according as the elements are grouped differently; thus—

$$(CH_3CH_2CH_2)',$$

or

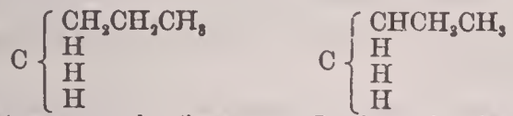
$$(CHCH_3CH_3)'.$$

The differences are still more strikingly shown by the use of graphic formulæ—



Propyl. Pseudopropyl.

Distinguishing these radicles from each other by the names propyl and pseudopropyl, it is clear that we can have a tetrane containing propyl and another containing pseudopropyl—



Tetrane or propyl-methane. Pseudopropyl methane.

These formulæ can, of course, be written in a more condensed form; thus—

$CH_3 . C_3H_7$ — Tetrane or propyl-methane.

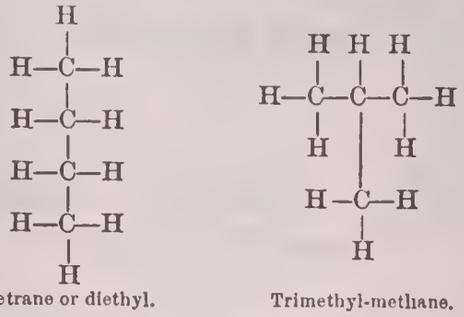
$CH_3 . CH(CH_3)_2$, — Methyl-pseudopropyl.

or

$(C_2H_5)_2$ — Tetrane or diethyl.

$CH(CH_3)_3$. — Trimethyl-methane.

The graphic formulæ help to show still more clearly that the elements can be grouped only in two different ways—



Tetrane or diethyl. Trimethyl-methane.

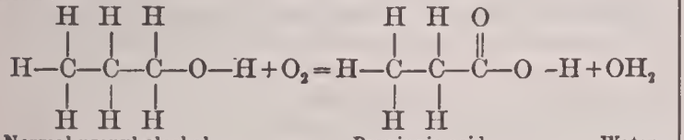
The fact thus shown possible by formulation is borne out experimentally. Two tetranes actually exist,—one, which from its mode of formation can be shown to be propyl-methane or diethyl, having a boiling point of 1° C., the other, which can be shown to be pseudopropyl-methane, boiling at −15° C.

The experimental confirmation does not, however, end here. The same isomerism can be shown to exist among all the derivatives of these two propyls. Thus we have—

Normal Series.				Isomeric Series.			
Name of Compound.	Formula.	Boiling point.	Specific gravity.	Name of Compound.	Formula.	Boiling point.	Specific gravity.
Hexane or dipropyl	$C_3H_7.C_3H_7$	70°	·669 at 16°	Di-pseudopropyl	$CH(CH_3)_2$ / $CH(CH_3)_2$	58°	·67 at 17°
Propyl chloride or chloropropane	C_3H_7Cl	46·5°	·915 at 0°	Pseudopropyl chloride	$CH(CH_3)_2Cl$	39°	·874 at 10°
Propyl bromide or bromopropane	C_3H_7Br	71°	1·35 at 16°	Pseudopropyl bromide	$CH(CH_3)_2Br$	61°	1·32 at 13°
Propyl iodide or iodopropane	C_3H_7I	102°	1·76 at 16°	Pseudopropyliodide	$CH(CH_3)_2I$	89·5°	1·70 at 15°
Propyl alcohol or ethyl carbinol	$C_3H_7.OH$	97·4°	·806 at 15°	Pseudopropyl alcohol or dimethyl carbinol	$CH(CH_3)_2.OH$	82·85°	·786 at 16°
Propylamine or amidopropane	$C_3H_7.NH_2$	49·5°	·728 at 0°	Pseudopropylamine	$CH(CH_3)_2.NH_2$	32°	·69 at 18°
Butyric acid	$C_3H_7.COOH$	162·5°	·982 at 0°	Pseudobutyric acid	$CH(CH_3)_2.COOH$	154°	·959 at 0°

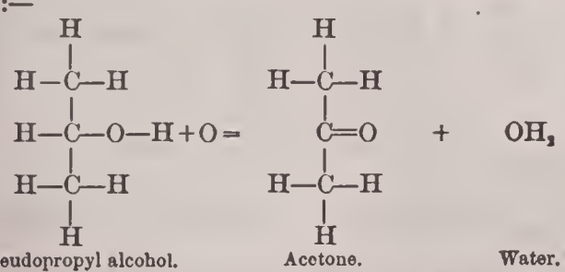
This list might be considerably extended, but sufficient examples have been given to illustrate the phenomena under consideration.

Not only do these isomerides differ in physical properties, but they exhibit different and characteristic transformations under the action of the same reagent. Thus, normal propyl alcohol when oxidized yields propionic acid:—



Normal propyl alcohol. Propionic acid. Water.

Under the same circumstances pseudopropyl alcohol yields the substance known as acetone or dimethyl ketone:—



Pseudopropyl alcohol. Acetone. Water.

The distinguishing character of this class of isomers is that the isomerides can be shown to belong to the same series of compounds, or, according to Schorlemmer, "they contain the same number of carbon atoms linked together."

Reactions that give rise to the formation of a compound capable of existing in two isomeric modifications frequently result in the production of both isomers, but the precise conditions which regulate the relative quantities of the two compounds are not yet known.

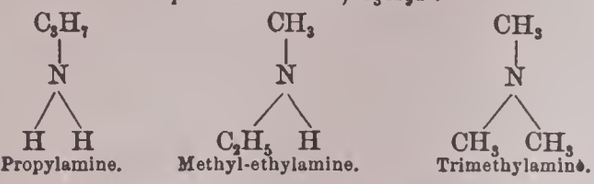
Certain relationships have been shown to exist between the physical and chemical properties of isomeric bodies, although numerous exceptions render the exact expression of these relationships an impossibility in the present state of knowledge. Thus, as a rule, the boiling points of the compounds of an isomeric series are lower than those of the normal series (see preceding table)—or, more generally, the boiling point is higher the more simple the constitution of the substance.

Since different amounts of heat are concerned in the production of isomeric bodies, it must be admitted that such bodies are stored with different amounts of potential energy. Adopting this view, some chemists have recently sought an explanation of isomerism in the different amounts of potential energy thus contained in isomerides, and have thrown distrust upon the "constitutional" theory. In taking this view, however, the true position seems reversed—the fact that isomerides contain different stores of potential energy by no means does away with the hypothesis that they possess different constitutions. It seems, on the contrary, that the difference of energy is accounted for on the view that the bodies possess a difference of constitution, since the contained energy results from the relative positions of the atoms or radicles with regard to the intramolecular chemical forces.

Metamerism.—Compounds having the same molecular

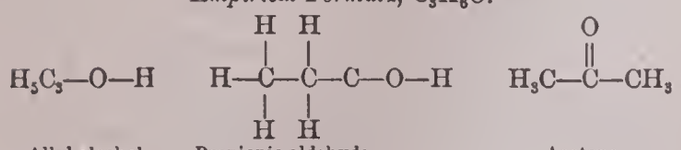
formula may result from the combination of totally distinct radicles, and exhibit in consequence not only a marked difference of physical properties, but in almost all cases different chemical transformations under the influence of the same reagent. Such substances are said to be *metameric*. The subjoined examples illustrate this class of cases. It is to be observed that, as with true isomeric compounds, two metameric bodies are frequently produced in the same reaction. For instance, most of the methods given for obtaining ethyl cyanide yield a mixture of this compound with the isocyanide.

Empirical Formula, C_3H_9N.



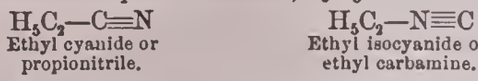
Propylamine. Methyl-ethylamine. Trimethylamine.

Empirical Formula, C_3H_6O.



Allyl alcohol. Propionic aldehyde. Acetone.

Empirical Formula, C_3H_5N.



Ethyl cyanide or propionitrile. Ethyl isocyanide or ethyl carbamine.

Polymerism.—Compounds having the same percentage composition but different vapor-densities are said to be *Polymeric;* thus—

Name of Compound.	Formula.	Vapor density.	Boiling point.
Acetylene.....	C_2H_2	13	Gas.
Benzene.....	$C_6H_6 = 3(C_2H_2)$	39	81°
Styrolene	$C_8H_8 = 4(C_2H_2)$	52	145°
Dihydronaphthalene..	$C_{10}H_{10} = 5(C_2H_2)$	65	210°

The above list exhibits the rise in boiling point with increase of vapor-density.

Polymeric bodies may be isomeric or metameric; the following, for example, are metameric polymerides:—

Formic aldehyde..... $\left\{\begin{matrix}H\\COH\end{matrix}\right\} = CH_2O$

Acetic acid..... $\left\{\begin{matrix}CH_3\\COOH\end{matrix}\right\} = C_2H_4O_2 = 2(CH_2O)$

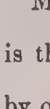
Lactic acid..... $\left\{\begin{matrix}C_2H_4OH\\COOH\end{matrix}\right\} = C_3H_6O_3 = 3(CH_2O)$

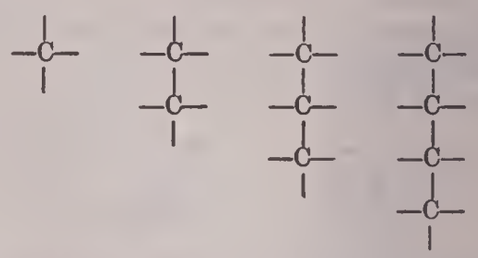
Classification of Organic Compounds.

Homologous Series.—Carbon being a tetrad element is only saturated by four atoms of a monad element, or by any number of atoms the joint atomicities of which are equal to four. Thus the following are saturated compounds:—

CH_4', $CHCl_3'$, $CO''Cl_2'$, CO_2'', $CN'''Cl'$, CI_4'.

Among inorganic compounds many instances occur in which two or more atoms of the same element unite such, for example, as in the ferric and manganic salts. In these cases, however, the number of atoms thus entering into combination is seldom great. In the carbon atom we meet with the greatest tendency to unite with similar atoms, and this special property of carbon accounts for the great multiplicity of organic compounds.

Making use of graphic notation, the tetrad carbon atom is thus represented  . If two atoms of carbon unite by one bond of each, the resultant atomicity of the group is 6; if 3 atoms unite the resultant atomicity is 8, and so on:—



Thus every additional atom of carbon brings two active units of atomicity into the molecule, and if we suppose these carbon atoms to be saturated by hydrogen, we shall have an ascending series of hydrocarbons, each member of which differs from the one beneath it by + CH_2. Such series are known as *homologous series*. The following are examples:—

CH_4, Methane.	CH_4O, Methyl alcohol.	CH_2O_2, Formic acid.
C_2H_6, Ethane.	C_2H_6O, Ethyl "	$C_2H_4O_2$, Acetic "
C_3H_8, Propane.	C_3H_8O, Propyl "	$C_3H_6O_2$, Propionic "
C_4H_{10}, Tetrane.	$C_4H_{10}O$, Butyl "	$C_4H_8O_2$, Butyric "
C_5H_{12}, Pentane.	$C_5H_{12}O$, Amyl "	$C_5H_{10}O_2$, Valeric "
.....	.....	.....
C_nH_{2n+2}	C_nH_{2n+2O}	$C_nH_{2n}O_2$

Isologous Series.—An inspection of the foregoing formulæ will show that hydrocarbons of the general formula C_nH_{2n+2} are the only *saturated* compounds, *i.e.*, the only compounds in which the atom-fixing powers of the carbon atoms are completely satisfied. If an odd number of hydrogen atoms be withdrawn, a compound having a certain odd number of unsatisfied units of atomicity (*i.e.*, a "perissad" radicle) is the result, and such compounds are incapable of existing in the free state. From this and previous considerations it follows, that "all hydrocarbons contain an even number of atoms of hydrogen," and further, "that the sum of the atoms of monad and triad elements contained in the molecule of a carbon compound must also always be an even number" (Schorlemmer).

Compounds containing an even number of unsatisfied units of atomicity, although non-saturated, are capable of existing in the free state. Thus, commencing with the saturated hydrocarbons of the C_nH_{2n+2} series, hydrogen atoms can be withdrawn by pairs, giving rise to a descending series of hydrocarbons, each member of which differs from the one below it by + H_2. Such series are termed *isologous series*. The following table shows at a glance the relationship between homologous and isologous series, and at the same time the system of nomenclature used:—

Isologous Series.		Isologous Series.		Isologous Series.		Isologous Series.		
Name of Compound.	Formula.	Name of Compound.	Formula.	Name of Compound.	Formula.	Name of Compound.	Formula.	
Methane	CH_4	Ethane	C_2H_6	Propane	C_3H_8	Butane	C_4H_{10}	Homologous Series.
Methene	CH_2	Ethene	C_2H_4	Propene	C_3H_6	Butene	C_4H_8	
		Ethine	C_2H_2	Propine	C_3H_4	Butine	C_4H_6	
				Propone	C_3H_2	Butone	C_4H_4	
						Butune	C_4H_2	

Organic Radicles.—The meaning of the term *radicle* has already been explained (p. 410), so that it is here only necessary to point out the part played by such unsaturated groups of atoms in the formation of organic compounds.

It has already been mentioned that an odd number of hydrogen atoms withdrawn from a saturated hydrocarbon of the C_nH_{2n+2} series leaves an unsaturated group having an odd number[1] of unsatisfied units of atomicity. For example:—

[1] The names of perissad radicles are made to end in *yl*.

$CH_4 - H = (CH_3)'$ Methane. Methyl.

$C_2H_6 - H = (C_2H_5)'$ Ethane. Ethyl.

$C_nH_{2n+2} - H = (C_nH_{2n+1})'$

$(C_2H_4)'' - H = (C_2H_3)'''$ Ethene. Ethenyl.

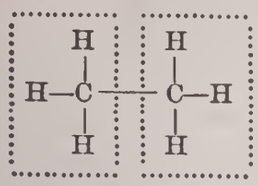
$(C_3H_6)'' - H = (C_3H_5)'''$ Propene. Propenyl.

$(C_nH_{2n})'' - H = (C_nH_{2n-1})'''$

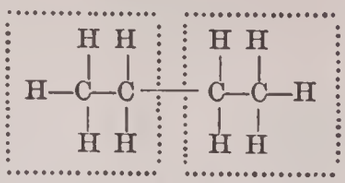
Thus the C_nH_{2n+2} hydrocarbons may be conveniently regarded for some purposes as hydrides of C_nH_{2n+1} radicles,

a series the members of which enter largely into the composition of organic compounds of all classes.

Perissad radicles are incapable of existing in the free state because on isolation two semi-molecules unite; for instance—



Dimethyl = ethane.



Diethyl = tetrane.

Generally $2(C_nH_{2n+1}) = C_{2n}H_{4n+2}$.

It is by no means necessary that a group of atoms should be capable of isolation in order to constitute such group an organic radicle. Any unsaturated group which through several reactions remains unchanged may be so regarded.[1] (Sec, for example, the previously quoted reactions of acetic acid.)

The following are additional examples of organic radicles:—

Cyanogen $N\equiv C-$; in the free state, $N\equiv C-C\equiv N$.

Acetyl $(C_2H_3O)' = CO\overset{CH_3}{\diagup}$.

Carboxyl $(COOH)'$; in the free state, oxalic acid, $\begin{matrix}COOH\\|\\COOH\end{matrix}$

While hydrocarbon radicles are positive (see p. 412), cyanogen and the oxygen-containing or acid radicles are negative.

Fatty and Aromatic Groups.—In order to assist in bringing the vast numbers of organic compounds within the scope of some system of classification, chemists frequently adopt the convenient division of them into fatty and aromatic groups.

It will be seen subsequently that most organic compounds may be regarded as derived by substitution from hydrocarbons.[2] Starting, then, with the saturated hydrocarbons C_nH_{2n+2}, the isologous series, down to C_nH_{2n-6}, and some of the members of the C_nH_{2n-4} series, with their derivatives, constitute the fatty group, so called because many of its members exist in fatty bodies. The hydrocarbons of the C_nH_{2n-6}, &c., series, with their derivatives, are termed the aromatic group, because many of the compounds are obtained from balsams, essential oils, gum-resins, and other aromatic substances. The chief characteristic of the aromatic group is the comparative stability of its compounds, for, whereas the artiad (*i.e.*, even) radicles of the fatty group act as unsaturated groups entering freely into direct combination with other elements, the aromatic radicles act more like saturated groups entering into direct combination only with difficulty, and forming substitution compounds with comparative ease.

The division here made between fatty and aromatic substances must not be regarded as one having a sharply defined boundary line. In point of fact, the two series merge into one another, and compounds belonging to one group can be transformed into compounds of the other. Thus benzene, the typical hydrocarbon of the aromatic group, can be formed directly from ethine or acetylene, a hydrocarbon of the fatty group, by the polymerization effected by heat:—

$$\underset{\text{Ethine.}}{3C_2H_2} = \underset{\text{Benzene.}}{C_6H_6}.$$

Also acetone, a substance directly obtainable from the salts of the fatty body acetic acid, when it is heated with sulphuric acid, loses water and is transformed into mesitylene or trimethylbenzene:—

$$\underset{\text{Acetone.}}{3CO(CH_3)_2} - \underset{\text{Water.}}{3OH_2} = \underset{\text{Trimethylbenzene.}}{C_6H_3(CH_3)_3}.$$

Families of Organic Compounds.—Most of the organic compounds at present known can be referred to certain families which we shall now proceed to enumerate.

I. *Hydrocarbons.*—These are the parent bodies from which the remaining families are derived. Their arrangement into homologous and isologous series has already been discussed.

II. *Alcohols.*—Formed from hydrocarbons by the substitution of hydroxyl for hydrogen:—

$\underset{\text{Methane.}}{CH_4}$, $\underset{\text{Methyl alcohol.}}{CH_3OH}$; $\underset{\text{Ethane.}}{C_2H_6}$, $\underset{\text{Ethyl alcohol.}}{C_2H_5OH}$, $\underset{\text{Ethene alcohol.}}{C_2H_4''(OH)_2}$;

$\underset{\text{Propane.}}{C_3H_8}$, $\underset{\text{Propyl alcohol.}}{C_3H_7OH}$, $\underset{\text{Propene alcohol.}}{C_3H_6''(OH)_2}$, $\underset{\text{Propenyl alcohol.}}{C_3H_5'''(OH)_3}$.

III. *Haloid Ethers.*—Formed from hydrocarbons by the substitution of halogen elements for hydrogen:—

$\underset{\text{Propane.}}{C_3H_8}$, $\underset{\text{Propyl chloride.}}{C_3H_7Cl}$, $\underset{\text{Propene dibromide.}}{C_3H_6''Br_2}$, $\underset{\text{Propenyl triiodide.}}{C_3H_5'''I_3}$.

IV. *Ethers.*—Derived from alcohols by the substitution of oxygen for hydroxyl; thus, from

$\underset{\text{Ethyl alcohol.}}{2(C_2H_5OH)}$, $\underset{\text{Ethene alcohol.}}{C_2H_4''(OH)_2}$, $\underset{\text{Propenyl alcohol.}}{C_3H_5'''(OH)_3}$

we have

$\underset{\text{Ethyl oxide or ether.}}{(C_2H_5)_2O}$, $\underset{\text{Ethene oxide.}}{C_2H_4''O}$, $\underset{\text{Propenyl oxide.}}{(C_3H_5)_2'''O_3}$.

V. *Sulphur, Selenium, and Tellurium Alcohols and Ethers.*—These compounds are the analogues of the alcohols and ethers, oxygen being replaced by sulphur, &c. The thio-alcohols are known as *mercaptans*:—

$\underset{\text{Ethyl alcohol.}}{C_2H_5OH}$, $\underset{\text{Ethyl sulphydrate or mercaptan.}}{C_2H_5SH}$, $\underset{\text{Ethyl selenio-hydrate or selenium mercaptan.}}{C_2H_5SeH}$, $\underset{\text{Ethyl sulphide.}}{(C_2H_5)_2S}$, $\underset{\text{Ethyl telluride.}}{(C_2H_5)_2Te}$;

$\underset{\text{Ethene alcohol.}}{C_2H_4''(OH)_2}$, $\underset{\text{Ethene sulphydrate.}}{C_2H_4''(SH)_2}$; $\underset{\text{Propenyl alcohol.}}{C_3H_5'''(OH)_3}$, $\underset{\text{Propenyl sulphydrate.}}{C_3H_5'''(SH)_3}$

VI. *Aldehydes.*—Derived from hydrocarbons by the replacement of hydrogen by the radicle $(COH)'$:—

$\underset{\text{Methane.}}{CH_4}$, $\underset{\text{Acetic aldehyde.}}{CH_3.COH}$; $\underset{\text{Ethane.}}{C_2H_6}$, $\underset{\text{Propionic aldehyde.}}{C_2H_5.COH}$.

VII. *Ketones.*—Derived from aldehydes by the replacement of hydrogen in the COH group by monad hydrocarbon radicles:—

$\underset{\text{Acetic aldehyde.}}{CH_3.COH}$, $\underset{\text{Dimethyl-ketone.}}{CH_3.CO.CH_3}$; $\underset{\text{Propionic aldehyde.}}{C_2H_5.COH}$, $\underset{\text{Ethyl-methyl ketone.}}{C_2H_5.CO.CH_3}$.

VIII. *Organic Acids.*—These compounds may be regarded as hydrocarbons in which hydrogen is replaced by carboxyl:—

$\underset{\text{Methane.}}{CH_4}$, $\underset{\text{Acetic acid.}}{CH_3.COOH}$; $\underset{\text{Ethane.}}{C_2H_6}$, $\underset{\text{Succinic acid.}}{C_2H_4''.(COOH)_2}$.

The organic acids may likewise be regarded as derived from alcohols by the replacement of H_2 by O:—

$\underset{\text{Ethyl alcohol.}}{CH_3.CH_2.OH}$, $\underset{\text{Acetic acid.}}{CH_3.CO.OH}$;

$\underset{\text{Ethene alcohol.}}{C_2H_4''(OH)_2}$, $\underset{\text{Glycollic acid.}}{C_2H_2O''(OH)_2}$, $\underset{\text{Oxalic acid.}}{C_2O_2''(OH)_2}$.

Corresponding thio-acids are known thus:—

$\underset{\text{Acetic acid.}}{C_2H_3O.OH}$ $\underset{\text{Thiacetic acid.}}{C_2H_3O.SH}$

IX. *Anhydrides.*—Derived from acids by the substitution of oxygen for hydroxyl, and thus bearing the same relationship to the acids that the ethers bear to the alcohols; thus, from

$\underset{\text{Acetic acid.}}{2(CH_3.CO.OH)}$, $\underset{\text{Succinic acid.}}{C_2H_4''C_2O_2(OH)_2}$, $\underset{\text{Benzoic acid.}}{2(C_6H_5.CO.OH)}$

we have

$\underset{\text{Acetic anhydride.}}{(CH_3.CO)_2O}$, $\underset{\text{Succinic anhydride.}}{C_2H_4''.C_2O_2.O}$, $\underset{\text{Benzoic anhydride.}}{(C_6H_5.CO)_2O}$.

Corresponding thio-compounds are capable of existing:—

$(CH_3.CO)_2S$ = thiacetic anhydride.

X. *Acid Halides.*—Derived from acids by the substitution of halogen elements for hydroxyl. These compounds are thus most conveniently formulated as compounds of an oxygenated or acid radicle[1] with the halogens:—

[1] So numerous, indeed, are these radicles in Organic Chemistry that this branch of the science has been named the "Chemistry of compound radicles."

[2] "We may therefore define that part of our science which is generally known as Organic Chemistry as the Chemistry of the Hydrocarbons and their Derivatives."—Schorlemmer.

[1] The names of all acid radicles, perissad and artiad (*i.e.*, odd and even), end in *yl*.

$C_2H_3O.HO$, $C_2H_3O.Cl$, $(C_2H_3O)_3I'''$;
Acetic acid. Acetyl chloride. Acetyl iodide.

$C_4H_4O_2''.(OH)_2$, $C_4H_4O_2''.Cl_2$.
Succinic acid. Succinyl chloride.

XI. *Ethereal Salts* or *Compound Ethers.*—Derived from acids, organic or inorganic, by the substitution of a hydrocarbon radicle for the hydrogen of the hydroxyl:—

$NO_2.OH$, $NO_2.O(C_2H_5)$;
Nitric acid. Ethyl nitrate.

$SO_2.(OH)_2$, $SO_2.OH.(OC_2H_5)$, $SO_2.(OC_2H_5)_2$;
Sulphuric acid. Ethyl-hydrogen sulphate. Diethyl sulphate.

$PO.(OH)_3$, $PO.(OH)_2(OC_2H_5)$, $PO.(OC_2H_5)_3$;
Phosphoric acid. Monethyl phosphate. Triethyl phosphate.

$C_2H_3O.OH$, $C_2H_3O.(OC_2H_5)$.
Acetic acid. Ethyl acetate.

The thio-acids also form ethereal salts:—

$C_2H_3O.SH$, $C_2H_3O.(SC_2H_5)$.
Thiacetic acid. Ethyl thiacetate.

XII. *Organo-metallic Bodies.* Compounds of hydrocarbon radicles with metals:—

NaC_2H_5 ; $Zn(C_2H_5)_2$; $Sn(C_2H_5)_4$; $SnI_2(C_2H_5)_2$.
Sodium ethide. Zinc ethide. Stannic ethide. Stannic diiodo-diethide.

XIII. *Amines* or *Compound Ammonias.*—These compounds are most conveniently regarded as derivatives of ammonia and its hydrate, and of ammonium haloid salts, hydrogen being replaced by hydrocarbon radicles:—

$N.\begin{cases}H\\H\\H\end{cases}$ $N\begin{cases}C_2H_5\\H\\H\end{cases}$ $N\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\end{cases}$ $N\begin{cases}C_6H_5\\C_2H_5\\H\end{cases}$ $N_2\begin{cases}C_2H_4''\\H\\H\\H\\H\end{cases}$
Ammonia. Ethylamine. Triethylamine. Ethyl-phenyl-amine. Ethene diamine.

$N\begin{cases}H\\H\\H\\H\\Cl\end{cases}$ $N\begin{cases}C_2H_5\\H\\H\\H\\Cl\end{cases}$ $N\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\C_2H_5\\I\end{cases}$ $N\begin{cases}CH_3\\C^{IV}\end{cases}$ $N\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\C_2H_5\\OH\end{cases}$
Ammonium chloride. Ethylammonium chloride. Tetrethyl-ammonium iodide. Methyl carbamine. Tetrethyl-ammonium hydrate.

These compounds may likewise be formulated as hydrocarbon derivatives:—

CH_4 , $CH_3(NH_2)$; C_2H_6 , $C_2H_5(NH_2)$, $C_2H_4''(NH_2)_2$;
Methane. Methyiamine or amido-methane. Ethane. Ethylamine or amido-ethane. Ethene diamine or diamido-ethane.

C_6H_6 , $C_6H_5(NH_2)$, $C_6H_4''(NH_2)_2$, $C_6H_3'''(NH_2)_3$.
Benzene. Amidobenzene. Diamidobenzene. Triamidobenzene.

The phosphorus, arsenic, antimony, and bismuth analogues of ammonia yield derivatives corresponding to the amines:—

$P\begin{cases}C_2H_5\\H\\H\end{cases}$ $P\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\end{cases}$ $As\begin{cases}CH_3\\CH_3\\H\end{cases}$
Ethylphosphine. Triethylphosphine. Dimethylarsine.

$Bi\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\end{cases}$ $Sb\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\C_2H_5\\Cl\end{cases}$ $P\begin{cases}C_2H_5\\C_2H_5\\C_2H_5\\C_2H_5\\I\end{cases}$
Triethylbismuthine. Tetrethylstibonium chloride. Tetrethylphosphonium iodide.

XIV. *Amides.*—These compounds are analogous to the amines, being derived from ammonia by the substitution of acid radicles for hydrogen:—

$N\begin{cases}H\\H\\H\end{cases}$ $N\begin{cases}C_2H_3O\\H\\H\end{cases}$ $N\begin{cases}C_2H_3O\\C_2H_3O\\H\end{cases}$ $N\begin{cases}C_2H_3O\\C_2H_3O\\C_2H_3O\end{cases}$
Ammonia. Acetamide. Diacetamide. Triacetamide.

$N_2\begin{cases}(C_4H_4O_2)''\\H\\H\\H\\H\end{cases}$ $N_2\begin{cases}(C_4H_4O_2)''\\(C_4H_4O_2)''\\(C_4H_4O_2)''\end{cases}$
Succinamide. Trisuccinamide.

The amides may also be written as compounds of acid radicles with amidogen $(NH_2)'$, imidogen $(NH)''$, and nitrogen N''':—

$.C_2H_3O.NH_2$, $(C_2H_3O)_2.(NH)''$,
Acetamide. Diacctamide.

$(C_2H_3O)_3N'''$; $(C_4H_4O_2)''.NH$
Triacetamide. Succinimide.

The fourteen families now enumerated, although comprising most of the known organic substances, still leave outstanding a large number of compounds, of which the constitution has not yet been determined, and which consequently cannot be referred to any of the above groups. We propose to consider briefly the individual families in succession, describing the mode of preparation and properties of the most important members of each family, and then proceeding to the consideration of the unclassed organic compounds.

Cyanogen and its Compounds.

The compound which in its chemical behavior most closely resembles inorganic substances, and which forms as it were a connecting link between these and organic bodies, is the radicle cyanogen. Before proceeding, therefore, to the systematic consideration of the great organic families, cyanogen and its compounds may be conveniently treated of.

Cyanogen,[1] CN or Cy, in the free state Cy_2, is generally prepared by heating the cyanide of some heavy metal (usually mercury): $HgCy_2 = Hg + Cy_2$. A brown substance, most probably a polymeride of cyanogen, known as *paracyanogen*, is always formed in this reaction.

Cyanogen is a colorless gas, having a pungent odor resembling that of bitter almond oil. It burns in air with a purple flame, and is extremely poisonous. The gas is condensable into a liquid under a pressure of about 4 atmospheres. The liquid boils at $-21°$ C., and solidifies at $-34°$ C. Water absorbs about 4 volumes of the gas in the cold. The aqueous solution decomposes on standing, ammonium oxalate being the chief product of the reaction: $C_2N_2 + 4OH_2 = (NH_4)_2C_2O_4$. At the same time small quantities of urea, ammonium carbonate, and cyanide are formed. The addition of a mineral acid to the solution greatly retards the decomposition, oxamide being then produced: $C_2N_2 + 2OH_2 = C_2O_2(NH_2)_2$. Conversely, when oxamide or ammonium oxalate is heated cyanogen is produced:—

$(NH_4)_2C_2O_4 - 4OH_2 = C_2N_2$; $C_2O_2(NH_2)_2 - 2OH_2 = C_2N_2$.

In its chemical relationships cyanogen is the exact analogue of the halogen elements. Its compounds with metals or positive radicles are called *cyanides*.

Compounds of cyanogen with Cl, Br, I, S, OH, and NH_2 are known, and are remarkable for their polymeric modifications. The following is a list of the more important compounds:—

Cyanogen chloride, $CNCl$	Cyanic acid, $CNOH$
Cyanuric chloride, $C_3N_3Cl_3$	Cyanuric acid, $C_3N_3O_3H_3$
Cyanogen bromide, $CNBr$	Sulphocyanic acid, $CNSH$
Cyanuric bromide, $C_3N_3Br_3$	Cyanamide, $CN(NH_2)$
Cyanogen iodide, CNI	Dicyanamide, $C_2N_2(NH_2)_2$
Cyanogen sulphide, C_2N_2S	Cyanuric amide, $C_3N_3(NH_2)_3$
Cyanogen selenide, C_2N_2Se	Ammelide, $C_3N_3(NH_2)(OH)_2$
	Ammeline, $C_3N_3(NH_2)_2OH$

Hydrogen Cyanide, or *Hydrocyanic* or *Prussic Acid*, HCN or HCy.—This compound is formed synthetically by passing electric sparks through a mixture of nitrogen and ethine gases: $C_2H_2 + N_2 = 2HCN$. In practice benzene vapor may be used instead of pure ethine, as it is partially resolved into the latter substance by the action of the spark. The anhydrous acid is also obtained by passing dry hydrogen sulphide over mercuric cyanide. The aqueous solution of the acid is prepared by the action of acids upon metallic cyanides: $HCl + KCN = KCl + HCN$; by the action of ammonia on chloroform: $NH_3 + CHCl_3 = HCN + 3HCl$; and also (most conveniently) by heating a mixture of 5 parts of potassium ferrocyanide with 3 parts of sulphuric acid and 4 parts of water.

The pure acid is a colorless liquid, having an odor of bitter almonds; it is a most violent poison. Its boiling-point is 26·°5 C. and its point of solidification $-15°$ C. The pure acid and its strong aqueous solution are both

[1] From κυανός, blue, because of the color of many of its compounds.

inflammable, burning in air with a violet flame. Both the anhydrous and aqueous acids are very unstable, the former decomposing into ammonia and a brown substance, and the latter undergoing the same decomposition with the additional formation of ammonium formate. Small quantities of formic or of a mineral acid prevent this decomposition, but on mixture with strong acids, a complete decomposition into formic acid ensues:—

$$\underset{\text{Hydrocyanic acid.}}{HCN} + \underset{\text{Water.}}{2OH_2} + \underset{\text{Hydrochloric acid.}}{HCl} = \underset{\text{Formic acid.}}{H.COOH} + \underset{\text{Ammonium chloride.}}{NH_4Cl}$$

Alkalies induce a similar change, alkaline formate and free ammonia being produced. When ammonium formate is heated, the inverse reaction takes place:—

$$\underset{\text{Ammonium formate.}}{HCO(ONH_4)} - \underset{\text{Water.}}{2OH_2} = \underset{\text{Hydrocyanic acid.}}{HCN}$$

A polymeride, $H_3C_3N_3$, is known.

Metallic Cyanides.—Cyanogen being a monad radicle forms, like Cl, Br, and I, a series of salts typified by the formulæ $M'Cy$, $M''Cy_2$, M'''_2Cy_6, M^nCy_n. Of these the most important is potassium cyanide, which can be formed by passing nitrogen over a mixture of red hot carbon and potassium carbonate:—

$$K_2CO_3 + 4C + N_2 = 2KCN + 3CO.$$

This salt is also produced by heating potassium ferrocyanide either alone or mixed with potassium carbonate. Most of the metallic cyanides can be prepared by the action of hydrocyanic acid upon the oxides and hydroxides of the metals, or by double decomposition.

The cyanides have a remarkable tendency to form double salts, such, for example, as the double cyanide of potassium and silver, $KCy,AgCy$.

Of these double cyanides a certain number are decomposed by the action of a mineral acid yielding free HCy and salts of the acid:—

$$KCN, AgCN + 2HNO_3 = KNO_3 + AgNO_3 + 2HCN.$$

Other double cyanides do not decompose in this manner by the action of mineral acids; the heavy metal cannot be detected by its ordinary reagents, and no HCy is evolved. Thus the double cyanide of potassium and iron, $4KCy, FeCy_2$, when acted on by acids exchanges its potassium for hydrogen, but the iron is not removed:—

$$\underset{\text{Potassium ferrocyanide.}}{K_4FeCy_6} + 4HCl = \underset{\text{Hydroferrocyanic acid.}}{H_4FeCy_6} + 4KCl.$$

Thus the group $FeCy_6$ is regarded as an acid radicle (*ferrocyanogen*), and a large number of its salts (*ferrocyanides*) are known. In the same manner we have—

Ferricyanides	$M_6'Fe_2Cy_{12} = 6M'Cy.Fe_2Cy_6$
Cobaltocyanides	$M_4'CoCy_6 = 4M'Cy.CoCy_2$
Cobalticyanides	$M_6'Co_2Cy_{12} = 6M'Cy.Co_2Cy_6$
Manganocyanides	$M_4'MnCy_6 = 4M'Cy.MnCy_2$
Manganicyanides	$M_6'Mn_2Cy_{12} = 6M'Cy.Mn_2Cy_6$
Chromocyanides	$M_4'CrCy_6 = 4M'Cy.CrCy_2$
Chromicyanides	$M_6'Cr_2Cy_{12} = 6M'Cy.Cr_2Cy_6$
Platinocyanides	$M_2'PtCy_4 = 2M'Cy.PtCy_2$
Palladiocyanides	$M_2'PdCy_4 = 2M'Cy.PdCy_2$

Of these compounds the most important are the ferrocyanides and ferricyanides of potassium.

Potassium ferrocyanide (known commonly as *yellow prussiate of potash*) is prepared on the large scale by fusing refuse animal matter, such as horn parings, leather scraps, &c., with crude potassium carbonate and iron filings. This salt is also formed when a ferrous salt is added to a solution of potassium cyanide—

$$6KCy + FeSO_4 = K_4FeCy_6 + K_2SO_4.$$

Potassium ferrocyanide crystallizes in large pale yellow crystals belonging to the quadratic system, and having the composition $K_4FeCy_6, 3OH_2$. Solutions of ferric salts produce in an aqueous solution of potassium ferrocyanide a deep blue precipitate of ferric ferrocyanide or *Prussian blue*:—

$$3K_4FeCy_6 + 2Fe_2Cl_6 = \underset{\text{Prussian blue.}}{2Fe_2Cy_6.3FeCy_2} + 12KCl.$$

Soluble ferrocyanides are thus a delicate test for the presence of ferric salts; and conversely, ferric salts are used to detect ferrocyanides, and also cyanides by the simultaneous addition of a ferrous salt (Scheele's test for prussic acid).

Potassium ferricyanide (or *red prussiate of potash*) is prepared by passing chlorine into a solution of the ferrocyanide:—

$$2K_4FeCy_6 + Cl_2 = \underset{\text{Ferricyanide.}}{K_6Fe_2Cy_{12}} + 2KCl$$

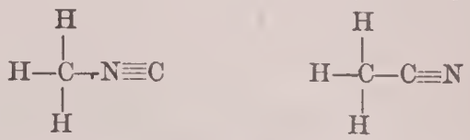
The ferricyanide forms large prismatic crystals of a dark red color soluble in water. Ferric salts give a brown coloration with ferricyanides, while ferrous salts give a blue precipitate of *Turnbull's blue* ($Fe_5Cy_{12} + Aq$).

Nitroprussides are salts of the general formula $M_2'Fe''Cy_5NO$ obtained by the action of nitric acid upon ferro- and ferri-cyanides.

Cyanides of Hydrocarbon Radicles.—The compounds formed by the union of cyanogen with hydrocarbon radicles are of the utmost interest and importance on account of their metameric modifications. Thus we have—

$$\underset{\text{Ethane.}}{C_2H_6}, \quad \underset{\text{Cyanethane=Ethyl cyanide.}}{C_2H_5.CN}, \quad \underset{\text{Ethene cyanide.}}{C_2H_4''.(CN)_2}.$$

On developing the graphic formulæ of one of these cyanides containing a monad radicle, taking for brevity the simplest case, viz., $CH_3.CN$, methyl cyanide, it will be seen that two metamerides are possible (sec also p. 478):—



In the one compound the carbon of the radicle is in combination with the nitrogen of the cyanogen. In the other compound the same carbon atom is in combination with the carbon of the cyanogen. Two such metameric series are actually known, one (cyanides or nitriles) being formulated as hydrocarbon derivatives, and the other (isocyanides or carbamines) as ammonia derivatives or amines (see p. 481); thus (representing the monad radicle by R′)—

$$\underset{\text{Methane.}}{C\{H,H,H,H}, \quad \underset{\text{Cyanide or nitrile.}}{C\{N''',R'} \qquad \underset{\text{Ammonia.}}{N\{H,H,H}, \quad \underset{\text{Isocyanide or Carbamine.}}{N^v\{C^{iv},R'}$$

In accordance with what has been previously said concerning isomeric bodies (p. 477), these two series exhibit different behavior under the action of the same reagent. For instance, the following equations show the ultimate action of water on them:—

Cyanides.	Isocyanides.
$C\{N''',R' + 2OH_2 = NH_3 + C\{R',O'',HO$	$N^v\{C^{iv},R' + 2OH_2 = N\{H,H,R' + \{H,COOH$
Acid.	Amine. Formic acid.

In accordance with these reactions cyanides or nitriles can be produced by the action of dehydrating agents on the ammonium salts of the corresponding acids—

$\underset{\text{Ammonium formate.}}{H.CO(ONH_4)} - 2OH_2 =$	$\underset{\text{Hydrogen cyanide.}}{H.CN} =$	$\underset{\text{Formonitrile.}}{(CH)'''N}$
$\underset{\text{Ammonium acetate.}}{CH_3.CO(ONH_4)} - 2OH_2 =$	$\underset{\text{Methyl cyanide.}}{CH_3.CN} =$	$\underset{\text{Acetonitrile.}}{(C_2H_3)'''N}$
$\underset{\text{Ammonium propionate.}}{C_2H_5.CO(ONH_4)} - 2OH_2 =$	$\underset{\text{Ethyl cyanide.}}{C_2H_5.CN} =$	$\underset{\text{Propionitrile.}}{(C_3H_5)'''N}$
$\underset{\text{Ammonium benzoate.}}{C_6H_5.CO(ONH_4)} - 2OH_2 =$	$\underset{\text{Phenyl cyanide.}}{C_6H_5.CN} =$	$\underset{\text{Benzonitrile.}}{(C_7H_5)'''N}$

The action of water upon nitriles thus gives rise to the formation of an acid containing the same number of carbon atoms as the nitrile; the radicle remaining unchanged, we may consider that in these reactions cyanogen (CN) is converted into carboxyl (COOH)—

$$R'.CN + 2OH_2 = NH_3 + R'.COOH.$$

It has been further stated that both the nitriles and organic acids can be formulated as hydrocarbon derivatives—in the former the H of the radicle being replaced by $(CN)'$, and in the latter by $(COOH)'$. Starting then with

the cyanide of a hydrocarbon radicle, we get by the action of water an acid containing one atom of carbon more than the hydrocarbon from which the acid is derived, and in this manner acids can be built up from their parent hydrocarbons, and the number of their contained semi-molecules of carboxyl increased; thus—

$H.CN$		$H.COOH$
Hydrogen cyanide	is converted by the action of water into	Formic acid.
$CH_3.CN$		$CH_3.COOH$
Methyl cyanide.	" "	Acetic acid.
$C_2H_4''.(CN)_2$		$C_2H_4''.(COOH)_2$
Ethene cyanide.	" "	Succinic acid.
$R^n.(CN)_n$		$R^n.(COOH)_n$
$CH_2.CN.COOH$		$CH_2.(COOH)_2$
Cyanacetic acid.	" "	Malonic acid.
$R'-H_n.(CN)_n.(COOH)$		$R'-H_n.(COOH)_{n+1}$

The cyanides of the hydrocarbon radicles will be again referred to when treating of the haloid ethers, of which bodies they may be considered the analogues. The isocyanides will be treated of as amines.

I. Hydrocarbons.

Starting with the saturated compounds of the C_nH_{2n+2} series, the isologous series C_nH_{2n}, C_nH_{2n-2}, ... C_nH_{2n-32} are known.

First Series, C_nH_{2n+2}.—*Marsh Gas or Paraffin Series.*

The first member of the series is CH_4 (marsh gas or methane), and the homologues down to $C_{16}H_{34}$ (hexdecane) have been obtained. The names and formulæ will be given later on.

General Properties.—The members of the series exhibit a regular gradation in physical properties with each successive addition of CH_2. Thus, the first four members are gaseous at ordinary temperatures, while the succeeding terms are liquids of increasing specific gravity and viscidity as the series is ascended; those containing 20 or more carbon atoms are solid crystalline bodies. The boiling-point increases as the series is ascended, the difference between the boiling-points of the successive terms of the normal series decreasing regularly by about 4° C. as far as $C_{12}H_{26}$, after which there appears to be a constant difference of 19° C.

The paraffins are chemically distinguished for their indifference, hence the name applied to the series (*parum affinis*). Being saturated molecules, they are incapable of uniting directly with any other element or radicle. The halogen elements produce by their action on paraffins substitution derivatives (haloid ethers), in which the hydrogen of the hydrocarbon is replaced by the halogen.

CH_4, CH_3Cl, CH_2Cl_2, $CHCl_3$, CCl_4;
C_2H_6, C_2H_5Cl, $C_2H_4Cl_2$, $C_2H_3Cl_3$, $C_2H_2Cl_4$,
C_2HCl_5, C_2Cl_6,
&c., &c.

These compounds will be again referred to under the family of the haloid ethers. Sulphuric acid is without action on paraffins, and at ordinary temperatures they are scarcely attacked by oxidizing agents; but on heating with these agents they are either entirely oxidized to CO_2 and OH_2, or, in addition, to acids of the acetic ($C_nH_{2n+1}COOH$) and succinic [C_nH_{2n}, $(COOH)_2$] series. Nitric acid exerts no action in the cold, but the concentrated acid attacks the higher members of the series when heated with them, forming nitro-substitution compounds in which hydrogen is replaced by nitryl (NO_2), and, in some instances, acids of the acetic and succinic series and nitriles. The lower members of the series are not acted on by nitric acid, but their nitro-derivatives can be obtained by indirect methods, the general method of preparation being the action of silver nitrite on the iodo-paraffin:—

$$C_nH_{2n+1}I + AgNO_2 = C_nH_{2n+1}(NO_2) + AgI.$$

These nitro-paraffins are interesting as being metameric with the corresponding ethereal salts of nitrous acid; thus—

Nitromethane, $C\begin{Bmatrix}H_3\\NO_2\end{Bmatrix}$, is metameric with methyl nitrite, $O\begin{Bmatrix}CH_3\\NO\end{Bmatrix}$

Nitroethane, $C\begin{Bmatrix}H_2CH_3\\NO_2\end{Bmatrix}$, " " ethyl nitrite, $O\begin{Bmatrix}C_2H_5\\NO\end{Bmatrix}$

Generally—

$$\begin{matrix}C_nH_{2n+1}\\|\\O=N=O\end{matrix}$$ are metameric with $$\begin{matrix}C_nH_{2n+1}\\|\\O-N=O\end{matrix}$$

Nitro-paraffins. Ethereal nitrites.

In accordance with the above formulation the two classes of compounds are differently acted on by nascent hydrogen.

$$\begin{matrix}C_nH_{2n+1}\\|\\NO_2\end{matrix} + 3H_2 = 2OH_2 + \begin{matrix}C_nH_{2n+1}\\|\\NH_2\end{matrix}$$

Nitro-paraffin. Amine, or amido-paraffin.

$$\begin{matrix}C_nH_{2n+1}\\|\\O-NO\end{matrix} + 3H_2 = OH_2 + NH_3 + \begin{matrix}C_nH_{2n+1}\\|\\OH\end{matrix}$$

Ethereal nitrite. Ammonia. Alcohol.

The higher members of the series are resolved by prolonged heating in sealed tubes into members lower in the series and members of the isologous series, C_nH_{2n} (olefines), in accordance with the general equation—

$$C_{n+p}H_{2(n+p)+2} = C_nH_{2n+2} + C_pH_{2p}.$$

Occurrence of Paraffins.—Methane, or marsh gas, is an invariable product of the decomposition of organic matter excluded from the air, and is thus produced at the bottom of stagnant ponds, marshes, &c. This gas is the "fire-damp" of coal mines; it is found in volcanic gases, and the gas issuing from a mud volcano in the Crimea is almost pure methane. The normal paraffins are found in coal formations and other bituminous strata. Thus, American petroleum contains a mixture of all the paraffins from marsh gas to pentadecane ($C_{15}H_{32}$), or even higher members. In boring for rock oil large quantities of methane escape, and from the freshly drawn petroleum ethane and propane are given off as gases at the ordinary temperature of the air. On distilling off the liquid portion (known commercially as "paraffin oil") the higher members of the series remain as white crystalline solids. Many paraffins occur also in the oil obtained by the destructive distillation of Boghead and cannel coal. Solid paraffins are likewise formed in the destructive distillation of wood, coal, bituminous shale, &c., and are found native, as *fossil wax*, *ozokerite*, *hatchetin*, &c.

General Methods of Formation of Paraffins.

1. By the action of nascent hydrogen upon haloid ethers of C_nH_{2n+1} radicles—

$$C_nH_{2n+1}Ha + H_2 = C_nH_{2n+2} + HHa;$$
(*Ha* being used to represent a halogen).

2. By the action of zinc and water upon the iodides of C_nH_{2n+1} radicles—

$$2C_nH_{2n+1}I + 2Zn + 2OH_2 = Zn(HO)_2 + ZnI_2 + 2C_nH_{2n+2}.$$

3. By the action of water upon the organo-metallic bodies of the general formula $Zn(C_nH_{2n+1})_2$—

$$Zn(C_nH_{2n+1})_2 + 2OH_2 = Zn(HO)_2 + 2C_nH_{2n+2}.$$

4. By heating iodides of C_nH_{2n+1} radicles with zinc—

$$Zn + 2C_nH_{2n+1}I = ZnI_2 + C_{2n}H_{4n+2}.$$

In this reaction the paraffin is, at the same time, resolved into a lower member of the series containing half the number of carbon atoms, and the corresponding isologue of the C_nH_{2n} series—

$$C_{2n}H_{4n+2} = C_nH_{2n+2} + C_nH_{2n}.$$

5. By the action of sodium on the iodides of C_nH_{2n+1} radicles—

$$2C_nH_{2n+1}I + Na_2 = C_{2n}H_{4n+2} + 2NaI.$$

6. By the electrolysis of the fatty acids of the series $C_nH_{2n}O_2$ (see acetic series)—

$$2C_nH_{2n}O_2 = 2CO_2 + C_{2n-2}H_{4n-2} + H_2.$$

7. By heating the dry sodium salts of $C_nH_{2n+1}.COOH$ and $C_nH_{2n}.(COOH)_2$ acids with sodium hydroxide—

$$C_nH_{2n+1}.COONa + NaHO = Na_2CO_3 + C_nH_{2n+2}.$$

$$C_nH_{2n}(COONa)_2 + 2NaHO = 2Na_2CO_3 + C_nH_{2n+2}.$$

8. By the dry distillation of acetates and butyrates several paraffins are formed.

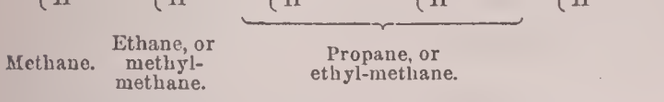
9. Almost all organic compounds yield paraffins when heated in sealed tubes to a very high temperature with excess of strong hydriodic acid.

10. Many paraffins have been obtained by acting on a mix

ture of the corresponding iodides and ethyl alcohol with copper-coated zinc foil (Gladstone and Tribe's "copper-zinc couple")—

$$C_nH_{2n+1}I + C_2H_5.OH + Zn = ZnI(C_2H_5O) + C_nH_{2n+2}.$$

Formulation and Classification of Paraffins.—All the members of the paraffin series can be regarded as methane, in which one atom of hydrogen is replaced by C_nH_{2n+1} radicles; thus—



Methane. Ethane, or methyl-methane. Propane, or ethyl-methane.

They may likewise be formulated as hydrides of C_nH_{2n+1} radicles, in accordance with their formation from the haloid ethers of these radicles by the action of nascent hydrogen—

$CH_4 = CH_3.H$; $C_2H_6 = C_2H_5.H$; $C_3H_8 = C_3H_7.H$.
Methane. Methyl hydride. Ethane. Ethyl hydride. Propane. Propyl hydride.

More generally, the paraffins may be regarded as formed by the coalescence of any hydrocarbon radicles, furnishing by their addition the necessary number of carbon and hydrogen atoms; thus—

$CH_4 = CH_3'H = CH_2''.H_2 = CH'''.H_3$
Methane. Methyl hydride. Methene hydride. Methenyl hydride.

$C_2H_6 = CH_3.CH_3 = C_2H_4''.H_2 = C_2H_3'''.H_3$
Ethane. Methyl methane, or dimethyl. Ethene hydride. Ethenyl hydride.

$C_3H_8 = CH_3.C_2H_5 =$
Propane. Ethyl methane, or methyl ethane.

$CH_2''(CH_3)_2$ or $C\begin{cases} CH_3 \\ CH_3 \\ H \\ H \end{cases}$ or $H_2C\begin{cases} CH_3 \\ CH_3 \end{cases}$

Methene dimethide, or dimethyl methane.

$C_4H_{10} = C_2H_5.C_2H_5 = CH_3.C_3H_7 = C_2H_4''(CH_3)_2 =$
Butane, or tetrane. Ethyl ethane, or diethyl. Propyl methane, or methyl propane. Ethene dimethide, or dimethyl ethane.

$CH'''(CH_3)_3$.
Trimethyl methane, or methenyl trimethide (isotetrane).

The number of possible methods of representing a paraffin thus greatly increases with the complexity of the molecule, but it must not be inferred from these formulæ that the radicles represented as composing a paraffin molecule have a separate existence in the compound. Such formulation expresses simply the possible modes of formation by which the compound can be produced. For instance—

α. The ethyl hydride obtained by the action of nascent hydrogen upon ethyl iodide ($C_2H_5I + H_2 = C_2H_6 + HI$) is identical with the ethene hydride produced by the action of nascent hydrogen on an ethene haloid ether ($C_2H_4''I_2 + 2H_2 = C_2H_4''H_2 + 2HI$), and with the dimethyl formed by heating CH_3I with a metal [$2CH_3I + Zn = (CH_3)_2 + ZnI_2$].

β. The propane (propyl hydride) obtained by the action of nascent hydrogen on propyl iodide, &c. ($C_3H_7I + H_2 = C_3H_7.H + HI$), is identical with the ethyl-methyl produced by the action of a metal on a mixture of the iodides of methyl and ethyl ($CH_3I + C_2H_5I + Na_2 = CH_3.C_2H_5 + 2NaI$), or by the action of zinc-ethyl on methyl iodide [$Zn(C_2H_5)_2 + 2CH_3I = 2CH_3.C_2H_5 + ZnI_2$].

γ. Methane obtained by the action of nascent hydrogen on methyl iodide is identical with the methenyl hydride formed by the action of nascent hydrogen on chloroform ($CH'''Cl_3 + 3H_2 = CH'''.H_3 + 3HCl$).

Thus it must not be supposed that, because ethane may be written as dimethyl, ethane contains methyl. On treating ethane with chlorine, for example, we do not obtain methyl chloride (CH_3Cl), but substitution products of ethane, C_2H_5Cl, and similar relations obtain throughout the series.

Turning to the graphic formulæ made use of in illustrating the formation of homologous series by the continuous coalescence of carbon atoms with the consequent increase of atomicity (p. 479), it will be seen that the homologous series of C_nH_{2n+1} radicles can be regarded as derived from the first member, methyl, CH_3, by the continuous addition of methene, CH_2''; and as the paraffins can be regarded as derived from the first member, methane, by the substitution of C_nH_{2n+1} radicles for hydrogen, we have the following constitutional formulæ for the first four members:—

Methane.....CH_4
Ethane.....$CH_3.CH_3$
Propane.....$CH_3.C_2H_5 = CH_3.CH_2.CH_3$
Butane.....$CH_3.C_3H_7 = CH_3.CH_2.C_2H_5 = CH_3.(CH_2)_2.CH_3$

Thus, with the increase of the number of atoms in the molecule we have an increased number of hydrocarbon radicles coalescing to form the paraffin; in other words we have increased complexity of structure, and thus the possible modes of arrangement, or the possible number of isomerides (see p. 476), becomes greater as the number of atoms becomes greater. The three first members, as will be seen from the above formulæ, can only be written in the manner shown, and no isomerides exist. The fourth member, butane or tetrane, as already shown, when treating of isomerism (p. 477), can be written in two ways, and two isomerides are known. Similarly there can be three pentanes, four hexanes, six heptanes, &c.

It has been found by Schorlemmer that all the paraffins of which the constitution is known can be classified under four series, viz.:—

1. *Normal paraffins*, in which no carbon atom is combined with more than two other carbon atoms. (See formulæ above.)

2. *Isoparaffins*, in which one carbon atom is combined with three others. Typical formula:—

$$HC\begin{cases} C_nH_{2n+1} \\ C_mH_{2m+1} \\ C_pH_{2p+1} \end{cases}$$

3. *Neoparaffins* (Odling), in which one carbon atom is combined with four others. Typical formula:—

$$C\begin{cases} C_nH_{2n+1} \\ C_mH_{2m+1} \\ C_pH_{2p+1} \\ C_rH_{2r+1} \end{cases}$$

4. *Mesoparaffins* (Odling), containing the group $[HC(CH_3)_2]'$ twice. Typical formula:—

$$\begin{matrix} HC(CH_3)_2 \\ | \\ C_pH_{2p} \\ | \\ HC(CH_3)_2 \end{matrix}$$

With regard to the general properties of a paraffin, as compared with those of its isomerides, it has been observed that the boiling-points and specific gravities of the normal compounds are higher than those of the isomers. With respect to chemical stability, the normal paraffins are more difficultly decomposable than their isomers.

The following list contains the names, formulæ, boiling-points, and specific gravities of the most important paraffins known at the present time:—

NORMAL PARAFFINS.

Names.	Formulæ.	Boiling-points.	Specific gravities.
Methane.....	CH_4	} Gaseous.	
Ethane.....	$CH_3.CH_3$		
Propane.....	$CH_3.CH_2.CH_3$		
Tetrane.....	$CH_3.(CH_2)_2.CH_3$	1° C.	·600 at 0° C.
Pentane	$CH_3.(CH_2)_3.CH_3$	37° — 39°	·628 " 18°
Hexane.....	$CH_3.(CH_2)_4.CH_3$	69° — 70°	·663 " 18°
Heptane.....	$CH_3.(CH_2)_5.CH_3$	98° — 99°	·691 " 18°
Octane.....	$CH_3.(CH_2)_6.CH_3$	123° — 125°	·716 " 16°
Nonane.....	$CH_3.(CH_2)_7.CH_3$	147° — 148°	·728 " 13°
Decane.....	$CH_3.(CH_2)_8.CH_3$	166° — 168°	·739 " 13°
Endecane.....	$CH_3.(CH_2)_9.CH_3$	180° — 184°	·765 " 16°
Dodecane	$CH_3.(CH_2)_{10}.CH_3$	202°	·774 " 17°
Tridecane.....	$CH_3.(CH_2)_{11}.CH_3$	216° — 218°	·792 " 20°
Tetradecane....	$CH_3.(CH_2)_{12}.CH_3$	236° — 240°	?
Pentadecane ...	$CH_3.(CH_2)_{13}.CH_3$	258° — 262°	·825 " 16°
Hexadecane....	$CH_3.(CH_2)_{14}.CH_3$	278°	Solid.

Isoparaffins.

Names.	Formulæ.	Boiling-points.	Specific gravities.
Isotetrane or trimethyl-methane	$HC\{CH_3, CH_3, CH_3$	−15° C.	
Isopentane or ethyl-dimethyl-methane	$HC\{C_2H_5, CH_3, CH_3$	30°	?
Isohexanes: Propyl-dimethyl-methane	$HC\{C_3H_7, CH_3, CH_3$	62°	·701 at 0° C.
Isohexanes: Diethyl-methyl-methane[1]	$HC\{C_2H_5, C_2H_5, CH_3$	?	?
Isoheptanes: Tetryl-dimethyl-methane	$HC\{C_4H_9, CH_3, CH_3$	90°	·683 at 18°
Isoheptanes: Triethyl-methane	$HC\{C_2H_5, C_2H_5, C_2H_5$	96°	·689 at 57°
Isoheptanes: Propyl-ethyl-methyl-methane[1]	$HC\{C_3H_7, C_2H_5, CH_3$	?	?
Isooctane or pentyl-dimethyl-methane	$HC\{C_5H_{11}, CH_3, CH_3$	124° ?	·708 at 12·5°

[1] These compounds have not hitherto been obtained, but are introduced in order to illustrate how the "constitution" theory of isomerism enables the existence of new compounds to be predicted with considerable certainty.

Neoparaffins.

Names.	Formulæ.	Boiling-points.	Specific gravity.
Neopentane or tetramethyl-methane	$C\{CH_3, CH_3, CH_3, CH_3$	9·5°C.	?
Neohexane or trimethyl-ethyl-methane	$C\{C_2H_5, CH_3, CH_3, CH_3$	43°–48°	?
Neoheptanes: Trimethyl-propyl-methane[2]	$C\{C_3H_7, CH_3, CH_3, CH_3$	?	?
Neoheptanes: Diethyl-dimethyl-methane	$C\{C_2H_5, C_2H_5, CH_3, CH_3$	86°–87°	·696 at 20·5°

[2] See note to last table.

Mesoparaffins.

Names.	Formulæ.	Boiling-points.	Specific gravities.
Meso-hexane or tetramethyl-ethane	$HC(CH_3)_2$ / $HC(CH_3)_2$	59° C.	·670 at 17°
Meso-octane or tetramethyl-tetrane	$HC(CH_3)_2$ / $(CH_2)_2$ / $HC(CH_3)_2$	110°	·698 at 16°
Meso-nonane or tetramethyl-pentane	$HC(CH_3)_2$ / $(CH_2)_3$ / $HC(CH_3)_2$	132°	·724 at 0°
Meso-decane or tetramethyl-hexane	$HC(CH_3)_2$ / $(CH_2)_4$ / $HC(CH_3)_2$	158°	·727 at 14°

We now proceed to give a few methods of preparing some of the more important paraffins, which methods do not come under the previously described general processes of formation.

Methane.—This hydrocarbon is found as a constituent of coal-gas where it is produced by the destructive distillation of coal. It is formed synthetically by passing a mixture of carbon disulphide vapor and steam (or sulphuretted hydrogen) over copper heated to redness in a tube:—

$$CS_2 + 2SH_2 + 4Cu = CH_4 + 4CuS.$$

Tetrane may be prepared by exposing ethyl iodide over mercury to the action of sunlight:—

$$2C_2H_5I + Hg = HgI_2 + C_4H_{10}.$$

Isopentane (ethyl-dimethyl-methane) is formed by the dehydration of amyl alcohol by means of zinc chloride.

Neopentane (tetramethyl-methane) is prepared by the action of zinc-methide on trimethyl-iodomethane (katabutyl-iodide):—

$$2C(CH_3)_3I + Zn(CH_3)_2 = ZnI_2 + 2C(CH_3)_4.$$

Hexane is produced by the action of hydriodic acid on benzene at 280°:—

$$C_6H_6 + 8HI = C_6H_{14} + 4I_2.$$

Meso-hexane (tetramethyl-ethane) is formed by the action of hydriodic acid on *pinacone*, a substance having the formula

$$\begin{matrix} HOC(CH_3)_2 \\ | \\ HOC(CH_3)_2 \end{matrix}$$

produced by the action of sodium amalgam on dimethyl-ketone in presence of water.

Isoheptane (tetryl-dimethyl-methane) is produced by the action of sodium on a mixture of the bromides of ethyl and amyl.

Solid Paraffin is, when purified, a white wax-like substance, melting between 40° and 60°, and boiling about 370°. It is contained in the tar produced by the distillation of Boghead and cannel coals, and is probably a mixture of several of the higher members of the C_nH_{2n+2} series.

Second Series, C_nH_{2n}.—Olefine[1] Series.

General Properties.—These hydrocarbons furnish a good illustration of polymerism, as they form a series which is both homologous and polymeric. Being unsaturated compounds, they act as dyad radicles, uniting with Cl_2, Br_2, O, HCl, HBr, HI, ClHO, &c. The haloid compounds of the olefines treated with alcoholic potash give up one halogen atom and furnish mono-haloid derivatives:—

$$C_nH_{2n}Ha_2 + KHO = C_nH_{2n-1}Ha + KHa + OH_2.$$

These mono-haloid olefines can again combine with Ha_2 and again lose Ha by the action of KHO:—

$$C_nH_{2n-1}Ha.Ha_2 + KHO = \underset{\text{Di-haloid olefine.}}{C_nH_{2n-2}Ha_2} + KHa + OH_2.$$

In this way 3,4.....n atoms of hydrogen can be replaced by Ha_3, Ha_4, Ha_n atoms of halogen, and the final product can again unite with Ha_2, forming a per-haloid paraffin derivative. For instance:—

$$\underset{\text{Tetrachlorethene.}}{C_2Cl_4} + Cl_2 = \underset{\text{Hexachlorethane.}}{C_2Cl_6}.$$

The compounds of olefines with hypochlorous acid yield the corresponding alcohols by the action of nascent hydrogen:—

$$C_nH_{2n}ClHO + H_2 = C_nH_{2n+1}.OH + HCl.$$

Many olefines combine with sulphuric acid, forming ethereal salts, which are converted by the action of water into sulphuric acid and the corresponding alcohol:—

$$C_nH_{2n} + H_2SO_4 = C_nH_{2n+1}HSO_4.$$
$$C_nH_{2n+1}HSO_4 + H(HO) = C_nH_{2n+1}.OH + H_2SO_4.$$

General Methods of Formation.—1. By heating the $C_nH_{2n+1}OH$ alcohols with dehydrating agents (H_2SO_4, $ZnCl_2$, &c.):—

$$C_nH_{2n+1}OH - OH_2 = C_nH_{2n}.$$

2. By electrolyzing $C_nH_{2n}(COOH)_2$ acids:—

$$C_nH_{2n}(COOH)_2 = C_nH_{2n} + 2CO_2 + H_2.$$

[1] So called from the oily liquids which these hydrocarbons produce when combined with chlorine.

3. By heating $N(C_nH_{2n+1})_4HO$ amines:—

$$N(C_nH_{2n+1})_4HO = N(C_nH_{2n+1})_3 + C_nH_{2n} + OH_2.$$

4. By the action of copper-coated zinc foil (Gladstone and Tribe's "copper-zinc couple") on the corresponding dibromides:—

$$C_nH_{2n}Br_2 + Zn = ZnBr_2 + C_nH_{2n}.$$

Isomerism.—The isomerides of the olefine series have been less completely investigated than those of the paraffins. The formula of the first member (ethene) might be written—

$$\begin{matrix} CH_2 \\ \| \\ CH_2 \end{matrix} \quad \text{or} \quad \begin{matrix} -CH_2 \\ | \\ -CH_2 \end{matrix} \quad \text{or} \quad \begin{matrix} CH_3 \\ | \\ =CH \end{matrix}.$$

The first is probably the radicle in the free state, and the second the radicle in combination with Cl, Br, &c. The third formula represents a compound unknown in the free state, but known in combination. While the normal series are known as *ethene* compounds, the isomeric series are known as *ethidene* compounds.

Similarly there may be 4 propenes, 9 tetrenes, &c.

The following is a list of the C_nH_{2n} hydrocarbons known at the present time. An idea of the general physical properties will be obtained from the table.

ETHENE SERIES OR OLEFINES.

Names.	Formulæ.	Boiling-points.
Ethene or ethylene	C_2H_4	Gaseous
Propene or propylene	C_3H_6	−18° C.
Tetrene or tetrylene	C_4H_8	3°
Pentene or amylene	C_5H_{10}	35°
Hexene or hexylene	C_6H_{12}	65°
Heptene or heptylene	C_7H_{14}	95°
Octene or octylene	C_8H_{16}	120°
Nonene or nonylene	C_9H_{18}	140°
Decene or paramylene	$C_{10}H_{20}$	160°
Pentadecene or triamylene	$C_{15}H_{30}$	248°
Hexdecene or cetene	$C_{16}H_{32}$	275°
Vigintene or tetramylene	$C_{20}H_{40}$	390°−400°
Heptivigintene or cerotene	$C_{27}H_{54}$	? melts at 57°
Trigintene or melene	$C_{30}H_{60}$	375° (?) " 62°

The numerous isomerides of the higher members of the series cannot be described within the limits of the present article.

The first member, ethene, is a colorless inodorous gas, which can be condensed by cold and pressure. It burns with a brilliant flame, and is the constituent to which coal-gas chiefly owes its luminosity. Several olefines can be synthesized from other hydrocarbons; propene, for instance, by passing methane and carbon monoxide through a red-hot tube:—

$$2CH_4 + CO = OH_2 + C_3H_6.$$

Third Series, C_nH_{2n-2}.

General Properties.—These hydrocarbons are capable of acting as tetrad radicles uniting with 4 atoms of Cl, Br, &c., and producing tetra-haloid paraffin derivatives; or the combination may be limited to 2 atoms, thus forming di-haloid olefines. Similarly they can combine directly with one or two molecules of haloid acids, producing $C_nH_{2n-1}Ha$, or $C_nH_{2n}Ha_2$. These combinations show their relations to the olefines and paraffins. Their relationship to the latter parent hydrocarbons is further shown by the ultimate action of chlorine:—

$$C_nH_{2n-2} + Cl_2 = C_nH_{2n-2}Cl_2.$$
$$C_nH_{2n-2}Cl_2 + Cl_2 = C_nH_{2n-2}Cl_4.$$
Perchlorinated paraffin.

General Methods of Formation.—1. By the action of an alcoholic solution of potassium hydroxide on mono-haloid olefine derivatives:—

$$C_nH_{2n-1}Ha + KHO = C_nH_{2n-2} + KHa + OH_2.$$

2. By the electrolysis of $C_nH_{2n-2}(COOH)_2$ acids:—

$$C_nH_{2n-2}(COOH)_2 = C_nH_{2n-2} + 2CO_2 + H_2.$$

The following is a list of the hydrocarbons of this series:—

ETHINE OR ACETYLENE SERIES.

Names.	Formulæ.	Boiling-points.
Ethine or acetylene	C_2H_2	Gaseous
Propine or allylene	C_3H_4	"
Tetrine or crotonylene	C_4H_6	18° C.
Pentine or valerylene	C_5H_8	45°
Hexine or hexoylene	C_6H_{10}	80°
Heptine or œnanthylidene	C_7H_{12}	107°
Octine or caprylidene	C_8H_{14}	133°
Decine or decenylene	$C_{10}H_{18}$	165°
Pentadecine or benylene	$C_{15}H_{28}$	225°
Hexdecine or cetenylene	$C_{16}H_{30}$	280°

But few of the isomerides of this series are known. *Diallyl,* C_6H_{10} (b. p. 59° C.), is isomeric with hexine, and *rutylene,* $C_{10}H_{18}$ (b. p. 150°), with decine.

Ethine or acetylene may be formed directly from its elements by causing the electric arc to pass between poles of dense carbon in an atmosphere of hydrogen. It is formed also by passing a mixture of methane and carbon monoxide through a red hot tube ($CH_4 + CO = C_2H_2 + OH_2$), by passing chloroform vapor over red hot copper ($2CHCl_3 + 6Cu = 3Cu_2Cl_2 + C_2H_2$), and by the imperfect combustion of most organic compounds. Ethine is a colorless, incondensable gas, having a characteristic odor. It is absorbed by an ammoniacal solution of cuprous chloride, forming a red precipitate of cuprous acetylide, $(C_2HCu_2)_2O$, which when heated with HCl furnishes pure ethine, so that this is a convenient method for purifying the hydrocarbon. Ethine can be made to combine with nascent hydrogen with the formation of ethene: $C_2H_2 + H_2 = C_2H_4$.

Fourth Series, C_nH_{2n-4}.

The hydrocarbons of this series may be conveniently divided into two groups. The first, consisting only of one member, *pentone* or *valylene* (C_5H_6), is related to the preceding series of hydrocarbons, since, by the addition of bromine, the hexabrom-paraffin $C_5H_6Br_6$ is formed.

The other group is composed of *decone* ($C_{10}H_{16}$) and a series of hydrocarbons known as *terpenes*, having the general formula $C_{10}H_{16}$, and found in the essential oils of various plants, chiefly of the orders *Coniferæ* and *Aurantiaceæ*.

Terpenes.—These hydrocarbons are found in the wood, leaves, &c., of Coniferous trees, and in the essential oils of lemon, lavender, bergamot, juniper, &c., &c. Many of these oils contain oxidized bodies besides terpenes. The terpenes possess very similar chemical properties, differing chiefly in their boiling-points (which range from 160° to 176° C.), specific gravities, and action upon a ray of polarized light, thus furnishing a good illustration of physical isomerism (see p. 476). They are generally clear, highly refractive liquids, possessing characteristic odors, and easily polymerized by the action of heat, H_2SO_4, BF_3, &c. Several polymerides exist ready formed in oils of copaiba, cubebs, &c. The terpenes are characterized by the extreme readiness with which they undergo isomeric changes under the influence of reagents. They act as unsaturated compounds combining with at most four monad atoms. Thus, they combine with HCl, forming such compounds as $C_{10}H_{17}Cl$, $C_{10}H_{18}Cl_2$, and some terpenes can be made to combine with water, forming such bodies as $C_{10}H_{20}O_2$, $C_{10}H_{18}O$, and $C_{20}H_{34}O$, which, in certain respects, resemble alcohols. The best known terpene is *turpentine oil*, which is obtained from the resinous exudation of certain French and American species of *Pinus* and *Abies*.

Camphor ($C_{10}H_{16}O$) is an oxidized compound closely allied to the terpenes contained in the leaves of *Laurus Camphora*.

The relationship of the terpenes to the group of aromatic hydrocarbons is shown by the production of *Cymene* ($C_{10}H_{14}$), a member of the C_nH_{2n-6} or benzene series, from turpentine oil and camphor, by the action of certain reagents.

Fifth Series, C_nH_{2n-6}.—*Benzene or Aromatic Series.*

The general characters of these hydrocarbons, as compared with the preceding series, have been previously considered (p. 478).

Occurrence.—Small quantities of these hydrocarbons are found in petroleum, but the chief source is the tar obtained in the destructive distillation of coal for the manufacture of coal-gas.

General method of Synthetic Formation.—By heating a mixture of a mono-iodated paraffin and a brominated benzene hydrocarbon with sodium:—

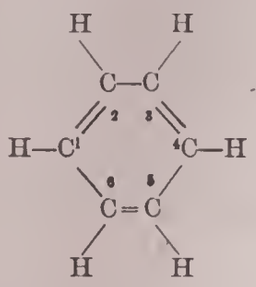
$$(C_nH_{2n+1}I)_m + C_nH_{2n-(6+m)}Br_m + Na_{2m} = C_nH_{2n-(6+m)}\cdot(C_nH_{2n+1})_m + (NaI)_m + (NaBr)_m.$$

Formulation and Isomerism of Benzene and its Derivatives.—Like the paraffins, the C_nH_{2n-6} hydrocarbons form a parent series giving rise to a vast number of derivatives, and just as the higher paraffins can be regarded as formed from methane by the substitution of C_nH_{2n+1} radicles for H, so the homologues of benzene can be considered as derived from this latter hydrocarbon by similar substitutions. Thus—

C_6H_6 Benzene. $C_6H_5.CH_3 = C_7H_8$ Methyl benzene. $C_6H_5.C_2H_5 = C_8H_{10}$ Ethyl benzene.

$C_6H_5.C_3H_7 = C_9H_{12}$ Propyl benzene.

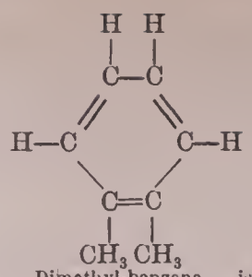
The synthesis of benzene from ethine has already been alluded to (p. 479). In accordance with this mode of formation, the structural formula of benzene may be written—



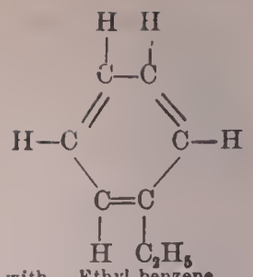
This formula, as will be seen on inspection, is in accordance with the fact that benzene can act as a hexatomic radicle, combining directly (though with difficulty) with 6 halogen atoms. Owing to the complex structure of the benzene molecule, an immense number of isomers are capable of existing. A few of the most important cases may be here elucidated.

Let us, in the first instance, suppose one atom of H to be replaced by another element or radicle. Supposing (as there is at present no reason for doubting) that all the H and C atoms in the molecule have the same property, it is obvious that there can be no isomer of a mono-substitution derivate, and thus we know only one methyl benzene, chlorobenzene, nitrobenzene, &c.

Passing on to the poly-substitution derivatives, we have several possible causes of isomerism. Thus the H atom may be replaced by one radicle, or more than one H atom may be replaced by an equivalent number of radicles, furnishing the same total number of C and H atoms. For instance—


Dimethyl-benzene

is metameric with


Ethyl-benzene.

Similarly diethyl-benzene is isomeric with tetramethyl-benzene, &c., &c. Another cause of isomerism is to be found in the C_nH_{2n+1} or other radicles replacing the H in the benzene molecule, since these radicles themselves admit of isomeric modifications, as has already been seen when the paraffin series were discussed. Thus, we may have—

$C_6H_5.C_3H_7$ Propyl-benzene. and $C_6H_5.CH(CH_3)_2$ Pseudo-propyl-benzene.

With regard to substitution derivatives of the homologues of benzene, the H atoms may be replaced either in the benzene molecule or in the radicle; thus—

$C_6H_4Cl.CH_3$ Methyl-chlorobenzene or monochlorotoluene } is metameric with { $C_6H_5.CH_2Cl$ Chloromethyl-benzene, or benzyl-chloride.

Another cause of isomerism depends on the relative *positions* of the replaced H atoms of the benzene molecule. Thus, there can be only one of each mono-substitution derivative, because it is immaterial which of the six H atoms is replaced. Di-derivatives containing two atoms of the same element or radicle are capable of three isomeric modifications, according as the replaced atoms are those numbered in the graphic formula 1 2 or 1 3 or 1 4. All other arrangements will be found on trial to be reducible to these (X representing the substituted element or radicle)—

Benzene.	Ortho-di-derivative.	Meta-di-derivative.	Para-di-derivative.
$C_6HHHHHH$	$C_6XXHHHH$	$C_6XHXHHH$	$C_6XHHXHH$
1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6

In like manner there can be three tri- or tetra-derivatives, and only one penta- or hexa-derivative, when the H atoms are replaced by the same element or radicle.

When the H atoms are replaced by three or more different elements or radicles the possible number of isomerides is greater than when replaced by the same number of similar elements or radicles, because the arrangements of the latter with regard to one another are then capable of variation. Thus, there can be only three di-derivatives containing two different elements or radicles XY, because the reversal of their order does not affect the relative positions of X to Y. But when three H atoms are replaced by XXY elements or radicles we may have, for every isomeride depending on the relative position of XXY to one another and to the remaining H atoms, corresponding isomerides depending on the order XYX. The same reasoning applies to the higher derivatives.

The following is a list of the hydrocarbons of this series:—

AROMATIC OR BENZENE SERIES.

	Names.	Formulæ.	Boiling-points.
C_6H_6	Benzene	C_6H_6	81° C.
C_7H_8	Methylbenzene or toluene	$C_6H_5(CH_3)$	111°
C_8H_{10}	Ethylbenzene	$C_6H_5(C_2H_5)$	133°
	Dimethyl-benzenes or xylenes: Orthoxylene	$C_6(CH_3)_2H_4$	140° — 141°
	Dimethyl-benzenes or xylenes: Metaxylene	$C_6(CH_3)H(CH_3)H_3$	137° — 138°
	Dimethyl-benzenes or xylenes: Paraxylene	$C_6(CH_3)H_2(CH_3)H_2$	139°
C_9H_{12}	Propylbenzene	$C_6H_5(C_3H_7)$	157°
	Pseudopropylbenzene	$C_6H_5.CH(CH_3)_2$	151°
	Methyl-ethylbenzene	$C_6H_4(CH_3)(C_2H_5)$	159°
	Trimethylbenzenes: Pseudocumene	$C_6(CH_3)H(CH_3)_2H_2$	166°
	Trimethylbenzenes: Mesitylene	$C_6(CH_3)H(CH_3)H(CH_3)H$	163°
$C_{10}H_{14}$	Isobutylbenzene	$C_6H_5.C_2H_3(CH_3)_2$	159° — 161°
	Methyl-propylbenzene	$C_6H_4(CH_3)(C_3H_7)$	178° — 179°
	Methyl-pseudopropylbenzene or α cymene	$C_6H_4.CH_3.CH(CH_3)_2$	176° — 178°
	Dimethyl-ethylbenzene	$C_6H_3(CH_3)_2(C_2H_5)$	183° — 184°
	Diethylbenzene	$C_6H_4(C_2H_5)_2$	178° — 179°
	Tetramethylbenzene or durene	$C_6H_2(CH_3)_4$	189° — 191°
$C_{11}H_{16}$	Isoamylbenzene	$C_6H_5.C_3H_5(CH_3)_2$	193°
	Methyl-diethylbenzene or diethyl-toluene	$C_6H_3(CH_3)(C_2H_5)_2$	178°
	Dimethyl-pseudopropylbenzene or laurene	$C_6H_3(CH_3)_2.CH(CH_3)_2$	188°
$C_{12}H_{18}$	Methyl-isoamylbenzene	$C_6H_4(CH_3).C_3H_5(CH_3)_2$	213°
$C_{13}H_{20}$	Dimethyl-isoamylbenzene	$C_6H_3(CH_3)_2.C_3H_5(CH_3)_2$	233°

Other hydrocarbons compounded of benzene residues and $C_n H_{2n-1}$, &c., radicles are known. *Dipropargyl*, C_6H_6 (b. p. 85° C.), is a substance isomeric with benzene, having the formula $HC{\equiv}C{-}(CH_2)_2{-}C{\equiv}CH$. The hydrocarbons of the benzene series are all colorless liquids (*durene* is solid), having peculiar and characteristic odors. By the action of oxidizing agents aromatic hydrocarbons of the general formula $C_6H_{6-m}(C_nH_{2n+1})_m$ are ultimately converted into acids of the general form $C_6H_{6-m}(COOH)_m$. Nitric acid gives rise to the formation of nitro-derivatives $C_nH_{2n-(6+m)}(NO_2)_m$. Sulphuric acid (concentrated) forms *sulphonic acids* $C_nH_{2n-(6+m)}(HSO_3)_m$. The halogens produce substitution derivatives $C_nH_{2n-(6+m)}Ha_m$, the particular metameric modification formed being often determined by the temperature at which the halogen is made to act. *Benzene, toluene*, &c., are formed by heating their corresponding acids with lime: $C_nH_{2n-7}(COOH) - CO_2 = C_nH_{2n-6}$.

The remaining series of hydrocarbons are as follows:—

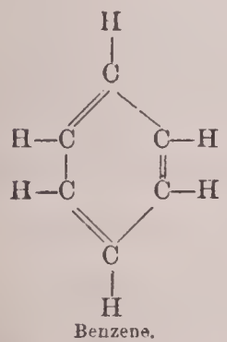
Names.	Formulæ.
C_nH_{2n-8}.	
Phenylene	C_6H_4
Cinnamene or styrolene	$C_8H_8 = C_6H_5.C_2H_3$
Allylbenzene	$C_9H_{10} = C_6H_5.C_3H_5$
Phenylbutene	$C_{10}H_{12} = C_6H_5.C_4H_7$
Tetrahydronaphthalene	$C_{10}H_{12} = C_{10}H_6.H_4$
C_nH_{2n-10}.	
Ethinylbenzene or acetenylbenzene	$C_8H_6 = C_6H_5.C_2H$
Dihydronaphthalene	$C_{10}H_{10} = C_{10}H_6.H_2$
Cholesterene	$C_{26}H_{42}$
C_nH_{2n-12}.	
Naphthalene	$C_{10}H_8$
Methylnaphthalene	$C_{11}H_{10} = C_{10}H_7.CH_3$
Ethylnaphthalene	$C_{12}H_{12} = C_{10}H_7.C_2H_5$
Hexa-hydroanthracene	$C_{14}H_{16} = C_{14}H_{10}.H_6$
C_nH_{2n-14}.	
Diphenyl	$C_{12}H_{10} = C_6H_5.C_6H_5$
Acenaphthene	$C_{12}H_{10} = C_{10}H_6.C_2H_4$
Diphenyl-methane	$C_{13}H_{12} = CH_2(C_6H_5)_2$
Dibenzyl or diphenyl ethane	$C_{14}H_{14} = C_2H_4(C_6H_5)_2$
Ditolyl	$C_{14}H_{14} = \begin{cases} C_6H_4.CH_3 \\ \vert \\ C_6H_4.CH_3 \end{cases}$
Phenyl-tolyl-methane or Benzyltoluene	$C_{14}H_{14} = H_2C \begin{cases} C_6H_5 \\ C_6H(C_3H_4) \end{cases}$
Benzyl-ethyl-benzene	$C_{15}H_{16} = C_6H_5.CH_2.C_6H_4.C_2H_5$
Benzyl-xylenes	$C_{15}H_{16} = C_6H_5.CH_2.C_6H_3(CH_3)_2$
Dimesityl methane	$C_{19}H_{24} = H_2C \begin{cases} C_6H_2(CH_3)_3 \\ C_6H_2(CH_3)_3 \end{cases}$
C_nH_{2n-16}.	
Fluorene	$C_{13}H_{10} = C_{12}H_6.CH_2$
Stilbene or diphenyl-ethene	$C_{14}H_{12} = C_2H_2(C_6H_5)_2$
Dihydro-anthracene	$C_{14}H_{12} = C_{14}H_{10}.H_2$
Hexa-hydropyrene	$C_{16}H_{16} = C_{16}H_{10}.H_6$
C_nH_{2n-16}.	
Anthracenes	$C_{14}H_{10} = HC{-}C_6H_4 \,\vert\times\vert\, HC{-}C_6H_4$
Phenanthrene	$C_{14}H_{10} = HC{-}C_6H_4 \,\vert\vert\, HC{-}C_6H_4$
Tolane or Diphenyl-ethine	$C_{14}H_{10} = C{-}C_6H_5 \,\vert\vert\vert\, C{-}C_6H_5$
Dimethyl-anthracene	$C_{16}H_{14} = C_{14}H_6(CH_3)_2$
Tetramethyl-anthracene or Retene	$C_{18}H_{16} = C_{14}H_6(CH_3)_4$
C_nH_{2n-20}.	
Naphthyl-phenyl methane	$C_{17}H_{14} = H_2C \begin{cases} C_6H_5 \\ C_{10}H_7 \end{cases}$
C_nH_{2n-22}.	
Pyrene	$C_{16}H_{10} = C_{10}H_6(C_6H_4)$
Diphenyl-diethine or diacetenyl-benzene	$C_{16}H_{10} = C_4(C_6H_5)_2$
Diphenyl-benzene	$C_{18}H_{14} = C_6H_4(C_6H_5)_2$
Triphenylmethane	$C_{19}H_{16} = CH(C_6H_5)_3$
C_nH_{2n-24}.	
Chrysene	$C_{16}H_{12}$
C_nH_{2n-26}.	
Dinaphthyl	$C_{20}H_{14} = C_{10}H_7.C_{10}H_7$
C_nH_{2n-30}.	
Idrialene	$C_{22}H_{14}$
Triphenyl-benzene	$C_{24}H_{18} = C_6H_3(C_6H_5)_3$
C_nH_{2n-32}.	
Tetraphenyl-ethene	$C_{26}H_{20} = C_2(C_6H_5)_4$

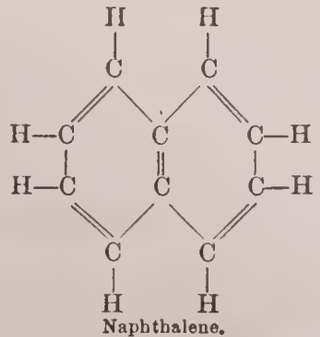
The hydrocarbons benzene (C_6H_6), naphthalene ($C_{10}H_8$), anthracene ($C_{14}H_{10}$), chrysene ($C_{18}H_{12}$), and idrialene ($C_{22}H_{14}$) are noteworthy as forming a homologous series, the successive terms of which differ by $+C_4H_2$. These compounds present certain analogies in their chemical behavior, and are particularly characterized by their giving rise to *quinones* when oxidized. In the formation of a quinone H_2 is replaced by $O_2 \left(\begin{matrix} O- \\ \vert \\ O- \end{matrix}\right)''$; thus—

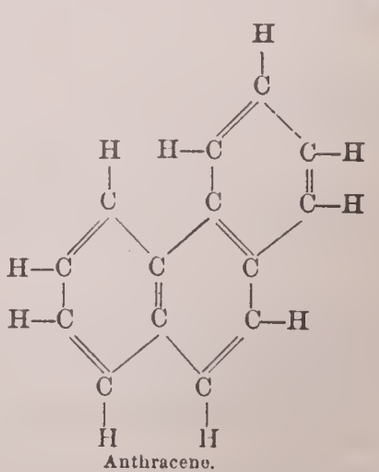
$$\underset{\text{Naphthalene.}}{C_{10}H_8} + 3O = \underset{\text{Naphthoquinone.}}{C_{10}H_6O_2''} + OH_2.$$

Pyrene ($C_{16}H_{10}$), although not a member of the series, furnishes a quinone on oxidation. Benzene does not yield a quinone by direct oxidation.

The relationship of the second and third members of the series to benzene will be seen from their graphic formulæ:—


Benzene.


Naphthalene.


Anthracene.

The hydrocarbons, being the parent compounds of the remaining organic bodies, have been treated in greater detail than is necessary in the case of the other families.

II. Alcohols.

Formulation and Classification.— It has already been pointed out that alcohols can be considered as derivatives of hydrocarbons by the substitution of hydroxyl for hydrogen, and, consequently, as compounds of hydroxyl with hydrocarbon radicles (p. 479). Each series of hydrocarbons can thus be supposed to give rise to a corresponding series of alcohols:—

C_nH_{2n+2} $C_nH_{2n+1}.HO$	C_nH_{2n} $(C_nH_{2n})''(HO)_2$ $C_nH_{2n-1}.HO$ $(C_nH_{2n-1})'''(HO)_3$	C_nH_{2n-2} $C_nH_{2n-3}.HO$ $(C_nH_{2n-2})^{IV}(HO)_4$	C_nH_{2n-4} $(C_nH_{2n-4})^{VI}(HO)_6$ $C_nH_{2n-5}.HO$ $(C_nH_{2n-5})^{V}(HO)_5$	C_nH_{2n-6} $C_nH_{2n-7}.HO$ $C_nH_{2n-8}(HO)_2$

Alcohols containing 1, 2, *n* semi-molecules of hydroxyl are said to be *monohydric, dihydric, n-hydric.* The dihydric alcohols of the ethene series are termed *glycols.* Alcohols derived from unsaturated hydrocarbons act as unsaturated compounds.

Series $C_nH_{2n+1}.HO$.—Some of these alcohols (derived from paraffins) have been previously quoted in illustration of homologous series (p. 552). The first member, methyl alcohol (CH_3HO), is termed *carbinol*, and the remaining terms can be derived from this by the replacement of H by C_nH_{2n+1} radicles. Thus,—

CH_3HO	$C(CH_3)H_2HO$	$C(C_2H_5)H_2HO$.
Methyl alcohol or Carbinol.	Ethyl alcohol or Methyl carbinol.	Propyl alcohol or Ethyl carbinol.

Since the paraffins can be formulated as derivatives of methane (see p. 556), and the present series of alcohols as derivatives of paraffins, it follows that these alcohols can be likewise regarded as methane derivatives:—

$$C\begin{Bmatrix}H\\H\\H\\H\end{Bmatrix} \quad C\begin{Bmatrix}H\\H\\H\\HO\end{Bmatrix} \quad C\begin{Bmatrix}CH_3\\H\\H\\HO\end{Bmatrix} \quad C\begin{Bmatrix}C_2H_5\\H\\H\\HO\end{Bmatrix} \quad C\begin{Bmatrix}C_3H_7\\H\\H\\HO\end{Bmatrix}$$

It will be convenient to distinguish the carbon atom in combination with hydroxyl as the "typical carbon atom."

The higher members of the series are susceptible of several kinds of isomerism, which may now be considered. Passing over the first two members, which are not capable of being formulated in more than one way, the third member (propyl alcohol) may be written as—

$C.C_2H_5.H_2.HO$	or	$C(CH_3)_2H.HO$
Ethyl carbinol.		Dimethyl carbinol.

Thus, the first kind of isomerism consists in the replacement of one C_nH_{2n+1} radicle by two others, each containing a smaller number of carbon atoms. The fourth member of the series (tetryl or butyl alcohol) may be written:—

$C.C_3H_7.H_2.HO$	$C(CH_3)(C_2H_5)H.HO$	$C(CH_3)_3.HO$
Propyl carbinol.	Methyl-ethyl carbinol.	Trimethyl carbinol.

The next kind of isomerism, as exemplified by the third of the above formulæ, consists in the substitution of three C_nH_{2n+1} radicles for the three hydrogen atoms of carbinol.

Now, as carbinol contains but three replaceable hydrogen atoms (not regarding the atom contained in the hydroxyl, the replacement of which gives rise to a new class of compounds), trimethyl carbinol is the type of a series of alcohols, in which the number of C_nH_{2n+1} radicles combined with the typical carbon atom is a maximum. The isomeric alcohols of the present series can thus be conveniently classified under the three following groups:—

1. *Primary alcohols*, in which the typical carbon atom is combined with but one other carbon atom—

$$C(C_nH_{2n+1})H_2.HO.$$

2. *Secondary alcohols*, in which the typical carbon atom is combined with two other carbon atoms—

$$C(C_nH_{2n+1})_2H.HO.$$

3. *Tertiary alcohols*, in which the typical carbon atom is combined with three other carbon atoms—

$$C(C_nH_{2n+1})_3.HO.$$

Another cause of isomerism among alcohols is to be found in the constitution of the C_nH_{2n+1} radicles (see also p. 476). Thus we may have—

$C.C_3H_7.H_2.HO$	isomeric with	$C.CH(CH_3)_2.H_2.HO$
Propyl carbinol.		Pseudopropyl carbinol.
$C(CH_3)(C_4H_9)H.HO$	"	$C.CH_3[CH_2.CH(CH_3)_2]H.HO$
Methyl butyl carbinol.		Methyl isobutyl carbinol.

Each of the three above-named groups is thus capable of a further division into two sub-groups, such as *normal primary* and *iso-primary*, *normal secondary* and *iso-secondary*, &c., &c. In the higher members a further number of isomeric modifications become possible. Many of these isomeric alcohols are known, but a large number have yet to be discovered to complete the series. The following is a list of the normal primary alcohols:—

Names.	Formulæ.	Boiling-points.
Methyl alcohol.....	CH_3HO	66° C.
Ethyl "	$C_2H_5.HO$	78°·4
Propyl "	$C_3H_7.HO$	97°·6
Butyl "	$C_4H_9.HO$	116°
Amyl "	$C_5H_{11}.HO$	137°
Hexyl "	$C_6H_{13}.HO$	157°
Heptyl "	$C_7H_{15}.HO$	176°·5
Octyl "	$C_8H_{17}.HO$	196°·5
Nonyl "	$C_9H_{19}.HO$	200° ?
Cetyl "	$C_{16}H_{33}.HO$	50° } Melting-point.
Ceryl "	$C_{27}H_{55}.HO$	79° } Melting-point.
Melissyl "	$C_{30}H_{61}.HO$	88° } Melting-point.

These alcohols (up to nonyl alcohol) are limpid liquids the viscidity of which increases with the molecular weight. The three other members are white crystalline solids. Methyl, ethyl, and propyl alcohols are readily miscible with water, the remaining members are more or less of the nature of oils. Most of these alcohols possess peculiar and characteristic odors. The boiling-points of the isomers are generally lower than those of the corresponding normal alcohols.

The normal and iso-primary alcohols can be obtained from the corresponding haloid paraffin derivatives by the action of potassium hydroxide:—

Normal primary. $C_nH_{2n+1}Ha + KHO = C_nH_{2n+1}.HO + KHa.$

Iso-primary..... $(CH_3)_2CH(CH_2)_n.Ha + KHO = (CH_3)_2CH(CH_2)_n.HO + KHa.$

Likewise by the action of nascent hydrogen on the corresponding normal primary and iso-primary aldehydes:—

$$(C_nH_{2n+1})COH + H_2 = C_nH_{2n+1}.CH_2.HO.$$

The synthesis of alcohols from the corresponding olefines has already been alluded to (p. 485). Since ethine can be formed directly from its elements (p. 485), and ethene from ethine (p. 485), it is obvious that ethyl alcohol can by these means be formed synthetically.

Secondary alcohols are produced by the action of nascent hydrogen on ketones:—

$$CO(C_nH_{2n+1})_2 + H_2 = C(C_nH_{2n+1})_2H.HO.$$

Tertiary alcohols are prepared by the action of organo-zinc compounds on the chlorides of acid radicles, $C_nH_{2n+1}.COCl$, and treatment of the product with water.

The metamerism of the three groups of alcohols is strikingly displayed by their behavior on oxidation. Thus, primary or iso-primary alcohols are oxidized first to aldehydes—

$$\underset{\text{Alcohol.}}{(C_nH_{2n+1})CH_2.HO} + O = \underset{\text{Aldehyde.}}{(C_nH_{2n+1})COH} + OH_2;$$

then to acids containing the same number of carbon atoms—

$$\underset{\text{Aldehyde.}}{(C_nH_{2n+1})COH} + O = \underset{\text{Acid.}}{C_nH_{2n+1}.COOH}.$$

Secondary alcohols are oxidized first to ketones—

$$\underset{\text{Alcohol.}}{C(C_nH_{2n+1})_2H.HO} + O = \underset{\text{Ketone.}}{CO(C_nH_{2n+1})_2} + OH_2;$$

then to one or more acids containing a smaller number of carbon atoms than the alcohol—

$$\underset{\text{Ketone.}}{CO(C_nH_{2n+1})_2} + 3O = \underset{\text{Acid.}}{C_nH_{2n+1}.COOH} + \underset{\text{Acid.}}{C_nH_{2n}O_2}.$$

Tertiary alcohols are probably first oxidized to ketones, and ultimately to a mixture of two or more acids containing a smaller number of carbon atoms than the alcohol.

By particular reactions an alcohol of one group can be converted into an isomer of another group, such, for instance, as normal primary butyl alcohol into the iso-primary alcohol, and the latter into the tertiary alcohol.

In many of their reactions alcohols are the analogues of water: for instance—

$$\underset{\text{Water.}}{HHO} + \underset{\text{Potassium.}}{K} = \underset{\text{Potassium hydroxide.}}{KHO} + H$$

$$\underset{\text{Ethyl alcohol.}}{C_2H_5.HO} + K = \underset{\text{Potassium ethylate.}}{C_2H_5.KO} + H.$$

In other reactions they resemble metallic hydroxides :—

$$\underset{\text{Potassium hydroxide.}}{KHO} + HCl = \underset{\text{Potassium chloride.}}{KCl} + OH_2$$

$$\underset{\text{Ethyl alcohol.}}{C_2H_5.HO} + HCl = \underset{\text{Ethyl chloride.}}{C_2H_5.Cl} + OH_2$$

Of this series the best known members are methyl and ethyl alcohols. The former (or "wood-spirit") is chiefly obtained from the crude "wood vinegar" produced by the destructive distillation of wood. Ethyl alcohol is common "spirits of wine," and is always procured by the fermentation of sugar, which, in contact with yeast, undergoes the following change—$C_6H_{12}O_6 = 2CO_2 + 2C_2H_5.HO$.

Many of the higher members are formed by the fermentation of grain, sugar-beet molasses, potato, &c. *Fusel oil* consists chiefly of isomeric modifications of amyl alcohol.

Names.	Formulæ.	Boiling-points.
$C_nH_{2n-1}.HO$.		
Vinyl alcohol	$C_2H_3.HO$	?
Allyl "	$C_3H_5.HO$	96°C.
$C_nH_{2n-3}.HO$.		
Propargyl alcohol	$C_3H_3.HO$	110°—115°
Borneol and camphol	$C_{10}H_{17}.HO$	212°

Series $C_nH_{2n-7}.HO$, *Phenols.*—The alcohols of this series bear the same relation to the benzene hydrocarbons that the ethyl series of alcohols bear to the paraffins. Thus these alcohols at once divide themselves into two metameric series according as the hydroxyl replaces hydrogen in the benzene or paraffin radicle; for instance, methyl-benzene or toluene ($C_6H_5.CH_3$) gives rise to—

$$\underset{\text{Cresol.}}{C_6H_4(HO).CH_3} \text{ and } \underset{\text{Benzyl alcohol.}}{C_6H_5.CH_2(HO)}.$$

The alcohols of the benzylic series $\left(C_6H_{5-m}\begin{cases} C_nH_{2n}(HO) \\ (C_nH_{2n+1})_m \end{cases}\right)$ are true alcohols in their chemical behavior, being formed from the haloid derivatives of their corresponding hydrocarbons by the action of potassium hydroxide, and being oxidized to acids containing the same number of carbon atoms. The alcohols represented by cresol, $C_6H_{5-m}HO.(C_nH_{2n+1})_m$, or phenols, on the other hand, act more like saturated compounds, and in some respects resemble acids. They cannot be directly obtained from their corresponding haloid hydrocarbon derivatives, and are converted by oxidation into *quinones*. The phenols yield substitution-derivatives by the action of halogens, nitric acid, &c.; such, for example, as—

$$\underset{\text{Monochloro-phenol.}}{C_6H_4Cl.HO}, \quad \underset{\text{Pentachloro-phenol.}}{C_6Cl_5.HO};$$

$$\underset{\text{Mononitrophenol.}}{C_6H_4(NO_2).HO}, \quad \underset{\text{Dinitrophenol.}}{C_6H_3(NO_2)_2.HO}, \quad \underset{\text{Trinitrophenol or picric acid.}}{C_6H_2(NO_2)_3.HO}.$$

The phenols yield *sulphonic acids* when acted on by strong sulphuric acid, $C_6H_4(HO)(HSO_3)$, $C_6H_3(HO)(HSO_3)_2$, &c.; the metameric alcohols do not undergo an analogous reaction.

The homologues of phenol being di-derivatives of benzene are susceptible of the isomeric modifications already pointed out (p. 486). Thus there are known—

$C_6H_5.CH_3$ — Methyl-benzene or Toluene.

$C_6(HO)(CH_3)HHHH$ (1 2 3 4 5 6) — Ortho-cresol.

$C_6(HO)H(CH_3)HHH$ (1 2 3 4 5 6) — Meta-cresol.

$C_6(HO)HH(CH_3)HH$ (1 2 3 4 5 6) — Para-cresol.

Isomerism analogous to that exhibited by the derivatives of benzene and its homologues likewise extends to all the derivatives of phenol and its homologues.

The following is a brief list of the compounds of the present series :—

Alcohols.		
Benzyl alcohol, $C_6H_5.CH_2HO$	Cuminyl alcohols	$C_9H_{11}.CH_2HO$
Xylyl alcohols, $C_7H_7.CH_2HO$		
Phenyl-propyl alcohols, $C_8H_9.CH_2HO$	Sycocceryl alcohol	$C_{17}H_{27}.CH_2HO$

Phenols.	
Phenol, $C_6H_5.HO$	Xylenols, Phlorol, &c., $C_8H_9.HO$
Cresols, $C_6H_4(CH_3).HO$	Thymol, Carvacrol, $C_{10}H_{13}.HO$

The boiling-points of the alcohols are generally higher than those of the metameric phenols.

Many of the compounds of the present series are transparent oily liquids possessed of powerful odors; others are white crystalline solids. Of the phenols the best known is *phenol* or *carbolic acid*, obtained from the acid portions of coal-tar.

Series $C_nH_{2n-9}.HO$ comprises *cinnamic alcohol*, $C_9H_9.HO$, and *cholesterin*, $C_{26}H_{43}.HO$.

Series $C_nH_{2n-13}.HO$.—Only one member is known, viz., *naphthol*, $C_{10}H_7.HO$.

Series $(C_nH_{2n})''(HO)_2$, *Glycols.*—Of these dihydric alcohols the terms corresponding to the first six members of the olefine series are known, and are named ethene glycol, propene glycol, &c. The glycols are colorless, viscid liquids, miscible with water. They are generally prepared by acting on di-haloid olefine compounds with silver acetate : $C_nH_{2n}Br_2 + 2AgC_2H_3O_2 = C_nH_{2n}(C_2H_3O_2)_2 + 2AgBr$. The resulting acetate is then heated with potassium hydroxide: $C_nH_{2n}(C_2H_3O_2)_2 + 2KHO = C_nH_{2n}(HO)_2 + 2KC_2H_3O_2$. The glycols are capable of existing in isomeric forms similar to those of analogous olefine compounds (see p. 485), but these isomers are at present but imperfectly known. A series of compounds known as *polyethenic glycols* are formed from ethene glycol by condensation, with elimination of water. Their general formula is $n\{C_2H_4(HO)_2\} - (n-1)(OH_2)$, where the highest value of n is 6.

Series $C_nH_{2n-8}(HO)_2$, *Dihydric Phenols.*—The following are known :—

Pyrocatechin (*ortho-*), Resorcin (*meta-*), Hydroquinone[1] (*para-*) ..... $C_6H_4(HO)_2$
Saligenin, Orcin, Guaiacol ..... $C_7H_6(HO)_2$
Xylene glycol, Creasol, Veratrol ..... $C_8H_8(HO)_2$
Hydrothymoquinone ..... $C_{10}H_{12}(HO)_2$

Many of these compounds can be formed by suitable reactions from benzene hydrocarbons, phenols, &c.; others are found ready formed in lichens, or can be prepared from substances of vegetable origin.

Series $(C_nH_{2n-1})'''(HO)_3$ comprises *propenyl alcohol* or *glycerin*, $C_3H_5.(HO)_3$, and *amyl-glycerin*, $C_5H_9.(HO)_3$. Glycerin can be formed synthetically, but is generally obtained from *glycerides*, a group of ethereal salts composed of glycerin and acids of the acetic and oleic series (see p. 497), which exist ready formed in most animal and vegetable oils and fats. Thus *stearin* (propenyl tristearate), a constituent of many natural fats, when acted upon by superheated steam, decomposes as shown in the equation—

$$\underset{\text{Stearin.}}{C_3H_5(C_{18}H_{35}O_2)_3} + 3OH_2 = \underset{\text{Glycerin.}}{C_3H_5(HO)_3} + 3H.\underset{\text{Stearic acid.}}{C_{18}H_{35}O_2}.$$

Large quantities of glycerin are obtained by this means. Glycerin is a colorless, transparent, viscid liquid of a sweetish taste, readily soluble in water, and boiling (under 50 mm. pressure) at 210° C. *Polyglycerins* analogous to the polyethenic glycols are known.

Series $(C_nH_{2n-9})'''(HO)_3$.—*Trihydric phenols* comprising the isomerides *pyrogallic acid* (or *pyrogallol*) and *phloroglucin*, $C_6H_3(HO)_3$.

Series $(C_nH_{2n-2})^{IV}(HO)_4$.—*Erythrite*, *erythromannite* or *phycite*, $C_4H_6(HO)_4$, and *propyl-phycite*, $C_5H_4(HO)_4$.

Series $(C_nH_{2n-5})^{V}(HO)_5$.—*Pinite* and *quercite*, $C_6H_7(HO)_5$.

Series $(C_nH_{2n-4})^{VI}(HO)_6$.—*Mannite* and *dulcite*, $C_6H_8(HO)_6$, two natural sugars.

Sugar, starch, gum, &c., are members of a group of compounds termed *carbohydrates*,[2] which are closely allied to the present series of alcohols. The names, classification, and relationship of these bodies are shown in the following table :—

[1] The quinones are also closely related to ketones.

[2] So called because the hydrogen and oxygen are always present in these compounds in the proportions to form water.

CARBOHYDRATES.		
Glucoses. $C_6H_{12}O_6$.	Saccharoses. Polyglucosic alcohols. $n(C_6H_{12}O_6)-(n-1)(OH_2)$ $(n=2)$.	Amyloses. Polyglucosic anhydrides. $n(C_6H_{10}O_5)$.
Dextrose or grape-sugar.	Saccharose or cane-sugar.	Starch.
Levulose.	Lactose or milk-sugar.	Inulin.
Galactose.	Arabin or gum-arabic.	Dextrin.
Sorbin.	Melitose.	Cellulose or lignin.
Eucalin.	Melizitose.	Glycogen.
Inosite.	Trehalose or mycose.	
Arabinose.		

The glucoses exhibit the characters both of aldehydes and of alcohols; the saccharoses bear the same relationship to the glucoses that the polyethenic glycols bear to glycol; the amyloses are formed from the saccharoses by the elimination of one molecule of water.

Many of the sugars are widely diffused throughout the vegetable kingdom—the sugar in ordinary use being obtained from the sugar-cane and sugar-beet. Dextrose and levulose are found in honey, ripe fruits, &c., lactose in milk, inosite in flesh. Gum-arabic is the dried exudation of certain species of *Acacia*. All the amyloses, with the exception of glycogen, which is found in the liver of animals, are of vegetable origin. Cellulose or lignin is the chief constituent of the cells of plants; starch is found in the cells of most plants. *Gun-cotton* or *pyroxylin* is obtained from cotton-wool, which is almost pure cellulose, by the action of strong nitric acid; it has the composition of trinitro-cellulose, $C_6H_7(NO_2)_3O_5$. Many of the varieties of the sugars are physical isomerides differing from each other only in their rotatory action on polarized light.

III. Haloid Ethers.

These compounds can be formed from saturated hydrocarbons, and from hydrocarbons which behave as such, by the direct action of the halogen:—

$$C_nH_{2n+2} + Cl_2 = C_nH_{2n+1}Cl + HCl.$$

The substitution can in many cases be continued atom by atom, till the whole of the hydrogen is replaced; thus:—

Methane	CH_4	Ethane	C_2H_6	Benzene	C_6H_6
Tetrachlormethane	CCl_4	Hexachlorethane	C_2Cl_6	Hexachlorbenzene	C_6Cl_6

The reactions are often accelerated and in some cases remarkably modified by light or heat. The presence of iodine, antimony, &c., frequently assists the action of chlorine. Chlorine is more energetic than bromine, and the action of iodine less energetic than that of bromine,—iodine, in fact, does not act directly on the paraffins. By the direct action of halogens on paraffins a mixture containing more than one derivative is generally obtained. Thus, when chlorine and methane are mixed and exposed to diffused light (explosion takes place in direct sunlight), the whole series of derivatives CH_3Cl, CH_2Cl_2, $CHCl_3$, and CCl_4 are formed.

Unsaturated hydrocarbons first of all combine directly with a certain number of halogen atoms. In some cases the number of halogen atoms thus taken up restores the compound to the type of a saturated body:—

$C_2H_4 + Cl_2 = C_2H_4Cl_2$ = ethene dichloride = dichlorethane.
Ethene.

In other cases the restoration is not to the type of a saturated hydrocarbon:—

$C_{10}H_8 + 2Cl_2 = C_{10}H_8Cl_4$, tetrachlorinated naphthalene, corresponding to type C_nH_{2n-8}.
Naphthalene.

The mono-haloid derivatives of paraffins and some other hydrocarbons are conveniently prepared by the action of haloid acids on the corresponding alcohols:—

$$\underset{\text{Methyl alcohol.}}{CH_3.HO} + HCl = \underset{\text{Methyl chloride.}}{CH_3Cl} + OH_2$$

$$\underset{\text{Benzyl alcohol.}}{C_7H_7.HO} + HCl = \underset{\text{Benzyl chloride.}}{C_7H_7.Cl} + OH_2{}^{1}$$

$$\underset{\text{Mannite.}}{C_6H_8(HO)_6} + 11HI = \underset{\text{Secondary hexyl iodide.}}{C_6H_{13}I} + 5I_2 + 6OH_2.$$

[1] The metameric phenol, cresol (p. 489), does not undergo a similar reaction.

Polyhydric alcohols may by these reactions have their hydroxyl only partially replaced by halogens:—thus, by the action of hydrochloric acid on glycerin there are produced $C_3H_5Cl(HO)_2$ (*chlorhydrin*) and $C_3H_5Cl_2(HO)$ (*dichlorhydrin*).

The haloid phosphorus compounds act upon alcohols in a manner similar to that of the halogen acids:—

$$\underset{\text{Ethyl alcohol.}}{3C_2H_5.HO} + PBr_3 = \underset{\text{Ethyl bromide.}}{3C_2H_5Br} + PH_3O_3$$

$$\underset{\text{Ethene glycol.}}{C_2H_4(HO)_2} + 2PCl_5 = \underset{\text{Ethene dichloride.}}{C_2H_4Cl_2} + 2POCl_3 + 2HCl$$

$$\underset{\text{Dichlorhydrin.}}{C_3H_5Cl_2(HO)} + PCl_5 = \underset{\text{Trichlorhydrin or allyl-trichloride.}}{C_3H_5Cl_3} + POCl_3 + HCl.$$

The haloid ethers are liable to the same isomeric modifications as their parent hydrocarbons and derivatives. The conditions which determine the production of any particular modification cannot in all cases be laid down with precision. For instance, the di-haloid paraffin derivatives obtained from the paraffins are in some cases identical and in other cases isomeric with the corresponding compounds produced by the direct union of halogens with olefines. Again, the higher members of the paraffin series when acted on by chlorine yield simultaneously two isomeric (primary and secondary) mono-chlorinated derivatives. As a final example, when chlorine acts upon *toluene* in the cold *chloro-toluenes* ($C_6H_4Cl.CH_3$, $C_6H_3Cl_2.CH_3$, &c.) are formed, but when the action takes place with boiling toluene the substitution takes place in the methyl radicle, thus forming *benzyl* compounds ($C_6H_5.CH_2Cl$, &c.).

Alcohols are reproduced from their haloid ethers by the action of KHO (see p. 488), or by first converting the haloid ether into an acetate of the radicle by treatment with silver acetate, and then acting on the acetate with KHO. The alcohols thus formed are similar in isomeric constitution to the haloid ethers from which they are obtained. For instance, $(CH_3)_2CH.I$ (pseudopropyl iodide) when made to undergo the reactions specified is converted into $(CH_3)_2CH.HO$ (pseudopropyl alcohol) (see also p. 488). Isomeric haloid ethers are thus named in accordance with the radicle composing the alcohols from which they are obtained, or to which they give rise on conversion into acetates and treatment with KHO; thus, we have the following monoiodobutanes:—

$C_2H_5.C_2H_4I$	$(CH_3)_2CH.CH_2I$	$(CH_3)(C_2H_5)CHI$
Normal butyl iodide.	Isobutyl iodide.	Pseudobutyl iodide.

$C(CH_3)_3I$.
Katabutyl iodide.

The same relations exist between the haloid ethers and their isomerides as between the paraffins and their isomerides. Thus, the boiling points and specific gravities of the normal ethers are higher, and their chemical stability is greater than that of the isomerides.

By the action of nascent hydrogen many haloid ethers are restored to the hydrocarbons from which they are derived by an inverse substitution. Thus tetrachlormethane (CCl_4) when treated with sodium amalgam and water is ultimately converted into methane (CH_4), monochlorbenzene (C_6H_5Cl) into benzene, &c. The action of caustic alkalies upon monohaloid ethers will be best illustrated by the following examples:—

$$\underset{\text{Benzyl chloride.}}{C_7H_7.Cl} + KHO = \underset{\text{Benzyl alcohol.}}{C_7H_7.HO} + KCl$$

Illustrating formation of an alcohol. (See also p. 488.) The metameric monochlorophenols do not undergo an analogous reaction.

$$\underset{\text{Pseudopropyl iodide.}}{(CH_3)_2CHI} + KHO = \underset{\text{Propene.}}{C_3H_6} + KI + OH_2$$

Illustrating reduction of a saturated compound to a lower isologue, *i. e.*, formation of C_nH_{2n} from type C_nH_{2n+2}. A similar change is sometimes effected by heat alone.

$$\underset{\text{Monochlorethene.}}{C_2H_3Cl} + KHO = \underset{\text{Ethine.}}{C_2H_2} + KCl + OH_2$$

Illustrating reduction of an unsaturated compound to a lower isologue, *i. e.*, reduction of type C_nH_{2n} to C_nH_{2n-2}.

The mono-haloid olefines (typified by monochlorethene in the last equation) are obtained by the action of a caustic alkali on di-haloid paraffins (see p. 484). These mono-haloid olefines, like their parent olefines, are dyad radicles combining with Ha_2 and HHa. Their compounds with haloid acids are under some conditions identical and under other conditions isomeric with the corresponding compounds produced by the direct combination of the olefine with two halogen atoms.

Of the haloid ethers derived from paraffins the best known is trichloromethane or *chloroform* ($CHCl_3$), a colorless transparent, sweet-tasting, and somewhat fragrant liquid boiling at 62°, largely used as an anæsthetic. It can be prepared by the direct action of chlorine on methane, but it is usually obtained by the action of bleaching-powder on common alcohol. The corresponding bromine and iodine compounds, $CHBr_3$ and CHI_3 (*bromoform* and *iodoform*), and $CH(NO_2)_3$ (*nitroform*), are known.

Cyano-derivatives of Hydrocarbons.—The metamerism exhibited by these compounds has been already referred to (p. 481), and since they resemble in many respects the haloid ethers, their modes of preparation may be now touched upon.

The most general method of obtaining the cyanides (nitriles) in a state of purity is the dehydration of the ammonium salts of acids containing the corresponding hydrocarbon radicles (see also p. 481).

$$\underset{\text{Ammonium benzoate.}}{C_6H_5.CO(ONH_4)} - 2OH_2 = \underset{\text{Phenyl cyanide.}}{C_6H_5.CN}$$

Most of the other processes yield a mixture of cyanides and isocyanides:—

$$\begin{array}{lcl} CH_3I + KCN = CH_3.CN + KI \\ CH_3I + AgCN = CH_3.CN + AgI^1 \end{array}$$

Methyl iodide. Methyl cyanide.

In the first of these methods the cyanide predominates, and in the second the isocyanide. By distilling a mixture of potassium cyanide with an ethereo-metallic salt of sulphuric or sulphurous acid, a mixture of cyanide and isocyanide of the radicle contained in the ethereal salt is obtained, the cyanide or nitrile being in excess:—

$$\underset{\text{Potassium-methylsulphate.}}{CH_3.KSO_4} + KCN = \underset{\text{Methyl cyanide.}}{CH_3.CN} + K_2SO_4$$

$$\underset{\text{Potassium-naphthylsulphite.}}{C_{10}H_7.KSO_3} + KCN = \underset{\text{Naphthyl cyanide.}}{C_{10}H_7.CN} + K_2SO_3.$$

The cyanides or nitriles do not exhibit strongly marked basic properties, nor are they oxidized by Ag_2O or HgO. They are not poisonous, and do not possess unpleasant odors. Their boiling-points are generally higher than those of the metameric isocyanides. The nitriles are susceptible of isomeric modifications depending on the isomerism of their contained hydrocarbon radicles.

IV. Ethers.

These compounds bear to the alcohols the same relations that the metallic oxides bear to the hydroxides:—

$NaHO$	Na_2O	$Ca''(HO)_2$	$Ca''O$
CH_3HO	$(CH_3)_2O$	$C_2H_4''(HO)_2$	$C_2H_4''O$
Methyl alcohol.	Methyl ether.	Ethene alcohol.	Ethene ether.

In accordance with this view, many ethers are formed by dehydrating their corresponding alcohols by means of strong sulphuric acid, zinc chloride, boron trioxide, &c.:—

$$\underset{\text{Methyl alcohol.}}{2CH_3HO} - OH_2 = \underset{\text{Methyl ether.}}{(CH_3)_2O}$$

$$\underset{\text{Benzyl alcohol.}}{2C_7H_7.HO} - OH_2 = \underset{\text{Benzyl ether.}}{(C_7H_7)_2O}.$$

Conversely, many ethers, by prolonged heating with water, are retransformed into their corresponding alcohols.

Oxygen being a diatomic element combines with two monatomic radicles. When the two radicles are similar the compound is termed a *simple ether*, when dissimilar a *compound ether*. Thus, the ethers formulated above (methyl and benzyl) are simple ethers; while

$$\underset{\text{Methyl-ethyl ether.}}{CH_3.O.C_2H_5}, \quad \underset{\text{Methyl-amyl ether.}}{C_5H_{11}.O.CH_3}, \quad \underset{\text{Phenyl-allyl ether.}}{C_6H_5.O.C_3H_5}$$

are examples of compound ethers. Compound ethers containing a C_nH_{2n+1} and a C_nH_{2n-7} radicle are termed *anisols*.

[1] The cyanide thus formed unites with AgCN, forming the compound $CH_3.CN, AgCN$, which, on treatment with KCN in excess, yields the methyl isocyanide with the formation of $KAg(CN)_2$.

Ethers are liable to isomeric modifications dependent on the isomerism of their contained radicles, and likewise to metamerism depending on the presence of different radicles. For example, $C_2H_5.O.C_4H_9$ (*ethyl-butyl ether*) would be metameric with $(C_3H_7)_2O$ (*propyl ether*).

A general method of preparing ethers (simple and compound) containing monatomic radicles is to act upon the sodium derivative of the alcohol containing the one radicle with the haloid ether containing the other radicle. When the alcohol and haloid ether contain the same radicles, the result is a simple ether; when they contain different radicles a compound ether is produced:—

$$\underset{\text{Sodium ethylate.}}{C_2H_5.NaO} + C_2H_5I = \underset{\text{Ethyl ether.}}{(C_2H_5)_2O} + NaI$$

$$\underset{\text{Sodium ethylate.}}{C_2H_5.NaO} + CH_3I = \underset{\text{Methyl-ethyl ether.}}{CH_3.O.C_2H_5} + NaI$$

$$\underset{\text{Sodium phenate.}}{C_6H_5.NaO} + CH_3I = \underset{\text{Methyl-phenyl ether.}}{CH_3.O.C_6H_5} + NaI$$

The ethers derived from the phenols are prepared by special methods. Ethers containing diatomic radicles are obtained from the mono-haloid derivatives of the dihydric alcohols (glycols) by the action of KHO:—

$$\underset{\text{Monochlorhydrin.}}{C_2H_4Cl(HO)} + KHO = \underset{\text{Ethene ether.}}{C_2H_4O} + KCl + OH_2.$$

Compound ethers can be obtained from the sodium derivatives of the glycols by the action of mono-haloid ethers:—

$$\underset{\text{Sodium ethenate.}}{C_2H_4(NaO)_2} + 2CH_3I = \underset{\text{Ethene-dimethyl ether.}}{C_2H_4\begin{matrix}OCH_3\\OCH_3\end{matrix}} + 2NaI$$

The ethene series of ethers are more active in their chemical behavior than those containing C_nH_{2n+1} radicles.

Ethers corresponding to the first seven normal primary alcohols of the series $C_nH_{2n+1}.HO$ are known. Of these "sulphuric ether" is most frequently met with. It is the oxide of ethyl $(C_2H_5)_2O$, and is prepared by allowing a stream of ethyl alcohol to flow into a mixture of strong sulphuric acid and alcohol kept at a constant temperature of about 140° C. The following reactions occur:—

$$\underset{\text{Alcohol.}}{C_2H_5HO} + H_2SO_4 = \underset{\text{Ethyl-hydrogen sulphate.}}{C_2H_5.HSO_4} + OH_2$$

$$\underset{\text{Ethyl-hydrogen sulphate.}}{C_2H_5.HSO_4} + C_2H_5HO = \underset{\text{Ether.}}{(C_2H_5)_2O} + H_2SO_4.$$

As will be seen from these equations, a given quantity of H_2SO_4 is theoretically capable of etherifying an unlimited quantity of alcohol; practically, however, a limit is reached. If a mixture of alcohols is employed at starting, a compound ether is produced.

Ethyl ether is a colorless, mobile liquid, but very slightly soluble in water, and possessing an agreeable odor. It boils at 35·5° C. By the action of chlorine it yields substitution derivatives, $C_2H_4Cl.O.C_2H_5$, ... $(C_2Cl_5)_2O$.

V. Sulphur, Selenium, and Tellurium Alcohols and Ethers.

These compounds are the analogues of the alcohols and ethers (see p. 479), and are in many cases prepared by analogous methods. The following are typical reactions:—

Preparation of Sulphur Alcohols.

$$\underset{\text{Ethyl chloride.}}{C_2H_5Cl} + KHS = \underset{\text{Ethyl hydrosulphide.}}{C_2H_5(HS)} + KCl$$

$$\underset{\text{Ethene dichloride.}}{C_2H_4Cl_2} + 2KHS = \underset{\text{Ethene dihydrosulphide.}}{C_2H_4(HS)_2} + 2KCl$$

$$\underset{\text{Allyl iodide.}}{C_3H_5I} + KHS = \underset{\text{Allyl hydrosulphide.}}{C_3H_5(HS)} + KI$$

$$\underset{\text{Benzyl chloride.}}{C_7H_7Cl} + KHS = \underset{\text{Benzyl hydrosulphide.}}{C_7H_7(HS)} + KCl$$

$$\underset{\text{Potassium ethyl-sulphate.}}{K(C_2H_5)SO_4} + KHS = \underset{\text{Ethyl hydrosulphide.}}{C_2H_5(HS)} + K_2SO_4$$

Preparation of Sulphur, &c., Ethers.

$$\underset{\text{Methyl chloride.}}{2CH_3Cl} + K_2S = \underset{\text{Methyl sulphide.}}{(CH_3)_2S} + 2KCl$$

$$\underset{\text{Potassium ethyl-sulphate.}}{2K(C_2H_5)SO_4} + K_2Se = \underset{\text{Diethyl selenide.}}{(C_2H_5)_2Se} + 2K_2SO_4$$

Diethyl telluride is prepared by an analogous reaction, K_2Te being substituted for K_2Se. Polysulphides, $(C_2H_5)_2S_2$,

$(C_2H_5)_2S_3$, can be obtained by employing alkaline polysulphides in these reactions. Certain thio-alcohols can be prepared from the corresponding alcohols by the action of phosphorus pentasulphide ($5C_2H_5.HO + P_2S_5 = 5C_2H_5.HS + P_2O_5$). The sulphur analogues of the phenols and dihydric phenols are prepared by a special general method. The sulphonic acid (see p. 488) of the corresponding hydrocarbon is converted into a sulphonic chloride by the action of PCl_5, and the sulphonic chloride is then acted on by nascent hydrogen:

$$\underset{\text{Benzene-sulphonic chloride.}}{C_6H_5(SO_2Cl)} + 3H_2 = \underset{\text{Phenyl hydrosulphide.}}{C_6H_5.HS} + 2OH_2 + HCl$$

$$\underset{\substack{\text{Benzene disulphonic}\\\text{chloride.}}}{C_6H_4(SO_2Cl)_2} + 6H_2 = \underset{\substack{\text{Phenylene dihydro-}\\\text{sulphide or thioresorcin.}}}{C_6H_4(HS)_2} + 4OH_2 + 2HCl.$$

The sodium derivatives of these thio-phenols yield compound thio-ethers by the action of haloid ethers:—

$$\underset{\text{Sodium thiophenate.}}{C_6H_5.NaS} + C_2H_5I = \underset{\text{Phenyl-ethyl sulphide.}}{C_6H_5.S.C_2H_5} + NaI.$$

Compounds intermediate between alcohols and thio-alcohols are known:—

$$C_3H_5(HO)_2Cl + KHS = C_3H_5(HO)_2(HS) + KCl.$$

The compounds of this family are mobile or oily liquids or crystalline solids. Most of them possess characteristic and offensive odors. They are susceptible of the same isomerism as their oxygen analogues. The thio-alcohols combine energetically with alkali metals, and with certain metallic oxides and salts, to form derivatives analogous to the metallic alcohol derivatives,—hence the name *mercaptans* (*corpus mercurio aptum*) sometimes given to these bodies. Certain lead mercaptides, when heated in the dry state, yield the corresponding thio-ethers.

VI. Aldehydes.

The relations between these compounds and the primary alcohols are clearly brought out by the mode of formulation adopted for these alcohols (p. 488). Thus:—

H	CH_3	C_nH_{2n+1}	H	CH_3	C_nH_{2n+1}	C_nH_{2n+1}
CH_3	CH_3	CH_3	CH_2OH	CH_2OH	CH_2OH	COH
Methane.	Ethane.	Paraffins.	Carbinol.	Methyl carbinol.	Primary alcohol.	Aldehydes.

C_6H_6	$C_6H_5.CH_3$	$C_6H_5.CH_2OH$	$C_6H_5.COH$
Benzene.	Methyl-benzene.	Benzyl-alcohol.	Benzoic aldehyde.

It will be seen from these formulæ that aldehydes are derived from alcohols by the elimination of H_2 from the group CH_2OH, *i.e.*, 2 hydrogen atoms are withdrawn from the typical carbon atom, leaving the group $(COH)'$ (compare with definition previously given, p. 479); hence the generic name (*alcohol dehydrogenatum*). It is thus possible for any alcohol to furnish an aldehyde, although great numbers of these compounds have yet to be discovered to complete the various series. The following formulæ will illustrate the derivation of aldehydes from polyhydric alcohols:—

CH_2	CH_2OH	COH	C_6H_6	$C_6H_4\begin{matrix}CH_3\\CH_3\end{matrix}$	$C_6H_4\begin{matrix}COH\\COH\end{matrix}$
CH_2	CH_2OH	COH			
Ethene.	Glycol.	Aldehyde (glyoxal).	Benzene.	Dimethyl-benzene.	Aldehyde (phthalic).

The aldehydes of monohydric alcohols are metameric with the oxides (ethers) of dyad radicles. Thus, ethyl aldehyde, $CH_3.COH$, is metameric with ethene oxide $(C_2H_4)''O$; benzoic aldehyde would be metameric with methyl-phenylene oxide $[C_6H_3(CH_3)]''O$. The aldehydes are liable also to the isomerism of their contained hydrocarbon radicles, while aromatic aldehydes of dihydric alcohols are susceptible of the isomerism incident to the relative positions of the COH groups.

By the action of oxidizing agents aldehydes are converted into acids containing the same number of carbon atoms; thus, R′ being the monatomic radicle—

$$\underset{\text{Aldehyde.}}{\begin{matrix}R'\\|\\COH\end{matrix}} + O = \underset{\text{Acid.}}{\begin{matrix}R'\\|\\COOH\end{matrix}}$$

Starting, therefore, from the parent hydrocarbons, the primary alcohols are the first results of the introduction of hydroxyl into the methyl group. The next step in oxidation removes the two remaining hydrogen atoms from this group with the formation of aldehydes, and the final result of the oxidation is to convert COH into carboxyl COOH, with the formation of acids. Aldehydes thus occupy a position intermediate between alcohols and acids:—

CH_3	CH_3	CH_3	CH_3
CH_3	CH_2OH	COH	$COOH$
Ethane or methyl methane.	Methyl-carbinol.	Ethyl or acetic aldehyde.	Acetic acid.

Aldehydes take up nascent hydrogen, reproducing alcohols—$R'.COH + H_2 = R'.CH_2OH$. The acid sulphites of the alkali metals combine directly with aldehydes, forming crystalline compounds, which, on treatment with a mineral acid, yield the aldehyde unaltered.

Aldehydes corresponding to eleven of the primary alcohols of the $C_nH_{2n+1}.HO$ series are known, and are generally prepared by the oxidation of these alcohols: $R'.CH_2OH - H_2 = R'.COH$. The contained C_nH_{2n+1} radicles are in some cases normal primary, and in others iso-primary. The first member, methyl or formic aldehyde, H.COH, is gaseous; the succeeding terms are liquid, and hexdecyl aldehyde is a crystalline solid. The liquid aldehydes are colorless, transparent, and possessed of pungent ethereal odors; their mobility decreases, and their boiling-points rise as the series is ascended. Their solubility in water decreases in the same manner. By the action of PCl_5 aldehydes lose their oxygen, and Cl_2 is substituted. These chloraldehydes are isomeric with the dichlorides of the olefines, and (with the exception of the ethyl compound), with the chlorides of monochlorinated C_nH_{2n+1} radicles. Thus:—

$CH_3.CHCl_2$		$CH_2Cl.CH_2Cl$
Ethidene dichloride or dichloraldehyde.	is isomeric with	Ethene dichloride.

(See also p. 485.) The aldehydes of the present series combine directly with ammonia, forming *aldehyde-ammonias* of the general formula $R'.C(OH)(NH_2)H$, which, by losing the elements of water, condense into basic substances, termed *aldines* and *oxaldines*. When acted on by chlorine in large excess these aldehydes yield the corresponding chlorides of acid radicles $(R'CO)'Cl$. Trichloraldehyde, $CCl_3.COH$, or *chloral*, can be obtained by the action of chlorine on ethyl alcohol. The *acetals* are compounds formed by the combination of aldehydes and alcohols of the $C_nH_{2n+1}HO$ series, with elimination of water. By the action of zinc chloride, &c., acetic aldehyde yields *crotonic aldehyde*: $2C_2H_4O - OH_2 = C_4H_6O$. The aldehydes oxidize with the greatest readiness to the corresponding acids; thus, silver oxide is reduced to the metallic state when heated with an aldehyde and water. A drop of acetic aldehyde let fall on blue litmus paper shows an acid reaction on mere exposure to the air, owing to the formation of acetic acid. Aldehydes are characterized by their extreme readiness to undergo polymeric modification. Thus the presence of a trace of certain reagents converts acetic aldehyde under some conditions into *paraldehyde*, $C_6H_{12}O_3 = 3C_2H_4O$, and under other conditions into *metaldehyde*, $n(C_2H_4O)$.

The aldehydes corresponding to the $C_nH_{2n-1}.HO$ alcohols are *acrylic aldehyde* or *acrolein*, $C_2H_3.COH$, and *crotonic aldehyde*, previously mentioned. These aldehydes do not yield compounds analogous to aldehyde-ammonia.

Of the aldehydes of the aromatic series mention may be made of *benzoic aldehyde*, which can be obtained from bitter-almond oil; *cumic aldehyde*, existing in oil of cumin; *salicylic aldehyde*, which exists in the flowers of "meadow-sweet;" and *cinnamic aldehyde*, the chief constituent of the oils of cassia and cinnamon. The aromatic aldehydes, by the action of ammonia, are converted into *hydramides* of the general formula $(C_nH_{2n-7}CH)_3''N_2$.

VII. Ketones.

These compounds are derived from secondary alcohols, in the same manner that aldehydes are derived from primary alcohols:—

$$\underset{\text{Secondary alcohol.}}{(C_nH_{2n+1})_2CH.OH} - H_2 = \underset{\text{Ketone.}}{(C_nH_{2n+1})_2CO}.$$

The ketones may thus be regarded as compounds of C_nH_{2n+1}, &c., radicles with CO, or as aldehydes in which the H of the COH group is replaced by such radicles. The compounds of this family bear considerable resem-

blance to the aldehydes, but are distinguished by their behavior on oxidation, for whereas the aldehydes are readily converted into acids containing the same number of carbon atoms, the ketones are converted (with some difficulty) into a mixture of two acids of the $C_nH_{2n+1}.COOH$ series, each containing a smaller number of carbon atoms. The law of the oxidation of ketones appears to be that the less complex of the two hydrocarbon radicles remains attached to the CO; thus—

$$CO\begin{cases}CH_3\\C_5H_{11}\end{cases} + 3O = CH_3.COOH + C_4H_9.COOH.$$

Methyl-pentyl ketone. Acetic acid. Valeric acid.

Ketones are converted by the action of nascent hydrogen into secondary alcohols (see p. 488).

The ketones are liable to isomeric modification depending on the isomerism of their contained hydrocarbon radicles.

For example, $CO\begin{cases}CH_3\\C_3H_7\end{cases}$ (methyl propyl ketone) is isomeric with $CO\begin{cases}CH_3\\CH(CH_3)_2\end{cases}$ (methyl-pseudopropyl ketone).

Furthermore, there can be metamerism among ketones owing to the presence of different radicles in the molecule, and every ketone is metameric with an aldehyde of the same series. Thus, the following are metameric:—

$CO\begin{cases}CH_3\\C_4H_9\end{cases}$ Methyl-butyl ketone. $CO\begin{cases}C_2H_5\\C_3H_7\end{cases}$ Ethyl-propyl ketone. $C_5H_{11}.COH$. Hexyl aldehyde.

Ketones corresponding to the general formulæ $CO(C_nH_{2n+1})_2$, $CO\begin{cases}C_nH_{2n+1},\\C_nH_{2n-7}\end{cases}$ and $CO(C_nH_{2n-7})_2$ are known, and are formed by various methods, of which the following are the most important:—

1. By the oxidation of secondary alcohols (see beginning of section).

2. By the action of sodium organo-metallic bodies on CO:

$$2Na(C_nH_{2n+1}) + CO = CO(C_nH_{2n+1})_2 + Na_2.$$

3. By the action of zinc organo-metallic compounds on acid chlorides (chlorides of acid radicles):—

$$2CO(C_nH_{2n+1})Cl + Zn(C_nH_{2n+1})_2 = 2CO(C_nH_{2n+1})_2 + ZnCl_2.$$

4. By the dry distillation of the Ca and Ba salts of monobasic acids of the series $C_nH_{2n+1}.CO_2H$, $C_nH_{2n-7}.CO_2H$, &c.,—

$$Ca''O_2(C_nH_{2n+1}.CO)_2 = CO(C_nH_{2n+1})_2 + CaCO_3$$
$$Ba''O_2(C_nH_{2n-7}.CO)_2 = CO(C_nH_{2n-7})_2 + BaCO_3.$$

By employing a mixture of the salts of acids belonging to two different series, or of two different acids belonging to the same series, ketones containing two different radicles are obtained.

The ketones of the series $CO(C_nH_{2n+1})_2$ and $CO\begin{cases}C_nH_{2n+1}\\C_nH_{2n-7}\end{cases}$ are, with few exceptions, mobile or oily colorless liquids, possessed of most characteristic and penetrating odors; those of the series $CO(C_nH_{2n-7})_2$ are crystalline solids. Ketones containing methyl form with acid sulphites white crystalline compounds, from which the ketone is obtained unaltered on distillation with an alkali. The best-known ketone of the series $CO(C_nH_{2n+1})_2$ is *dimethylketone* or *acetone*, $CO(CH_3)_2$, a limpid, inflammable liquid, boiling at 55°·5 C., and readily miscible with water. In addition to the general modes of formation previously given, this ketone can be obtained by the destructive distillation of citric acid, and also by distilling certain carbohydrates with quicklime. Heated with ammonia, acetone forms *acetonine*, a basic substance, of the formula $(C_3H_6)_3''N_2$. Of the aromatic ketones *methyl-phenyl ketone* or *acetophenone* is interesting as furnishing, by the action of fuming nitric acid, a nitro-derivative, $CO\begin{cases}CH_3\\C_6H_4(NO_2)\end{cases}$, which, when heated with soda-lime and zinc-dust, yields *indigotin* or *indigo-blue*—

$$2CO\begin{cases}CH_3\\C_6H_4(NO_2)\end{cases} - 2H_2O - O_2 = \underset{\text{Indigotin.}}{C_{16}H_{10}N_2O_2}$$

VIII. Organic Acids.

The relationship of the organic acids to the hydrocarbons and to the alcohols has been previously pointed out (pp. 479 and 483). A further development of this relationship, as bearing on the formation of acids from polyhydric alcohols, is shown in the following examples:—

$CH_2.OH$	$CH_2.OH$	$CO.OH$
$CH_2.OH$	$CO.OH$	$CO.OH$
Ethene glycol.	Glycollic acid.	Oxalic acid.

In the formation of acids from alcohols, therefore (disregarding the intermediate formation of aldehydes), one atom of oxygen is substituted for H_2 in the group CH_2OH, thus converting this group into carboxyl, COOH.[1] It has been before mentioned that CH_2OH is derived from methyl by the substitution of HO for H, so that carboxyl may be regarded as a methyl derivative, and a similar view may be extended to cyanogen CN, where N‴ may be regarded as replacing H_3. This connection between CN and COOH is shown by the various reactions in which the one radicle is converted into the other, but more particularly, so far as the compounds now under consideration are concerned, by the synthesis of organic acids from the corresponding nitriles (p. 481). A few comparative formulæ will serve to illustrate still further this important relationship:—

CH_3	CH_3	CH_3
CH_3	CN	$CO.OH$
Ethane, or methyl methane.	Methyl cyanide, cyano-methane, or acetonitrile.	Acetic acid.

CH_3	$CH_2.OH$	$CH_2.CN$	$CH_2.COOH$
CH_2	$CH.OH$	$CH.CN$	$CH.COOH$
CH_3	$CH_2.OH$	$CH_2.CN$	$CH_2.COOH$
Propane.	Propenyl alcohol, or glycerin.	Propenyl tricyanide.	Tricarballylic acid.

Classification.—By inspecting the formulæ given at the commencement of the present section, it will be seen that the number of times COOH occurs in an acid is dependent on the number of times the group $CH_2.OH$ occurs in the parent alcohol. Now, organic like mineral acids, when brought into contact with metallic oxides or hydroxides, give rise to the formation of *salts*, in which H, H_2, H_3, &c., are replaced by M′, M′$_2$ or M″, M′$_3$ or M‴, &c.; but the hydrogen thus replaceable is found to be not that which enters simply into the composition of HO, as with mineral acids, but that which exists in the group COOH. The basicity of an organic acid depends therefore on the number of carboxyl groups it contains—acids containing 1, 2, 3, *n* carboxyl groups being mono-, di-, tri-, *n*-basic.

Monobasic Acids.

Series $C_nH_{2n+1}(CO_2H)$, *Acetic or Fatty Series.*—These acids are prepared—1. By the oxidation of the corresponding primary alcohols and aldehydes (pp. 489 and 492); 2. By the action of mineral acids or alkalies on the cyano-derivatives of the paraffins obtained by the methods previously given (p. 491; see also p. 481); 3. By the action of organo-sodium compounds on carbon dioxide:—

$$C_nH_{2n+1}Na + CO_2 = \underset{\text{Sodium salt.}}{C_nH_{2n+1}.COONa}$$

Isomerism.—Just as the alcohols of the methyl series are most conveniently formulated as derivatives of the first term carbinol, so the present acids may be regarded as derived from formic or acetic acids, the two first members of the series:—

H	CH_3	$CH_2(CH_3)$	(C_nH_{2n+1})	$CH_2(C_nH_{2n+1})$
$COOH$	$COOH$	$COOH$	$COOH$	$COOH$
Formic acid.	Acetic or methyl-formic acid.	Propionic or methacetic acid.	(C_nH_{2n+1})-formic acid.	(C_nH_{2n+1})-acetic acid.

The first kind of isomerism which we have to consider is that depending on the replacement of one C_nH_{2n+1} radicle by two or three others, each containing a smaller number

[1] "Organic hydroxides are converted into acids, not only by transformation of the group CH_2OH into COOH, but also when negative elements or radicles accumulate near an alcoholic hydroxyl."—Watts's *Dictionary of Chemistry*, second supplement.

of carbon atoms. (Compare with isomerism of alcohols, p. 488.) Thus we may have the following isomerides:

$CH_2(C_3H_7)$	$CH(CH_3)(C_2H_5)$	$C(CH_3)$
COOH	COOH	COOH
Propacetic or valeric acid.	Methyl-ethacetic acid.	Trimethacetic acid.

Acids are thus classified in the same manner as the alcohols, into primary, secondary, and tertiary, according as the carbon atom in combination with carboxyl is combined with one, two, or three other carbon atoms.

Another kind of isomerism is dependent on the isomerism of the radicles replacing the H of the CH_3 of the acetic acid; thus—

$C(C_3H_7)H_2.COOH$ — Propacetic acid — is isomeric with — $C[CH(CH_3)_2]H_2.COOH$ — Pseudopropacetic acid.

Each of the three groups of acids is accordingly subdivided into normal and iso-acids, although the series are far from being complete.

The following is a list of the normal primary acids:—

Names.	Formulæ.	Boiling-points.	Names.	Formulæ.	Melting-points.
Formic acid	$H.CO_2H$	100° C.	Lauric acid	$C_{11}H_{23}.CO_2H$	44° C.
Acetic "	$CH_3.CO_2H$	117°	Myristic "	$C_{13}H_{27}.CO_2H$	54°
Propionic "	$C_2H_5.CO_2H$	141°	Palmitic "	$C_{15}H_{31}.CO_2H$	62°
Butyric "	$C_3H_7.CO_2H$	163°	Margaric "	$C_{16}H_{33}.CO_2H$	60°?
Valeric "	$C_4H_9.CO_2H$	185°	Stearic "	$C_{17}H_{35}.CO_2H$	69°
Caproic "	$C_5H_{11}.CO_2H$	205°	Arachidic "	$C_{19}H_{39}.CO_2H$	75°
Œnanthylic acid	$C_6H_{13}.CO_2H$	224°	Behenic "	$C_{21}H_{43}.CO_2H$	76°
Caprylic "	$C_7H_{15}.CO_2H$	238°	Cerotic "	$C_{26}H_{53}.CO_2H$	78°
Pelargonic "	$C_8H_{17}.CO_2H$	254°	Melissic "	$C_{29}H_{59}.CO_2H$	88°
Capric "	$C_9H_{19}.CO_2H$	269°			

These acids exhibit the general physical properties of all homologous series. Up to pelargonic acid they are limpid liquids, possessing penetrating odors, and of increasing viscidity; the remaining members are solid fats. The acids of this series are found in nature in the free state (formic acid in ants, cerotic acid in beeswax, &c.), or as glyceric, &c., ethereal salts, in natural fats (mutton fat, glyceric stearate; spermaceti, cetylic palmitate, &c.); hence the term "fatty series." Formic acid can be prepared by certain special methods—1. By passing carbon monoxide over moist potash ($CO+KHO=H.COOK$); 2. By heating dry oxalic acid with glycerine ($H_2C_2O_4=CO_2+H.COOH$). Acetic acid also can be synthesized from ethine and oxygen in presence of potash ($C_2H_2+O+KHO=C_2H_3KO_2$). This acid is obtained on the large scale by the dry distillation of wood, and is likewise contained in vinegar. Butyric acid is formed by the fermentation of sugar in presence of chalk and putrefying cheese or milk. The metallic salts formed by the fatty acids furnish the organic acids unchanged on distillation with a mineral acid. The potassium salts, when distilled with potassium formate, yield the corresponding aldehydes—

$$C_nH_{2n+1}.COOK + HCOOK = C_nH_{2n+1}.COH + CO(OK)_2.$$
Potassium salt. Formate. Aldehyde.

The aldehydes can be converted into the alcohols by the action of nascent hydrogen, and from the alcohols the haloid ethers can be obtained, which, by methods now known to the reader, can be converted into nitriles, and these again into acids containing one more atom of carbon than the alcohol (p. 482). It will be obvious that by these reactions the homologous series of fatty acids can be ascended term by term. By the action of chlorine, &c., on the fatty acids substitution compounds are obtained. Thus acetic acid is converted into $CH_2Cl.CO_2H$, $CHCl_2.CO_2H$, and $CCl_3.CO_2H$. Other derivatives can be obtained from these haloid derivatives by double decomposition; for example (by the action of KCN), $CH_2(CN).CO_2H$, *cyan-acetic acid;* (by the action of ammonia), $CH_2(NH_2).CO_2H$, *amidacetic acid* or *glycocine.*

Series $C_nH_{2n}(HO).CO_2H$, *Lactic Series.*—These acids are the hydroxyl derivatives of the fatty acids, from which they can be obtained by treating the mono-haloid substitution derivatives with Ag_2O and water—

$$2C_nH_{2n}Ha.CO_2H + Ag_2O + OH_2 = 2C_nH_{2n}(HO).CO_2H + 2AgHa.$$

The isomeric modifications of these acids admit of being grouped under four divisions:—

1. *Primary Acids,* $C(C_nH_{2n+1})H.HO.CO_2H$.—These are formed by the above reaction from primary fatty acids, and also by the slow oxidation of glycols of the form $CH(C_nH_{2n+1})OH.CH_2.OH$.

Aldehydes of the acetic series form compounds with HCN, which, on heating with HCl and water, yield acids of this group:—

$$CH_3.COH + HCN + 2OH_2 + HCl = C(CH_3)H.HO.CO_2H + NH_4Cl.$$
Acetic aldehyde. Ethidene-lactic acid.

2. *Secondary Acids,* $C(C_nH_{2n+1})_2.HO.CO_2H$.—Produced by the action of Ag_2O and water on mono-haloid derivatives of secondary fatty acids. Also by the action of organo-zinc compounds on ethyl oxalate, $C_2O_2(OC_2H_5)_2$, and treatment of the resulting compound with water. Ketones containing C_nH_{2n+1} radicles, when heated with HCN, HCl, and water, produce acids of this group:—

$$CO(CH_3)_2 + HCN + 2OH_2 + HCl = C(CH_3)_2.HO.CO_2H + NH_4Cl.$$
Acetone. Oxybutyric acid.

3. *Primary Olefine Acids,* C_nH_{2n} $\begin{cases} CH_2.OH \\ CO.OH \end{cases}$.—Produced by the oxidation of glycols of the form C_nH_{2n} $\begin{cases} CH_2.OH \\ CH_2.OH \end{cases}$.

4. *Secondary Olefine Acids,* C_nH_{2n} $\begin{cases} CH(C_nH_{2n+1}).OH \\ CO.OH, \end{cases}$.—Produced by the action of nascent hydrogen on certain compounds formed by the action of sodium on ethyl acetate, $CH_3.CO(C_2H_5O)$. (See p. 573.)

The following is a list of the acids of the lactic series:—

Carbonic acid[1]	$HO.CO_2H$
Glycollic "	$CH_2(HO).CO_2H$
Ethylidene-lactic acid Ethylene- " " Paralactic " Hydracrylic "	$C_2H_4(HO).CO_2H$
Oxybutyric acids	$C_3H_6(HO).CO_2H$
Oxyvalerio "	$C_4H_8(HO).CO_2H$
Oxycaproic "	$C_5H_{10}(HO).CO_2H$
Oxyheptylic acid	$C_6H_{12}(HO).CO_2H$
Oxydodecatylic acid	$C_{11}H_{22}(HO).CO_2H$

Ethylidene lactic acid is the first product of the butyric fermentation of sugar; ethylene and paralactic acids are contained in the juice of flesh. *Lactide* and *dilactic acid* ($C_3H_4O_2$ and $C_6H_{10}O_5$) are produced by the elimination of water from one and two molecules of lactic acid by heat.

Series $C_nH_{2n-1}O.CO_2H$, *Pyruvic Series.*—These acids may be regarded as derived from those of the lactic series by the abstraction of H_2. The following are known:—

Pyruvic or pyroracemic acid	$C_2H_3O.CO_2H$
Epihydric "	$C_3H_5O.CO_2H$
Acetopropionic "	$C_4H_7O.CO_2H$
Convolvulinoleic "	$C_{12}H_{23}O.CO_2H$
Jalapinoleic "	$C_{15}H_{29}O.CO_2H$
Ricinoleic "	$C_{17}H_{33}O.CO_2H$

Series $C_nH_{2n+1}O_2.CO_2H$ comprises *glyoxylic* and *glyceric* acids, $CH_3O_2.CO_2H$ and $C_2H_5O_2.CO_2H$.

Series $C_nH_{2n-1}.CO_2H$, *Acrylic Series.*—The acids known in this series are the following:—

Acrylic acid	$C_3H_3.CO_2H$
Crotonic and methacrylic acids	$C_3H_5.CO_2H$
Angelic and methylcrotonic acids	$C_4H_7.CO_2H$
Pyroterebic, hydrosorbic, and ethylcrotonic acids	$C_5H_9.CO_2H$
Moringic and cimicic acids	$C_{14}H_{27}.CO_2H$
Hypogœic, gaïdic, and physetoleic acids	$C_{15}H_{29}.CO_2H$
Oleic and elaïdic acids	$C_{17}H_{33}.CO_2H$
Doeglic acid	$C_{18}H_{35}.CO_2H$
Brassic and erucic acids	$C_{21}H_{41}.CO_2H$

[1] This acid (the hydroxyl derivative of formic acid) is unknown in the free state, and is *dibasic.*

These acids are produced by the oxidation of the corresponding aldehydes, and also by the dehydration of secondary lactic acids. They may be arranged in two isomeric series:—*primary acids* of the form $CHR''.CO_2H$, and *secondary acids*, $CR'R''.CO_2H$. These acids combine directly with Ha_2, HHa, and are raised to the $C_nH_{2n+1}.CO_2H$ type. On fusion with KHO they yield potassium salts of two fatty acids.

Series $C_nH_{2n-3}.CO_2H$ contains *tetroleic* ($C_3H_3.CO_2H$), *sorbic* ($C_5H_7.CO_2H$), and *stearolic* ($C_{17}H_{31}.CO_2H$) *acids*.

Series $C_nH_{2n-7}.CO_2H$, *Benzoic* or *Aromatic Series*.—The following are known:—

Benzoic acid	$C_6H_5.CO_2H$
Toluic acids	$C_7H_7.CO_2H$
Xylic, hydrocinnamic, mesitylenic, and ethylbenzoic acids	$C_8H_9.CO_2H$
Cumic and cumylic acids	$C_9H_{11}.CO_2H$
Homocumic acid	$C_{10}H_{13}.CO_2H$

These acids are prepared by the general methods of oxidizing the corresponding alcohols and aldehydes, and by the action of KHO on the cyanides of the C_nH_{2n-7} radicles. Benzoic acid exists in gum-benzoin, from which it sublimes, on heating, in white feathery crystals, having a fragrant odor. By the action of Cl, HNO_3, &c., these acids yield substitution derivatives, such as $C_6H_4Cl.CO_2H$ and $C_6H_4(NO_2).CO_2H$, chlorobenzoic and nitrobenzoic acids. The latter, by the action of nascent hydrogen, is converted into $C_6H_4(NH_2).CO_2H$, amidobenzoic acid. *Hippuric acid*, the potassium salt of which occurs in the urine of many herbivorous animals, is *benzamido-acetic acid*—

$$CH_2(NH.COC_6H_5).CO_2H.$$

The aromatic acids can be arranged in two metameric series corresponding to the benzylic alcohols and the phenols.

Series $C_nH_{2n-8}(HO).CO_2H$, *Oxybenzoic Series*.—This bears to the preceding series the same relationship as the lactic to the fatty series:—

Salicylic (*ortho-*), oxybenzoic (*meta-*), and paraoxybenzoic acids	$C_6H_4(HO).CO_2H$
Anisic (or oxymethyl-benzoic), cresotic, and mandelic (or formo-benzoic) acids	$C_7H_6(HO).CO_2H$
Phloretic, hydrocoumaric, hydroparacoumaric and phenyl-lactic acids	$C_8H_8(HO).CO_2H$
Thymotic and thymyl-carbonic acids	$C_{10}H_{12}(HO).CO_2H$

Series $C_nH_{2n-9}(HO)_2.CO_2H$, *Dioxybenzoic Series*, contains *oxysalicylic, hypogallic, protocatechuic*, and *carbohydro-quinonic acids*—$C_6H_3(HO)_2.CO_2H$.

Allied to this series are *piperic* ($C_{12}H_{10}O_4$) and *eugetic* ($C_{11}H_{12}O_4$) *acids*.

Series $C_nH_{2n-10}(HO)_3.CO_2H$, *Gallic Series*.—*Gallic acid*, $C_6H_2(HO)_3.CO_2H$, exists ready formed in many plants, such as sumach, hellebore, &c. *Tannins* are the astringent vegetable principles made use of in tanning. They all contain some form of *tannic acid*, $C_{27}H_{22}O_{17}$, a compound resolved by the action of acids into gallic acid and glucose (see p. 497). Gallic acid is generally prepared from the gallotannic acid extracted from gall-nuts.

Series $C_nH_{2n-9}.CO_2H$:—*Cinnamic, atropic*, and *isatropic acids*, $C_8H_7.CO_2H$.

Series $C_nH_{2n-10}(HO).CO_2H$:—*Coumaric* and *paracoumaric acids*, $C_8H_6(HO).CO_2H$.

Series $C_nH_{2n-11}.CO_2H$:—*Phenyl-propiolic acid*,

$$C_8H_5.CO_2H.$$

Series $C_nH_{2n-13}.CO_2H$, comprising two *naphthoic acids*, $C_{10}H_7.CO_2H$.

Series $C_nH_{2n-14}(HO).CO_2H$, containing *oxynaphthoic acids*, $C_{10}H_6(HO).CO_2H$.

Series $C_nH_{2n-16}(HO).CO_2H$, containing *benzilic acid*,

$$C_{13}H_{10}(HO).CO_2H.$$

Series $C_nH_{2n-19}.CO_2H$:—*Anthracenecarbonic acid*,

$$C_{14}H_9.CO_2H.$$

Dibasic Acids.

Series $C_nH_{2n}(CO_2H)_2$, *Succinic Series*.—The following are known:—

Oxalic acid	$(CO_2H)_2$	Pimelic acid	$C_5H_{10}(CO_2H)_2$
Malonic acid	$CH_2(CO_2H)_2$	Suberic acid	$C_6H_{12}(CO_2H)_2$
Succinic acid	$C_2H_4(CO_2H)_2$	Anchoic acid	$C_7H_{14}(CO_2H)_2$
Pyrotartaric acid	$C_3H_6(CO_2H)_2$	Sebacic acid	$C_8H_{16}(CO_2H)_2$
Adipic acid	$C_4H_8(CO_2H)_2$	Roccellic acid	$C_{15}H_{30}(CO_2H)_2$

These acids may be prepared by the general methods of oxidizing the corresponding alcohols (glycols), and from the cyano-olefine compounds, $C_nH_{2n}(CN)_2$, by the usual reactions. Oxalic acid (sodium salt) may be synthesized by heating sodium in dry CO_2, and is manufactured on the large scale by fusing sawdust with caustic alkalies. This acid, free or combined, is found in many plants,—hence the name (from *Oxalis*, wood-sorrel). Succinic acid exists in amber. Many of these acids are produced by oxidizing various organic substances with nitric acid. The acids of the present series are crystalline solids, forming, like all dibasic acids, two series of salts, *normal* and *acid*, of the formulæ $C_nH_{2n}\begin{cases}COOH\\COOM'\end{cases}$ and $C_nH_{2n}\begin{cases}COOM'\\COOM'\end{cases}$. Isomerides of many of the acids are known. Oxalates may be formed from cyanogen compounds (see p. 480).

Series $C_nH_{2n-1}(HO)(CO_2H)_2$, *Malic Series*:—

Tartronic or oxymalonic acid	$CH(HO)(CO_2H)_2$
Malic or oxysuccinic acid	$C_2H_3(HO)(CO_2H)_2$
Citramalic and glutanic acids	$C_3H_5(HO)(CO_2H)_2$
Oxyadipic acid	$C_4H_7(HO)(CO_2H)_2$
Oxysuberic acid	$C_6H_{11}(HO)(CO_2H)_2$

Malic acid is found free or combined in the juice of most fruits.

Series $C_nH_{2n-2}(HO)_2(CO_2H)_2$, *Tartaric Series*.—The following are known:—

Mesoxalic acid (?)	$C(HO)_2(CO_2H)_2$
Tartaric acid	$C_2H_2(HO)_2(CO_2H)_2$
Homo-, citra-, and ita-tartaric acids	$C_3H_4(HO)_2(CO_2H)_2$
Dioxyadipic acid	$C_4H_6(HO)_2(CO_2H)_2$
Dioxysuberic	$C_6H_{10}(HO)_2(CO_2H)_2$

Tartaric, like malic and oxalic acids, is of frequent occurrence in the vegetable kingdom, being found free or combined in the juice of many fruits. It is generally obtained from *argol* or *tartar* (crude acid potassium tartrate), which is deposited from fermenting grape juice. It can be formed by the action of Ag_2O and water on dibromsuccinic acid, $C_2H_2Br_2(CO_2H)_2$. Five modifications of tartaric acid, differing chiefly in their optical properties, are known, viz., dextrotartaric, levotartaric, racemic, mesotartaric, and metatartaric acids. Normal and acid tartrates are known. *Tartar emetic* is potassio-antimonious tartrate; the acid potassium tartrate is known as *cream of tartar*.

Series $C_nH_{2n-2}(CO_2H)_2$, *Fumaric Series*.—This consists of *fumaric* and *maleic acids*, $C_2H_2(CO_2H)_2$; *citraconic, itaconic*, and *mesaconic acids*, $C_3H_4(CO_2H)_2$.

Series $C_nH_{2n-8}(CO_2H)_2$, *Phthalic Series*, comprises:—

Phthalic (*ortho-*), isophthalic (*meta-*), and terephthalic (*para-*) acids	$C_6H_4(CO_2H)_2$
Uvitic or mesidic, xylidic, and isoxylidic acids	$C_7H_6(CO_2H)_2$
Cumidic acid	$C_8H_8(CO_2H)_2$

The phthalic acids are obtained by the oxidation of many aromatic hydrocarbons and their derivatives. Derived from these acids are *hydro-phthalic* and *hydroterephthalic acids* ($C_8H_8O_4$).

Tribasic Acids.

Meconic acid, $C_4HO(CO_2H)_3$, is obtained from opium; *tricarballylic acid*, $C_3H_5(CO_2H)_3$, from tricyanopropane (see p. 493).

Citric acid, $C_3H_4(HO)(CO_2H)_3$, exists in many fruits, and is generally obtained from lemon juice. It forms colorless crystals readily soluble in water. Being a tribasic acid, it forms with metals three classes of salts, typified by $M'C_6H_7O_7$, $M_2'C_6H_6O_7$, $M_3'C_6H_5O_7$, &c.

Aconitic Acid, $C_3H_3(CO_2H)_3$, is derived from citric acid, and is found also in monkshood (*Aconitum Napellus*).

Trimellitic (*para-*), *trimesic* (*meta-*), and *hemimellitic* (*ortho-*) *acids*, $C_6H_3(CO_2H)_3$, are tricarboxyl derivatives of benzene.

Tetrabasic and Hexabasic Acids.

The following tetracarboxyl benzene derivatives are known:—*pyromellitic* (*para-*), *prehnitic* (*meta-*), and *mellophanic* (*ortho-*) *acids*, $C_6H_2(CO_2H)_4$.

The hexabasic acids known are *mellitic acid*, $C_6(CO_2H)_6$, and its derivative *hydromellitic acid*, $C_6H_6(CO_2H)_6$.

It is to be remembered that the foregoing list is necessarily brief. Many acids of vegetable and animal origin, and others derived from them by artificial methods, are known, but their constitution is in many cases still undecided.

IX. Anhydrides.

These compounds are the ethers of acid radicles (see p. 479), and may be prepared in many cases by analogous reactions:—

$$\underset{\text{Acetyl chloride.}}{C_2H_3O.Cl} + \underset{\text{Sodium acetate.}}{C_2H_3O.ONa} = \underset{\text{Acetic anhydride.}}{(C_2H_3O)_2O} + NaCl$$

$$\underset{\text{Acetyl chloride.}}{C_2H_3O.Cl} + \underset{\text{Sodium butyrate.}}{C_4H_7O.ONa} = \underset{\text{Aceto-butyric anhydride.}}{C_2H_3O.O.C_4H_7O} + NaCl.$$

Many anhydrides are obtained by heating the corresponding acids:—

$$\underset{\text{Lactic acid.}}{(C_3H_4O)''(HO)_2} - OH_2 = \underset{\text{Lactic anhydride (lactide).}}{(C_3H_4O)''O}$$

$$\underset{\text{Phthalic acid.}}{(C_8H_4O_2)''(HO)_2} - OH_2 = \underset{\text{Phthalic anhydride.}}{(C_8H_4O_2)''O}.$$

Anhydrides when acted on by water yield the corresponding acids:—

$$(C_2H_3O)_2O + OH_2 = 2(C_2H_3O)HO$$

$$\underset{\text{Aceto-butyric anhydride.}}{C_2H_3O.O.C_4H_7O} + OH_2 = \underset{\text{Acetic acid.}}{(C_2H_3O)HO} + \underset{\text{Butyric acid.}}{(C_4H_7O)HO}.$$

Compound anhydrides when distilled are resolved into two simple anhydrides—

$$\underset{\text{Aceto-benzoic anhydride.}}{2C_2H_3O.O.C_7H_5O} = \underset{\text{Acetic anhydride.}}{(C_2H_3O)_2O} + \underset{\text{Benzoic anhydride.}}{(C_7H_5O)_2O}.$$

Acetic anhydride is an oily liquid, boiling at 137°, and having a pungent odor. By the action of P_2S_5 it yields *thiacetic anhydride*, $(C_2H_3O)_2S$, and by BaO_2 *acetic peroxide*, $(C_2H_3O)_2O_2$. It combines directly with aldehydes.

X. Acid Halides.

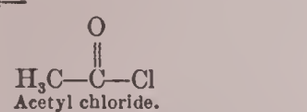
These may be regarded as the haloid ethers of acid radicles. They can be prepared by the action of haloid phosphorus compounds on the acids containing the corresponding radicles—

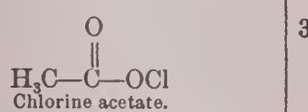
$$\underset{\text{Acetic acid.}}{3(C_2H_3O)HO} + PCl_3 = \underset{\text{Acetyl chloride.}}{3C_2H_3O.Cl} + PH_3O_3$$

$$\underset{\text{Succinic acid.}}{(C_4H_4O_2)''(HO)_2} + 2PCl_5 = \underset{\text{Succinyl chloride.}}{(C_4H_4O_2)''Cl_2} + 2POCl_3 + 2HCl$$

A similar reaction can be effected with the haloid substitution compounds of the acids. Thus, $C_2H_2ClO.Cl$, $C_2HCl_2O.Cl$, and $C_2Cl_3O.Cl$ (mono-, di-, and tri-chloracetyl chlorides), can be obtained by the action of PCl_5 on mono-, di-, and tri-chloracetic acids.

The compounds of this family must be distinguished from the haloid salts of the acids which contain the halogen atom in the place of the carboxyl hydrogen; for instance—


Acetyl chloride.


Chlorine acetate.

The latter compound is a yellow liquid produced by the action of acetic anhydride upon hypochlorous anhydride: $(C_2H_3O)_2O + Cl_2O = 2C_2H_3O.OCl$. It is very unstable, being decomposed by heat, Br, I, and most metals. The corresponding iodine compound produced by the action of iodine on the chlorine acetate is interesting as showing the triad nature of the iodine atom—$[(C_2H_3O)O]_3I'''$.

The acid halides are as a rule colorless liquids more or less oily, and possessing characteristic odors. They are decomposed by water:—

$$\underset{\text{Acetyl chloride.}}{C_2H_3O.Cl} + OH_2 = \underset{\text{Acetic acid.}}{(C_2H_3O)HO} + HCl$$

$$\underset{\text{Benzoyl chloride.}}{C_7H_5O.Cl} + OH_2 = \underset{\text{Benzoic acid.}}{(C_7H_5O)HO} + HCl.$$

In some cases the whole of the halogen is not removed by the action of cold water:—

$$\underset{\text{Lactyl dichloride.}}{(C_3H_4O)''Cl_2} + OH_2 = \underset{\text{Chloropropionic acid.}}{(C_3H_4ClO)HO} + HCl.$$

Acetyl chloride, when made to act upon potassium hydrosulphide, forms *thiacetic acid*:—

$$C_2H_3O.Cl + KHS = (C_2H_3O)HS + KCl.$$

When it is mixed with acetic acid, and acted on by sodium amalgam, the corresponding alcohol is produced:—

$$\underset{\text{Acetic acid.}}{3CH_3.CO_2H} + \underset{\text{Acetyl chloride.}}{(CH_3.CO)Cl} + 2Na_2 = \underset{\text{Sodium acetate.}}{3CH_3.CO_2Na} + \underset{\text{Ethyl alcohol.}}{CH_3.CH_2(HO)} + NaCl.$$

Some acid halides can be synthesized from hydrocarbons by the action of carbonyl dichloride (phosgene gas)—

$$\underset{\text{Ethene.}}{C_2H_4} + COCl_2 = \underset{\text{Paralactyl chloride.}}{(C_3H_4O)''Cl_2}$$

$$\underset{\text{Benzene.}}{C_6H_6} + COCl_2 = \underset{\text{Benzoyl chloride.}}{C_7H_5O.Cl} + HCl.$$

XI. Ethereal Salts.

These compounds are derived from acids by the substitution of hydrocarbon radicles for hydrogen, but it is only the hydrogen entering into the composition of hydroxyl that can be thus replaced. Thus, the number of ethereal salts that any acid can form depends upon the number of times it contains HO; in other words, an *n*-hydric acid can form *n* ethereal salts. It has been previously mentioned that the basicity of an organic acid depends upon the number of times it contains COOH, hence it follows that monohydric acids must be monobasic, but *n*-hydric acids may be 1, 2, 3,.....*n*-basic. For example, tartaric acid is tetrahydric, but as only two of its hydrogen atoms are replaceable by metals it is dibasic, and consequently contains 2(COOH). But this acid being tetrahydric contains 4(HO), and has thus four hydrogen atoms replaceable by radicles, giving rise to four ethereal salts:—

Metallic salts: $C_2H_2(HO)_2\begin{Bmatrix}COOM'\\COOM'\end{Bmatrix}$ Normal salt. $C_2H_2(HO)_2\begin{Bmatrix}COOH\\COOM'\end{Bmatrix}$ Acid salt.

Ethereal salts: $C_2H_2\begin{Bmatrix}R'O.COOR'\\R'O.COOR'\end{Bmatrix}$ $C_2H_2\begin{Bmatrix}HO.COOR\\R'O.COOR'\end{Bmatrix}$

$C_2H_2\begin{Bmatrix}HO.COOR'\\HO.COOR'\end{Bmatrix}$ $C_2H_2\begin{Bmatrix}HO.COOH\\HO.COOR'\end{Bmatrix}$

Ethereal salts are normal or acid according as the carboxyl (basic) hydrogen is entirely or partially replaced by radicles.

Every acid, inorganic and organic, can give rise to the formation of ethereal salts, these being in many cases produced by the direct action of the acid on the alcohol containing the necessary radicle:—

$$\underset{\text{Nitric acid.}}{NO_2HO} + \underset{\text{Amyl alcohol.}}{C_5H_{11}.HO} = \underset{\text{Amyl nitrate.}}{NO_2(OC_5H_{11})} + OH_2$$

$$\underset{\text{Phosphoric acid.}}{PO(HO)_3} + \underset{\text{Ethyl alcohol.}}{C_2H_5.HO} = \underset{\text{Mono-ethyl phosphate.}}{PO\begin{Bmatrix}(HO)_2\\(C_2H_5O)\end{Bmatrix}} + OH_2$$

$$\underset{\text{Acetic acid.}}{CH_3.COOH} + \underset{\text{Ethyl alcohol.}}{C_2H_5.HO} = \underset{\text{Ethyl acetate.}}{CH_3.CO(OC_2H_5)} + OH_2$$

$$\underset{\text{Acetic acid.}}{3CH_3.COOH} + \underset{\text{Propenyl alcohol (glycerin).}}{C_3H_5'''(HO)_3} = \underset{\text{Propenyl triacetate (triacetin).}}{C_3H_5'''(O.COCH_3)_3} + 3OH_2$$

Other methods of preparing ethereal salts are exemplified by the following reactions:—

$$\underset{\text{Amyl hydrogen sulphate.}}{C_5H_{11}.HSO_4} + \underset{\text{Potassium acetate.}}{CH_3.COOK} = \underset{\text{Amyl acetate.}}{CH_3.CO(OC_5H_{11})} + KHSO_4.$$

$$\underset{\text{Succinyl chloride.}}{C_2H_4\begin{Bmatrix}COCl\\COCl\end{Bmatrix}} + \underset{\text{Ethyl alcohol.}}{2C_2H_5.HO} = \underset{\text{Ethyl succinate.}}{C_2H_4\begin{Bmatrix}CO(OC_2H_5)\\CO(OC_2H_5)\end{Bmatrix}} + 2HCl.$$

[In practice this reaction is effected by passing HCl gas into a mixture of the acid and alcohol.]

$$\underset{\text{Triargentic phosphate.}}{PO(AgO)_3} + \underset{\text{Ethyl iodide.}}{3C_2H_5I} = \underset{\text{Triethyl phosphate.}}{PO(OC_2H_5)_3} + 3AgI$$

$$\underset{\text{Potassium ethyl sulphate.}}{C_2H_5.K.SO_4} + \underset{\text{Potassium methyl carbonate.}}{CH_3.K.CO_3} = \underset{\text{Methyl ethyl carbonate.}}{C_2H_5.CH_3.CO_3} + K_2SO_4$$

$$\underset{\text{Ethyl alcohol.}}{3C_2H_5.HO} + \underset{\text{Boric anhydride.}}{B_2O_3} = \underset{\text{Triethyl borate.}}{B(OC_2H_5)_3} + \underset{\text{Boric acid.}}{B(HO)_3}$$

$$\underset{\text{Ethyl alcohol.}}{4C_2H_5.HO} + \underset{\text{Silicon tetrachloride.}}{SiCl_4} = \underset{\text{Tetrethyl silicate.}}{Si(OC_2H_5)_4} + 4HCl$$

Most ethereal salts are decomposed on heating with water into an acid and an alcohol. The same reaction is more speedily induced by caustic alkalies:—

$$\underset{\text{Ethyl acetate.}}{CH_3.CO(OC_2H_5)} + KHO = \underset{\text{Potassium acetate.}}{CH_3.COOK} + \underset{\text{Ethyl alcohol.}}{C_2H_5.HO}.$$

The ethereal salts of nitrous acid are metameric with nitro-derivatives of hydrocarbons: thus—

$$\underset{\text{Nitroethane}}{H_5C_2.NO_2} \quad \text{is metameric with} \quad \underset{\text{Ethyl nitrite.}}{H_5C_2.O(NO)}.$$

Ethyl nitrite is produced by the action of ethyl sulphuric acid on potassium nitrite. Nitroethane is formed when ethyl iodide acts on silver nitrite. By the action of nascent hydrogen the difference in constitution between these two compounds is well brought out:—

$$\underset{\text{Ethyl nitrite.}}{C_2H_5.O(NO)} + 3H_2 = \underset{\text{Alcohol.}}{C_2H_5(OH)} + \underset{\text{Ammonia.}}{NH_3} + OH_2$$

$$\underset{\text{Nitroethane.}}{C_2H_5.NO_2} + 3H_2 = \underset{\substack{\text{Amidoethane}\\\text{(Ethylamine).}}}{C_2H_5.NH_2} + 2OH_2.$$

Many ethereal salts exist ready formed in various animal and vegetable substances. Thus, oil of wintergreen (*Gaultheria procumbens*) contains methyl salicylate, $C_6H_4(HO).CO(OCH_3)$. The ethereal salts of glycerin (*glycerides*) have received special names:—

Oleins.

$C_3H_5(HO)_2(C_{18}H_{33}O_2)$, Monolein.
$C_3H_5(HO)(C_{18}H_{33}O_2)_2$, Diolein.
$C_3H_5(C_{18}H_{33}O_2)_3$, Triolein.
(Triolein exists in animal fats and olive oil.)

Palmitins.

$C_3H_5(HO)_2(C_{16}H_{31}O_2)$, Monopalmitin.
$C_3H_5(HO)(C_{16}H_{31}O_2)_2$, Dipalmitin.
$C_3H_5(C_{16}H_{31}O_2)_3$, Tripalmitin.
(Tripalmitin exists in palm oil and other fats.)

Stearins.

$C_3H_5(HO)_2(C_{18}H_{35}O_2)$, Monostearin.
$C_3H_5(HO)(C_{18}H_{35}O_2)_2$, Distearin
$C_3H_5(C_{18}H_{35}O_2)_3$, Tristearin.
(Stearins occur in suet, tallow and other fats.)

Glucosides are compounds existing in vegetables which by the action of reagents or natural ferments are resolved into glucose and some other compound. Thus *amygdalin*, a crystalline substance from bitter almonds, &c., when decomposed by the action of *synaptase* or *emulsin*, a ferment existing in the plant, is converted into glucose, benzoic aldehyde, and hydrocyanic acid: $C_{20}H_{27}NO_{11} + 2OH_2 = C_7H_6O + HCN + 2C_6H_{12}O_6$. Among the more important glucosides are:—

Gallotannic acid ($C_{27}H_{22}O_{17}$), from oak-galls, sumach, &c.
Salicin ($C_{13}H_{18}O_7$), from bark and leaves of poplar and willow.
Æsculin ($C_{21}H_{24}O_{13}$), from bark of horse-chestnut, &c.
Glycyrrhizin ($C_{24}H_{36}O_9$), from liquorice root.
Quercitrin ($C_{33}H_{30}O_{17}$), from bark of quercitron (*Quercus infectoria*).
Phlorizin ($C_{21}H_{24}O_{10}.2OH_2$), from root bark of apple, pear, plum, and cherry.

Many of the vegetable coloring matters employed in dyeing are glucosides. Thus *indican*, from woad (*Isatis tinctoria*), is a colorless substance decomposed by acids into indigo-blue and a glucose-like body (indiglucin):—

$$\underset{\text{Indican.}}{2C_{26}H_{31}NO_{17}} + 4OH_2 = \underset{\text{Indigo blue.}}{C_{16}H_{10}N_2O_2} + \underset{\text{Indiglucin.}}{6C_6H_{10}O_6}.$$

The most valuable tinctorial constituent of madder-root (*Rubia tinctoria*) is *alizarin* ($C_{14}H_8O_4$), which exists in the root as a glucoside (*rubianic acid*) ($C_{26}H_{28}O_{14}$). When heated with zinc dust alizarin yields *anthracene* ($C_{14}H_{10}$), and conversely, anthracene can be converted into alizarin by first oxidizing it to *anthraquinone* ($C_{14}H_8O_2''$), then by treatment with Br or H_2SO_4, transforming the quinone into dibromanthraquinone or anthraquinone-disulphonic acid, and finally fusing either of these products with caustic alkalies: $C_{14}H_6Br_2O_2'' + 2KHO = C_{14}H_8O_4 + 2KBr$. Large quantities of artificial alizarin are thus manufactured.

Vanillin ($C_8H_8O_3$), the odorous principle of vanilla, has also been obtained artificially from *coniferin* ($C_{16}H_{22}O_8$), a glucoside obtained from the cambium of Coniferous trees. This glucoside when heated with water and emulsin is resolved into glucose and a crystalline substance ($C_{10}H_{12}O_3$) which on oxidation is converted into vanillin.

By the action of sodium on ethyl acetate there is produced among other compounds the sodium salt of an acid, $C_6H_{10}O_3$, which is of extreme interest on account of its enabling the ascent of the series of ketones and fatty acids to be effected. Thus:—

Ascent of Ketones
$$\begin{cases} C_6H_9NaO_3 + C_nH_{2n+1}I = C_6H_9(C_nH_{2n+1})O_3^1 + NaI \\ C_6H_9(C_nH_{2n+1})O_3 + 2KHO = CH_3.COCH_2(C_nH_{2n+1}) + \\ \qquad C_2H_5.HO + K_2CO_3. \end{cases}$$

The ascent of the fatty acids is more simply explained by considering the first products of the action of Na on ethyl acetate to result from the replacement of the methyl hydrogen by Na. Thus:

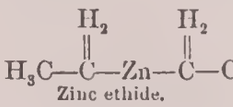
$$\underset{\substack{\text{Ethyl}\\\text{monosodacetate.}}}{\begin{cases} CH_2Na \\ CO(OC_2H_5) \end{cases}} + C_nH_{2n+1}I = \underset{\text{New ethereal salt.}}{\begin{cases} CH_2(C_nH_{2n+1}) \\ CO(OC_2H_5) \end{cases}} + NaI$$

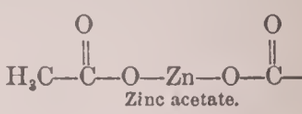
$$\underset{\substack{\text{Ethyl}\\\text{disodacetate.}}}{\begin{cases} CHNa_2 \\ CO(OC_2H_5) \end{cases}} + 2C_nH_{2n+1}I = \underset{\text{New ethereal salt.}}{\begin{cases} CH(C_nH_{2n+1})_2 \\ CO(OC_2H_5) \end{cases}} + 2NaI$$

The liberation of the acid from the ethereal salt is effected by the action of KHO, as previously explained.

XII.—Organo-metallic Bodies.

The constitution of these compounds has been already considered (p. 480); they have to be distinguished from organic compounds containing metals, such as metallic salts of organic acids. In organo-metallic bodies the metal is directly combined with the hydrocarbon radicle, while in organic compounds containing metals the metallic atom is connected with the radicle through the medium of some other element:—


Zinc ethide.


Zinc acetate.

Organo-zinc compounds are prepared by the action of zinc upon the iodides of C_nH_{2n+1} radicles:—

$$2Zn + 2C_nH_{2n+1}I = Zn(C_nH_{2n+1})_2 + ZnI_2.$$

The operation is most rapidly conducted by digesting the iodide with zinc foil coated with copper by previous immersion in a weak solution of cupric sulphate (Gladstone and Tribe). *Zinc ethide*, the first of these compounds obtained by Frankland, is a limpid, mobile liquid boiling at 118° C., and spontaneously inflammable.

Organo-compounds of *tin*, *lead*, *mercury*, *bismuth*, *arsenic*, and *antimony* have been prepared by the action of the iodides and bromides of the corresponding radicles on the potassium or sodium alloys of the metals:—

$$\underset{\text{Sodium amalgam.}}{HgNa_2} + \underset{\text{Ethyl iodide.}}{2C_2H_5I} = \underset{\text{Mercuric ethide.}}{Hg(C_2H_5)_2} + 2NaI$$

$$\underset{\text{Sodium amalgam.}}{HgNa_2} + \underset{\text{Phenyl bromide.}}{2C_6H_5Br} = \underset{\text{Mercuric phenide.}}{Hg(C_6H_5)_2} + 2NaBr.$$

Many organo-metallic bodies are derived from others by simple replacement or by double decomposition:—

$$\underset{\text{Stannic chloride.}}{SnCl_4} + \underset{\text{Zinc ethide.}}{2Zn(C_2H_5)_2} = \underset{\text{Stannic ethide.}}{Sn(C_2H_5)_4} + 2ZnCl_2$$

$$\underset{\text{Mercuric ethide.}}{3Hg(C_2H_5)_2} + \underset{\text{Aluminic ethide.}}{Al_2} = Al_2(C_2H_5)_6 + 3Hg$$

$$\underset{\text{Zinc ethide.}}{3Zn(C_2H_5)_2} + Na_2 = \underset{\text{Sodic zinc ethide.}}{2[Na(C_2H_5), Zn(C_2H_5)_2]} + Zn.$$

In the case of organo-compounds of monad metals prepared by the direct action of the metal on some other body, as in the last reaction, the original compound occurs inseparably in the resulting compound.

The following is a list of the organo-metallic bodies:—

Potassic zinc methide.....$K(CH_3), Zn(CH_3)_2$
Potassic zinc ethide.....$K(C_2H_5), Zn(C_2H_5)_2$
Sodic zinc ethide.....$Na(C_2H_5), Zn(C_2H_5)_2$
Lithic zinc ethide.....$Li(C_2H_5), Zn(C_2H_5)_2$
Lithic mercuric ethide.....$Li(C_2H_5), Hg(C_2H_5)_2$
Magnesium ethide.....$Mg(C_2H_5)_2$
Zinc methide.....$Zn(CH_3)_2$
Zinc ethide.....$Zn(C_2H_5)_2$
Zinc propide.....$Zn(C_3H_7)_2$
Zinc amylide.....$Zn(C_5H_{11})_2$
Aluminium methide.....$Al_2(CH_3)_6$
Aluminium ethide.....$Al_2(C_2H_5)_6$
Aluminium propide.....$Al_2(C_3H_7)_6$
Glucinum propide.....$G(C_3H_7)_2$
Mercuric methide.....$Hg(CH_3)_2$

[1] By the action of nascent hydrogen these compounds are converted into ethereal salts of secondary olefine acids of the lactic series (p. 494).

Mercuric ethide.....$Hg(C_2H_5)_2$
Mercuric propide.....$Hg(C_3H_7)_2$
Mercuric amylide.....$Hg(C_5H_{11})_2$
Mercuric phenide.....$Hg(C_6H_5)_2$
Mercuric tolylide.....$Hg(C_7H_7)_2$
Mercuric naphthide.....$Hg(C_{10}H_7)_2$
Stannous ethide.....$Sn_2(C_2H_5)_2$
Distannic hexethide.....$Sn_2(C_2H_5)_6$
Stannic methide.....$Sn(CH_3)_4$
Stannic ethide.....$Sn(C_2H_5)_4$
Stannic diethodimethide.....$Sn(C_2H_5)_2(CH_3)_2$
Stannic phenyltrietuide.....$Sn(C_6H_5)(CH_3)_3$
Stannic iodotripropide.....$Sn(C_3H_7)_3I$
Plumbic ethide.....$Pb(C_2H_5)_4$

Not many isomerides of the above compounds have as yet been obtained; *zinc pseudopropide* and *mercuric benzylide* (isomeric with the tolylide) are known.

The extreme readiness with which the organo-metallic bodies exchange their hydrocarbon radicles for more negative elements or radicles obviously renders them of particular value in organic synthesis.

The following are further important reactions:—

1. Synthesis of fatty acids by the direct absorption of CO_2 by organo-sodium compounds:—

$$CO_2 + Na(C_nH_{2n+1}) = \begin{cases} C_nH_{2n+1} \\ COONa \end{cases}.$$

2. Displacement of halogens, oxygen, (HO), (OC_nH_{2n+1}), &c., by C_nH_{2n+1} radicles (see the preparation of $Sn(C_2H_5)_4$ from $SnCl_4$ given above):—

$$\begin{cases} CO(OC_2H_5) \\ CO(OC_2H_5) \end{cases} + Zn\begin{cases} C_2H_5 \\ C_2H_5 \end{cases} + 2OH_2 = \begin{cases} C(C_2H_5)_2.OH \\ CO(OC_2H_5) \end{cases} +$$

Ethyl oxalate. Zinc ethide. Ethyl diethoxalate.

$$Zn\begin{cases} OH \\ OH \end{cases} + C_2H_5.HO.$$

Zinc hydroxide. Alcohol.

Also, formation of paraffins by action of water on organo-zinc bodies:—

$$Zn(C_nH_{2n+1})_2 + 2OH_2 = Zn(HO)_2 + 2C_nH_{2n+2}.$$

Componnds intermediate between organo-metallic bodies and haloid salts of the metals have been obtained, *e.g.*—

$Hg(CH_3)I$ (Mercuric methiodide.), $Sn(CH_3)_2I_2$ (Stannic dimetho-diiodide.), $Sn_2(C_2H_5)_4I_2$ (Distannic tetretho-diiodide.),

$Sn(C_6H_5)(C_2H_5)Cl_2$. (Stannic etho-phenyl-dichloride.)

The action of slow oxidation upon the compounds of this family is shown in the following examples:—

$$Zn(C_2H_5)_2 + O = Zn(C_2H_5)(OC_2H_5)$$

Zinc ethide. Zinc etho-ethylate.

$$Zn(C_2H_5)_2 + O_2 = Zn(OC_2H_5)_2.$$

Zinc ethide. Zinc ethylate.

Organo-boron compounds containing boron directly combined with hydrocarbon radicles have been obtained by the aid of zinc methide and ethide:—

$$2B(OC_2H_5)_3 + 3Zn(CH_3)_2 = 2B(CH_3)_3 + 3Zn(OC_2H_5)_2.$$

Triethyl borate. Zinc methide. Boric methide. Zinc ethylate.

Boric ethide has been prepared by an analogous reaction. Boric methide is a gas, and boric ethide a limpid liquid; both are spontaneously inflammable, burning in air with a green-tinted flame. They combine with ammonia forming compounds of the formula NH_3, BR'_3.

Organo-silicon compounds are bodies in which carbon is replaced partially or entirely by silicon. Many of these are formed by means of zinc methide and its homologues:—

$$SiCl_4 + 2Zn(C_2H_5)_2 = Si(C_2H_5)_4 + 2ZnCl_2.$$

Silicic chloride. Zinc ethide. Silicic ethide.

A large number of these compounds are now known. Their analogy to the carbon compounds will be seen from the following examples:—

$Si(CH_3)_4$ Silicic methide.	$C(CH_3)_4$ Tetramethyl-methane.	$SiHCl_3$ Silicon chloroform.	$CHCl_3$. Chloroform.
$H.SiO(OH)$ Silicoformic acid.	$CH_3.SiO(OH)$ Siliconacetic acid.	$C_2H_5.SiO(OH)$ Siliconpropionic acid.	
$H.CO(OH)$ Formic acid.	$CH_3.CO(OH)$ Acetic acid.	$C_2H_5.CO(OH)$. Propionic acid.	

XIII. Amines.

It has been previously stated that amines are derivatives of ammonia or its hydrate and haloid salts (p. 480), hydrogen being partially or entirely replaced by hydrocarbon radicles. Amines built on the type of NH_3 may arise from the replacement of hydrogen in NH_3, N_2H_6, or N_3H_9, thus forming *monamines*, *diamines*, or *triamines*:—

$N\begin{cases} H \\ H \\ H \end{cases}$ Ammonia (1 molecule). $N\begin{cases} R' \\ H \\ H \end{cases}$ Monamine. $N_2\begin{cases} H_2 \\ H_2 \\ H_2 \end{cases}$ Ammonia (2 molecules). $N_2\begin{cases} R'' \\ H_2 \\ H_2 \end{cases}$ Diamine.

Similarly triamines are formed by replacement of H_3 by R'''.

Each of these groups of amines is further divisible into *primary*, *secondary*, and *tertiary*, according as one-third, two-thirds, or all the hydrogen of ammonia is replaced by hydrocarbon radicles. For example:—

$N\begin{cases} R' \\ H \\ H \end{cases}$ Primary monamine. $N\begin{cases} R' \\ R' \\ H \end{cases}$ Secondary monamine. $N\begin{cases} R' \\ R' \\ R' \end{cases}$ Tertiary monamine.

$N_2\begin{cases} R'' \\ H_2 \\ H_2 \end{cases}$ Primary diamine. $N_2\begin{cases} R'' \\ R'_2 \\ H_2 \end{cases}$ $N_2\begin{cases} R'' \\ R'' \\ H_2 \end{cases}$ Secondary diamines. $N_2\begin{cases} R'' \\ R'' \\ R'_2 \end{cases}$ $N_2\begin{cases} R'' \\ R'' \\ R'' \end{cases}$ Tertiary diamines.

$N_3\begin{cases} R''' \\ H_3 \\ H_3 \end{cases}$ Primary triamines. $N_3\begin{cases} R''' \\ R_3' \\ H_3 \end{cases}$ $N_3\begin{cases} R''' \\ R''' \\ H_3 \end{cases}$ Secondary triamines.

$N_3\begin{cases} R''' \\ R_3' \\ R_3' \end{cases}$ $N_3\begin{cases} R''' \\ R''' \\ R_3' \end{cases}$ $N_3\begin{cases} R''' \\ R''' \\ R''' \end{cases}$ Tertiary triamines.

Monamines containing C_nH_{2n+1} *radicles.*—The following are known:—

Primary.	*Secondary.*
Methylamine.....$N(CH_3)H_2$	Dimethylamine$N(CH_3)_2H$
Ethylamine.....$N(C_2H_5)H_2$	Methyl-ethyl-amine. ....$N(CH_3)(C_2H_5)H$
Propylamine.....$N(C_3H_7)H_2$	
Butylamine.....$N(C_4H_9)H_2$	
Amylamine.....$N(C_5H_{11})H_2$	Diethylamine...$N(C_2H_5)_2H$
Hexylamine.....$N(C_6H_{13})H_2$	Dipropylamine$N(C_3H_7)_2H$
Heptylamine.....$N(C_7H_{15})H_2$	Dibutylamine...$N(C_4H_9)_2H$
Octylamine.....$N(C_8H_{17})H_2$	Ethyl-amyl-amine. $N(C_2H_5)(C_5H_{11})H$
Nonylamine.....$N(C_9H_{19})H_2$	
	Diamylamine...$N(C_5H_{11})_2H$

Tertiary.

Trimethylamine.....$N(CH_3)_3$
Triethylamine.....$N(C_2H_5)_3$
Tripropylamine.....$N(C_3H_7)_3$
Tributylamine.....$N(C_4H_9)_3$
Triamylamine.....$N(C_5H_{11})_3$

These amines are produced by the following methods:—

1. By heating the haloid compounds of C_nH_{2n+1} radicles with a solution of ammonia in alcohol:—

$$C_nH_{2n+1}I + NH_3 = N(C_nH_{2n+1})H_3I.$$

Iodide of radicle. R'-yl-ammonium iodide.

The resulting compound is formed on the type of the salts of ammonia, and like these bodies is decomposed by fixed alkalies:—

$$N(C_nH_{2n+1})H_3I + KHO = N(C_nH_{2n+1})H_2 + OH_2 + KI.$$

R'-yl-ammonium iodide. Amine.

At the same time, according to the proportion of the reagents, the temperature, &c., in the first reaction, more or less of the secondary and tertiary monamines are produced:—

$$2C_nH_{2n+1}I + 2NH_3 = N(C_nH_{2n+1})_2H_2I + NH_4I.$$

Secondary monamine hydriodide.

$$3C_nH_{2n+1}I + 3NH_3 = N(C_nH_{2n+1})_3HI + 2NH_4I.$$

Tertiary monamine hydriodide.

Amines containing different radicles are obtained thus:—

$$\underset{\text{Ethylamine.}}{N(C_2H_5)H_2} + \underset{\text{Methyl iodide.}}{CH_3I} = \underset{\text{Methyl-ethylammonium iodide.}}{N(CH_3)(C_2H_5)H_2I}.$$

The secondary and tertiary amines are in all these cases liberated by the action of KHO.

2. Cyanic and cyanuric acids (p. 480) form two classes of ethereal salts analogous to the cyanides and isocyanides (p. 481); thus—

$$\underset{\text{Cyanate.}}{N\equiv C-OR'} \qquad \underset{\text{Isocyanate.}}{O=C=N-R'}$$

Isocyanates are prepared by distilling ethereo-potassium salts of H_2SO_4 containing the necessary radicles with potassium cyanate: $R'KSO_4 + CO''.NK = CO''.NR' + K_2SO_4$. Isoeyanurates are obtained by a similar reaction, substituting potassium cyanurate for cyanate.

Both these classes of ethercal salts furnish primary amines on distillation with caustic alkali:—

$$CO.NR' + 2KHO = NR'H_2 + K_2CO_3.$$

3. Nitro-substitution derivatives of the paraffins are reduced by nascent hydrogen, ammonium sulphide, &c., with the formation of amines (see reduction of nitroethane to ethylamine, p. 497).

With the exception of the methylamines (which are gaseous), the amines of the present class are limpid liquids, having powerful ammoniacal odors and highly basic properties, restoring the color of red litmus, and uniting with acids to form salts analogous to those of ammonium:—

$$\underset{\text{Methylamine.}}{N(CH_3)H_2} + HCl = \underset{\text{Methylammonium chloride.}}{N(CH_3)H_3Cl}.$$

$$\underset{\text{Triethylamine.}}{N(C_2H_5)_3} + HI = \underset{\text{Triethylammonium iodide.}}{N(C_2H_5)_3HI}.$$

Like ammonium salts, these amines form yellow crystalline double salts when their hydrochlorides are mixed with a solution of platinic chloride. The general formula of these salts (A representing amine) is $2AHCl, PtCl_4$. Tertiary amines unite directly with iodides of C_nH_{2n+1} radicles, forming compounds of the type of haloid ammonium salts:—

$$\underset{\text{Triethylamine.}}{N(C_2H_5)_3} + \underset{\text{Ethyl iodide.}}{C_2H_5I} = \underset{\text{Tetrethylammonium iodide.}}{N(C_2H_5)_4I}$$

These compounds do not again furnish the tertiary amine on treatment with KHO, but on heating with Ag_2O and water bodies such as *tetrethylammonium hydroxide*, $N(C_2H_5)_4HO$, are produced. These bodies are highly caustic bases analogous to ammonium hydroxide, but more like the fixed alkalies in their general behavior.

The amines of the present group are susceptible of metamerism and isomerism. For example:—

$$\text{Metameric...}\ \underset{\text{Propylamine.}}{N(C_3H_7)H_2},\ \underset{\text{Methyl-ethylamine.}}{N(CH_3)(C_2H_5)H},\ \underset{\text{Trimethylamine.}}{N(CH_3)_3}.$$

$$\text{Isomeric...}\ \underset{\text{Propylamine.}}{N(C_3H_7)H_2},\qquad \underset{\text{Pseudopropylamine.}}{N[CH(CH_3)_2]H_2}.$$

By the action of nitrous acid primary amines are converted into nitrites, which are decomposed on heating, with the formation of the corresponding alcohol:—

$$N(C_nH_{2n+1})H_2.HNO_2 = C_nH_{2n+1}.HO + OH_2 + N_2.$$

The alcohols produced by this reaction are isomeric and not identical with those of the radicle from which the amine is derived in cases where such isomerism is possible.

The action of nascent hydrogen on the nitriles gives rise to the formation of amines:—

$$C_nH_{2n+1}.CN + 2H_2 = N(CH_2C_nH_{2n+1})H_2.$$

The nitriles can be obtained from the alcohols by combining the latter with sulphuric acid, converting the sulpho-acid thus produced into a potassium salt, and distilling this with potassium cyanide (p. 482). By combining all these reactions the homologous series of alcohols can be ascended. To give an illustration:—*Methyl alcohol* is combined with sulphuric acid, and the resulting sulpho-acid converted into potassium methylsulphate. This latter salt is mixed with potassium cyanide and submitted to dry distillation, when mythl cyanide (acetonitrile) is produced; this when acted on by nascent hydrogen is converted into ethylamine, which by the action of nitrous acid is transformed into *ethyl alcohol*. By a similar series of reactions *ethyl alcohol* can be converted into propylamine, which by the action of HNO_2 is converted into *pseudopropyl alcohol*.

Isocyanides or Carbamines.—These compounds, metameric with the cyanides of hydrocarbon radicles (p. 481), may be regarded as formed on the type of ammonium salts; thus (X′ representing the acid radicle)—

$$\underset{\text{Ammonium salts.}}{N^vH_4X'} \qquad \underset{\text{Carbamine.}}{N^vC^{iv}R'}$$

Most of the reactions made use of in preparing the cyanides give rise to the simultaneous formation of isocyanides (see p. 481); the latter bodies are in excess when the iodides of the radicles are made to act upon silver cyanide. Isocyanides are also obtained by heating primary amines with chloroform and caustic potash:—

$$NR'H_2 + CHCl_3 + 3KHO = N\left\{\begin{matrix} R' \\ C^{iv} \end{matrix}\right. + 3KCl + 3OH_2.$$

This reaction affords a ready means of distinguishing primary amines, as the isocyanides are at once detected, even in the smallest traces, by their powerful and nauseous odors. The carbamines reduce many metallic oxides (such as HgO, Ag_2O, &c.) with the formation of cyanates of the contained hydrocarbon radicles. They possess properties decidedly more basic than their metamerides, combining energetically with acids to form salts. When heated in sealed tubes the isocyanides are partially transformed into the corresponding nitriles.

Monamincs containing C_nH_{2n-1} *radicles* are represented by *allylamine*, $N(C_3H_5)H_2$.

Monamines containing C_nH_{2n-7} *radicles.*—These bases belong to two isomeric series corresponding to the alcohols of the benzyl series and to the phenols. This relationship is exemplified by the following formulæ:—

$$\underset{\text{Toluidine.}}{C_6H_4(NH_2).CH_3} \quad \text{isomeric with} \quad \underset{\text{Benzylamine.}}{C_6H_5.CH_2(NH_2)}$$

$$\underset{\text{Xylidine.}}{C_6H_3(NH_2).(CH_3)_2} \quad \text{isomeric with} \quad \underset{\text{Xylylamine.}}{C_6H_4.CH_3.CH_2(NH_2)}$$

The following are the more important amines of the present group:—

Primary.

Phenylamine (aniline)	$C_6H_5(NH_2)$
Benzylamine	$C_7H_7(NH_2)$
Xylylamine	$C_8H_9(NH_2)$
Cymylamine	$C_{10}H_{13}(NH_2)$
Toluidine	$C_6H_4(NH_2).CH_3$
Xylidine	$C_6H_3(NH_2).(CH_3)_2$
Cumidine	$C_6H_2(NH_2).(CH_3)_3$
Cymidine	$C_6H(NH_2).(CH_3)_4$

Secondary.

Dibenzylamine	$(C_7H_7)_2(NH)$
Dixylylamine	$(C_8H_9)_2(NH)$
Dicymylamine	$(C_{10}H_{13})_2(NH)$
Diphenylamine	$(C_6H_5)_2(NH)$
Ethyl-phenylamine	$(C_6H_5)(C_2H_5)(NH)$
Methyl-phenylamine	$(C_6H_5)(CH_3)(NH)$

Tertiary.

Tribenzylamine	$(C_7H_7)_3N$
Trixylylamine	$(C_8H_9)_3N$
Tricymylamine	$(C_{10}H_{13})_3N$
Triphenylamine	$(C_6H_5)_3N$
Dimethyl-phenylamine	$(C_6H_5)(CH_3)_2N$
Dimethyltoluidine	$(C_6H_4.CH_3)(CH_3)_2N$
Dimethylxylidine	$[C_6H_3(CH_3)_2](CH_3)_2N$
Dimethylcumidine	$[C_6H_2(CH_3)_3](CH_3)_2N$
Dimethylcymidine	$[C_6H(CH_3)_4](CH_3)_2N$

The amines of the benzyl series are obtained by the action of the chlorides of the corresponding radicles on ammonia. Toluidine and its homologues are prepared by reducing the nitro-derivatives of the corresponding hydrocarbons by means of acetic acid and iron (ferrous acetate), ammonium sulphide, &c.:—

$$\underset{\text{Nitrobenzene.}}{C_6H_5(NO_2)} + 3SH_2 = \underset{\text{Amidobenzene (aniline).}}{C_6H_5(NH_2)} + 2OH_2 + 3S.$$

These latter amines, which may be regarded as amidobenzene, in which 1, 2, 3, &c., H atoms are replaced by R′, R_2', R_3', &c., are susceptible of the isomeric modification dependent on the relative positions of the replaced H atoms. Thus we have—

$C_6(NH_2)(CH_3)HHHH$ (1 2 3 4 5 6) Orthotoluidine. $C_6(NH_2)H(CH_3)HHH$ (1 2 3 4 5 6) Metatoluidine.

$C_6(NH_2)HH(CH_3)HH$ (1 2 3 4 5 6) Paratoluidine.

All these amines are basic colorless liquids, more or less oily, and possessing highly characteristic odors. They combine with acids forming crystalline salts, which are decomposed by caustic alkalies with the liberation of the amine.

Phenylamine or *aniline*, the first member of the present series of primary amines, may be regarded as the first homologue of both the above isomeric series. It derives its name from the indigo-plant (*Indigofera Anil*), as it was first obtained by distilling indigo with caustic potash. Aniline is found in small quantities in coal-tar oils, but is manufactured on the large scale by reducing nitrobenzene with iron and acetic acid. Aniline is, when pure, a colorless, oily liquid, having a peculiar odor; it boils at 182° C., and solidifies at − 8° C. The replacement of the phenylic hydrogen by halogens gradually destroys the basic character of aniline. Thus, chloraniline, $C_6H_4Cl(NH_2)$, and dichloraniline, $C_6H_3Cl_2(NH_2)$, form crystalline salts with acids; but trichloraniline, $C_6H_2Cl_3(NH_2)$, possesses no basic properties. By the action of the iodides of C_nH_{2n+1} radicles upon aniline, the amido-hydrogen can be replaced by these radicles, giving rise to the formation of secondary and tertiary monamines containing different radicles, such, for example, as *ethyl-aniline*, $(C_6H_5)(C_2H_5)NH$, produced by the action of C_2H_5I upon aniline, and subsequent treatment with KHO; *ethyl-amyl-aniline*, $(C_6H_5)(C_2H_5)(C_5H_{11})N$, formed by the action of $C_5H_{11}I$ upon ethyl-aniline, &c. These tertiary amines combine directly with $C_nH_{2n+1}I$, producing stable iodides—

$$N(C_6H_5)(C_nH_{2n+1})(C_mH_{2m+1})(C_pH_{2p+1})I,$$

which are not decomposed by KHO, but by the action of Ag_2O and water are converted into alkaline hydroxides, analogous to NH_4HO. It will be seen that the iodides of C_nH_{2n+1} radicles can thus be employed to determine whether the amine is primary, secondary, or tertiary. When aniline hydrochloride and methyl alcohol are heated together in a sealed tube, the amido-hydrogen is partially or entirely replaced by methyl, giving rise to the formation of methyl and dimethyl-aniline hydrochlorides. When both atoms of amido-hydrogen have been thus replaced, if the heating is continued the phenylic hydrogen becomes replaced by methyl giving rise to dimethyl-toluidine and its homologues. This interesting intra-molecular substitution was discovered by Hofmann. The nature of the transformation will be seen from the following formulæ:—

$N(C_6H_5)(CH_3)(CH_3)$ Dimethylaniline. $N[C_6H_4(CH_3)](CH_3)(CH_3)$ Dimethyltoluidine.

$N[C_6H_3(CH_3)_2](CH_3)(CH_3)$. Dimethylxylidine.

(The last atom of phenylic hydrogen does not appear to be removed by this reaction.)

Nitrous acid acts upon aniline in a manner similar to its action upon the C_nH_{2n+1} primary monamines, converting it into the corresponding alcohol (phenol):—

$$C_6H_5(NH_2) + HNO_2 = C_6H_5(HO) + OH_2 + N_2.$$

If the aniline is diluted with alcohol, however, intermediate products are formed—

$$\underset{\text{Aniline.}}{2C_6H_5(NH_2)} + HNO_2 = \underset{\text{Azodiphenyldiamine.}}{C_{12}H_{11}N_3} + 2OH_2$$

$$\underset{\text{Azodiphenyldiamine.}}{C_{12}H_{11}N_3} + HNO_2 = \underset{\text{Diazo-diphenyldiamine.}}{C_{12}H_8N_4} + 2OH_2.$$

If salts of aniline are employed, salts of these azo-derivatives are produced.

Aniline combines with aldehydes with the elimination of water, producing *phenaldines*:—

$$2C_6H_5NH_2 + CH_3.COH - OH_2 = C_{14}H_{16}N_2.$$

Paraniline, a polymeride of aniline, having the composition $C_{12}H_{14}N_2$, is known.

Allied to the present group of amines is *naphthalidine*, $C_{10}H_7(NH_2)$, produced by the reduction of nitronaphthalene.

Natural Alkaloids.—These compounds are organic bases existing already formed in plants. With the exception of *piperidine* ($C_5H_{11}N$) and *conine*, which are secondary monamines, the alkaloids at present known are tertiary compounds. The following are some of the more important of this group of amines:—

From the bark of species of Cinchona.

Quinine	$C_{20}H_{24}N_2O_2$	Quinamine	$C_{20}H_{26}N_2O_2$
Cinchonine	$C_{20}H_{24}N_2O$	Paytine	$C_{21}H_{24}N_2O$

From Opium.

Morphine	$C_{17}H_{19}NO_3$	Pseudomorphine	$C_{17}H_{19}NO_4$
Codeine	$C_{18}H_{21}NO_3$	Codamine	$C_{20}H_{25}NO_4$
Narcotine	$C_{22}H_{23}NO_7$	Lanthopine	$C_{23}H_{25}NO_4$
Thebaine	$C_{19}H_{21}NO_3$	Laudanine	$C_{20}H_{25}NO_4$
Papaverine	$C_{20}H_{21}NO_4$	Meconidine	$C_{21}H_{23}NO_4$
Narceine	$C_{23}H_{29}NO_9$	Cryptopine	$C_{21}H_{23}NO_5$
Hydrocotarnine	$C_{12}H_{15}NO_3$	Protopine	$C_{20}H_{19}NO_5$

From various Plants.

Strychnine	$C_{21}H_{22}N_2O_2$	From Nux Vomica, St. Ignatius's bean, &c.
Brucine	$C_{23}H_{26}N_2O_4$	
Nicotine	$C_{10}H_{14}N_2$	From tobacco.
Conine	$C_8H_{15}N$	From hemlock.
Sparteine	$C_{10}H_{26}N_2$	From broom.
Atropine	$C_{17}H_{23}NO_3$	From nightshade.
Aconitine	$C_{30}H_{47}NO_7$	From monkshood.
Theobromine	$C_7H_8N_4O_2$	From cocoa seeds.
Caffeine and Theine	$C_8H_{10}N_4O_2$	From tea, coffee, *Ilex paraguensis*, &c.

The constitution of the radicles contained in these various bases has not hitherto been made clear. Among the cinchona alkaloids—of which the valuable medicine quinine is a member—some interesting cases of physical isomerism occur. Many bases have been obtained by the action of reagents on the opium alkaloids. A base isomeric with conine has been prepared artificially by heating normal butyl aldehyde with an alcoholic solution of ammonia so as to produce *dibutyraldine:* $2C_3H_7.COH + NH_3 - OH_2 = C_8H_{17}NO$, and then submitting this latter substance to dry distillation: $C_8H_{17}NO - OH_2 = C_8H_{15}N$.

Bases from various Sources.—The following are a few bases of animal origin:—

Creatine	$C_4H_9N_3O_2$	From juice of raw flesh.
Creatinine	$C_4H_7N_3O$	From creatine by the action of strong acids.
Guanine	$C_5H_5N_5O$	From guano and pancreatic juice of mammalia.
Xanthine	$C_5H_4N_4O_2$	From guanine and urinary calculi.
Sarcine	$C_5H_4N_4O$	From flesh of vertebrata.

Many bases have been obtained by the destructive distillation of organic matter containing nitrogen. These compounds are tertiary monamines:—

Chinoline	C_9H_7N	By distilling cinchona alkaloids with caustic potash.
Pyrrol	C_4H_5N	From coal-tar and animal oil.

Others are derived from oil produced by the destructive distillation of bones, &c., and coal-tar naphtha:—

Pyridine	C_5H_5N	Parvoline	$C_9H_{13}N$
Picoline	C_6H_7N	Coridine	$C_{10}H_{15}N$
Lutidine	C_7H_9N	Rubidine	$C_{11}H_{17}N$
Collidine	$C_8H_{11}N$	Viridine	$C_{12}H_{19}N$

Hydramides (p. 492), when boiled with potash solution, are converted into basic compounds. *Amarine*, $C_{21}H_{18}N_2$, is a substance formed in this manner from hydrobenzamide.

Diamines are formed by reactions analogous to those employed in the preparation of monamines:—

$$\underset{\text{R'' dibromide.}}{C_nH_{2n}Br_2} + 2NH_3 = \underset{\text{R''-diamine dihydrobromide.}}{N_2(C_nH_{2n})H_4.2HBr}$$

As in the preparation of monamines, secondary diamines are at the same time formed:—

$$\underset{\text{R'' dibromide.}}{2C_nH_{2n}Br_2} + 4NH_3 = \underset{\text{Di-R''-diamine dihydrobromide.}}{N_2(C_nH_{2n})_2H_2.2HBr} + 2NH_4Br.$$

The action of KHO upon the primary diamine dihydrobromide is different from its action upon the corresponding monamine compound, inasmuch as an oxide of the diamine is formed:—

$$\underset{\text{R''-diamine dihydrobromide.}}{N_2(C_nH_{2n})H_6Br_2} + 2KHO = \underset{\text{R''-diammonium oxide.}}{N_2(C_nH_{2n})H_6O} + 2KBr + OH_2$$

The diamines corresponding to benzene and its homologues are produced by the reduction of the dinitro-derivatives of the respective hydrocarbons—

$$\underset{\text{Dinitrobenzene.}}{C_6H_4(NO_2)_2} + 6H_2 = \underset{\text{Phenylene diamine.}}{C_6H_4(NH_2)_2} + 4OH_2.$$

Intermediate products are sometimes formed—

$$\underset{\text{Dinitrobenzene.}}{C_6H_4(NO_2)_2} + 3H_2 = \underset{\text{Nitraniline.}}{C_6H_4(NO_2)(NH_2)} + 2OH_2.$$

The diamines have not been investigated with the amount of detail that has been bestowed upon the monamines. By the action of the iodides of C_nH_{2n+1} radicles upon ethene and diethene diamines a large number of bases have been obtained, in which the ammonic hydrogen is more or less replaced by these radicles. Diamines form two classes of salts, monacid and diacid.

Triamines.—The following belong to this class:

Guanidine or carbotriamine.....N_3CH_5
Melaniline or carbodiphenyl-triamine.....$N_3C_{13}H_{13}$
Triphenyl-guanidine or carbotriphenyl-triamine....$N_3C_{17}H_{19}$

Aniline Colors.—A large number of the colors obtained from aniline are triamines, and may be conveniently referred to here. *Rosaniline* (magenta or fuchsine) is the base of a splendid red dye which serves as the starting point of numerous other colors. It is prepared by oxidizing a mixture of aniline and toluidine with arsenic acid:— $C_6H_7N + 2C_7H_9N - 3H_2 = C_{20}H_{19}N_3$ (Rosaniline). *Mauve* is a purple dye produced by the oxidation of aniline by means of sulphuric acid and potassium dichromate. The base of this color is *mauveine* ($C_{26}H_{24}N_4$), and it is interesting as being the first of the aniline dyes practically employed in the arts.

The numerous other dyes derived from benzene, phenol, and naphthalene cannot be discussed here.

It has been recently observed by Dr. Otto Witt that the peculiar properties of organic coloring substances are in most cases due to the combined presence of two groups or radicles attached to a carbon nucleus. The one which is the color-producing group is termed the *chromophore*, the other is a salt-forming group, *i.e.*, a group which confers upon a molecule either acidity or basicity. A substance containing a chromophore does not become a color until the salt-forming group is introduced into the molecule; such potential coloring matters are therefore termed *chromogens*. The chromophoric group exercises its influence more powerfully in the salts of coloring substances. The principal salt-forming groups combined with aromatic nuclei are HO and NH_2, so that most chromogens of this class give rise to two colors according as one or other of the foregoing radicles enters into their composition.

Phosphines, Arsines, Stibines, and Bismuthines.

These compounds are analogues of the amines, and contain the above elements in place of nitrogen. Some of the methods employed in their production are seen in the following reactions:—

$$\underset{\substack{\text{Phosphonium}\\\text{iodide.}}}{2PH_4I} + \underset{\substack{\text{Ethyl}\\\text{iodide.}}}{2C_2H_5I} + ZnO = \underset{\substack{\text{Ethyl-phosphonium}\\\text{iodide.}}}{2P(C_2H_5)H_3I} + OH_2 + ZnI_2$$

$$\underset{\text{Zinc ethide.}}{3Zn(C_2H_5)_2} + 2PCl_3 = \underset{\text{Triethyl phosphine.}}{2P(C_2H_5)_3} + 3ZnCl_2.$$

$$\underset{\substack{\text{Sodium}\\\text{arsenic alloy.}}}{AsNa_3} + \underset{\substack{\text{Ethyl}\\\text{iodide.}}}{3C_2H_5I} = \underset{\substack{\text{Triethyl}\\\text{arsine.}}}{As(C_2H_5)_3} + 3NaI.$$

The corresponding tertiary stibines and bismuthines are produced by a similar reaction.

The compounds of the present group are possessed of great affinity for oxygen, many of them taking fire spontaneously when exposed to the air. *Arsendimethyl* or *cacodyl*, $As_2(CH_3)_4$, is a spontaneously inflammable liquid, having a most repulsive odor, produced by the action of methyl iodide on sodium arsenic alloy, or by distilling a mixture of potassium acetate and arsenious anhydride. The analogy between these compounds and the amines is still further exemplified by the following reactions:—

$$\underset{\text{Triethyl phosphine.}}{P(C_2H_5)_3} + \underset{\text{Methyl iodide.}}{CH_3I} = \underset{\substack{\text{Methyl-triethyl phosphonium}\\\text{iodide.}}}{P(C_2H_5)_3(CH_3)I}$$

$$\underset{\substack{\text{Tetrethyl}\\\text{Stibonium iodide.}}}{2Sb(C_2H_5)_4I} + Ag_2O + OH_2 = \underset{\substack{\text{Tetrethyl stibonium}\\\text{hydroxide.}}}{2Sb(C_2H_5)_4HO} + 2AgI$$

$$\underset{\substack{\text{Triethyl phosphonium}\\\text{iodide.}}}{P(C_2H_5)_3HI} + KHO = \underset{\substack{\text{Triethyl}\\\text{phosphine.}}}{P(C_2H_5)_3} + KI + OH_2.$$

XIV. Amides.

The compounds of this class are most conveniently regarded as derived from acids by the substitution of NH_2 for the HO contained in the carboxyl group. It will be thus evident that monobasic acids can yield only one amide—a *monamide* of the form $R'CO(NH_2)$. Polybasic acids, on the other hand, can have their hydroxyl partially or entirely replaced by amidogen, thus yielding normal and acid amides. The latter are known as *amic acids*:—

From Dibasic Acids.

$$\underset{\substack{\text{Acid amide}\\\text{(Amic acid).}}}{R''\begin{cases}CO(NH_2)\\CO(HO)\end{cases}} \qquad \underset{\substack{\text{Normal amide}\\\text{(Diamide).}}}{R''\begin{cases}CO(NH_2)\\CO(NH_2)\end{cases}}$$

From Tribasic Acids.

$$\underbrace{R'''\begin{cases}CO(NH_2)\\CO(HO)\\CO(HO)\end{cases} \quad R'''\begin{cases}CO(NH_2)\\CO(NH_2)\\CO(HO)\end{cases}}_{\substack{\text{Acid amides}\\\text{(Amic acids).}}} \qquad \underset{\substack{\text{Normal amide}\\\text{(Triamide).}}}{R'''\begin{cases}CO(NH_2)\\CO(NH_2)\\CO(NH_2)\end{cases}}$$

Amides are primary, secondary, or tertiary, according as one-third, two-thirds, or all the hydrogen of the ammonia is replaced by acid radicles (see p. 498).

Amides are produced—(1.) By distilling the normal ammonium salts of the corresponding acids:—

$$\underset{\text{Ammonium acetate.}}{CH_3.CO(ONH_4)} - OH_2 = \underset{\text{Acetamide.}}{CH_3.CO(NH_2)}$$

$$\underset{\text{Ammonium succinate.}}{C_2H_4.[CO(ONH_4)]_2} - 2OH_2 = \underset{\text{Succinamide.}}{C_2H_4.[CO(NH_2)]_2};$$

(2.) Also by the action of ammonia on the acid halides:—

$$\underset{\text{Acetyl chloride.}}{CH_3.COCl} + 2NH_3 = \underset{\text{Acetamide.}}{CH_3.CO(NH_2)} + NH_4Cl.$$

By the further action of the acid halide upon the primary monamide secondary and tertiary monamides are produced:—

$$\underset{\text{Acetyl chloride.}}{CH_3.COCl} + \underset{\text{Acetamide.}}{CH_3.CO(NH_2)} = \underset{\text{Diacetamide.}}{(CH_3.CO)_2(NH)} + HCl$$

$$\underset{\text{Diacetamide.}}{(CH_3.CO)_2(NH)} + \underset{\text{Acetyl chloride.}}{CH_3.COCl} = \underset{\text{Triacetamide.}}{(CH_3.CO)_3N} + HCl.$$

Diacetamide is also formed by the action of dry HCl upon acetamide and triacetamide by heating acetonitrile (methyl cyanide) with acetic anhydride.

The formation of amides containing dyad radicles is exemplified by the equation—

$$\underset{\text{Succinyl chloride.}}{C_2H_4(COCl)_2} + 4NH_3 = \underset{\text{Succinamide.}}{C_2H_4.[CO(NH_2)]_2} + 2NH_4Cl.$$

(3.) Amides are formed by the action of ammonia on the ethereal salts of the corresponding acids:—

$$\underset{\text{Ethyl acetate.}}{CH_3.CO(OC_2H_5)} + NH_3 = \underset{\text{Acetamide.}}{CH_3.CO(NH_2)} + \underset{\text{Ethyl alcohol.}}{C_2H_5.HO}$$

$$\underset{\text{Ethyl oxalate.}}{\begin{cases}CO(OC_2H_5)\\CO(OC_2H_5)\end{cases}} + 2NH_3 = \underset{\text{Oxamide.}}{\begin{cases}CO(NH_2)\\CO(NH_2)\end{cases}} + \underset{\text{Ethyl alcohol.}}{2C_2H_5.HO}$$

$$\underset{\text{Ethyl citrate.}}{(C_3H_4)^{iv}(HO)\begin{cases}CO(OC_2H_5)\\CO(OC_2H_5)\\CO(OC_2H_5)\end{cases}} + 3NH_3$$

$$= \underset{\text{Citramide.}}{(C_3H_4)^{iv}(HO)\begin{cases}CO(NH_2)\\CO(NH_2)\\CO(NH_2)\end{cases}} + \underset{\text{Ethyl alcohol.}}{3C_2H_5.HO}.$$

All the known amides are white crystalline solids, many of them possessing both acid and basic properties. Boiled with acids or alkalies the primary amides regenerate their parent acids:—

$$\underset{\text{Acetamide.}}{CH_3.CO(NH_2)} + HCl + OH_2 = \underset{\text{Acetic acid.}}{CH_3.COOH} + NH_4Cl$$

$$\underset{\text{Acetamide.}}{CH_3.CO(NH_2)} + KHO = \underset{\text{Potassium acetate.}}{CH_3.COOK} + NH_3.$$

Distilled with P_2O_5 primary amides are converted into *nitriles*:—

$$\underset{\text{Acetamide.}}{CH_3.CO(NH_2)} - OH_2 = \underset{\text{Acetonitrile.}}{CH_3.CN}$$

$$\underset{\text{Benzamide.}}{C_6H_5.CO(NH_2)} - OH_2 = \underset{\text{Benzonitrile.}}{C_6H_5.CN}$$

$$\underset{\text{Oxamide.}}{C_2O_2(NH_2)_2} - 2OH_2 = \underset{\text{Cyanogen.}}{(CN)_2}.$$

Amic acids are intermediate between the amides and their parent acids, from which they are produced by submitting the acid ammonium salts to dry distillation:—

$$\begin{matrix}\{CO(ONH_4)\\\{COOH\end{matrix} - OH_2 = \begin{matrix}\{CO(NH_2)\\\{COOH\end{matrix}$$

Acid ammonium oxalate. Oxamic acid.

$$C_2H_4\begin{matrix}\{CO(ONH_4)\\\{COOH\end{matrix} - OH_2 = C_2H_4\begin{matrix}\{CO(NH_2)\\\{COOH\end{matrix}.$$

Acid ammonium succinate. Succinamic acid.

Diamides of dibasic acids must be distinguished from secondary monamides containing dyad acid radicles. The latter are termed *imides*. Thus,—

$$C_2H_4\begin{matrix}\{CO(ONH_4)\\\{COOH\end{matrix} - 2OH_2 = [C_2H_4(CO)_2]''(NH)''.$$

Acid ammonium succinate. Succinimide.

Ethereal salts of amic acids have been obtained by various methods. The following are a few examples:—

$$\begin{matrix}\{CO(NH_2)\\\{CO(OC_2H_5)\end{matrix} \quad CO''(NH_2)(OC_2H_5) \quad (C_2H_3)'''(HO)\begin{matrix}\{CO(NH_2)\\\{CO(OC_2H_5)\end{matrix}.$$

Ethyl oxamate. Ethyl carbamate. Ethyl malamate.

$$\begin{matrix}\{CO(NH.C_2H_5)\\\{COOH\end{matrix} \quad \begin{matrix}CO''[NH\\(C_6H_5)](HO)\end{matrix} \quad (C_2H_3)'''(OC_6H_5)\begin{matrix}\{CO(NH_2)\\\{CO(ONH_4)\end{matrix}.$$

Ethyloxamic acid. Phenylcarbamic acid. Ammonium phenylmalamate.

The salts formulated above, containing the radicle in the carboxyl group, are *neutral;* those in which the radicle replaces amido-hydrogen are *acid.* The ammonium salt of carbamic acid is formed by the direct action of carbon dioxide on ammonia: $CO_2+2NH_3=CO''(ONH_4)(NH_2)$. The neutral ethereal salts of carbamic acid are known as *urethanes.*

Alkalamides are compounds intermediate between amines and amides, that is, containing both positive and negative radicles. The following are examples:—

$$N\begin{matrix}\{C_2H_3O\\\{C_2H_5\\\{H\end{matrix} \quad N\begin{matrix}\{C_2H_3O\\\{C_2H_3O\\\{C_2H_5\end{matrix} \quad N\begin{matrix}\{C_7H_5O\\\{C_7H_5O\\\{C_6H_5\end{matrix} \quad N_2\begin{matrix}\{(C_2O_2)''\\\{(C_2H_5)_2\\\{H_2\end{matrix}.$$

Ethyl acetamide. Ethyl diacetamide. Phenyl dibenzamide. Diethyl oxamide.

It has been previously mentioned that cyanic acid forms two classes of the compounds analogous to the nitriles and carbamines. Sulphocyanic acid forms two analogous series. The ethereal salts of the iso-series derived from these acids can be formulated as alkalimides:—

$$N\begin{matrix}\{CO''\\\{H\end{matrix} \quad N\begin{matrix}\{CO''\\\{CH_3\end{matrix} \quad N\begin{matrix}\{CS''\\\{C_2H_5\end{matrix} \quad N\begin{matrix}\{CS''\\\{C_6H_5\end{matrix}.$$

Cyanic acid, or carbimide. | Methyl isocyanate, or methylcarbimide. | Ethyl isosulphocyanate, or ethyl sulphocarbimide. | Phenyl isosulphocyanate, or phenyl sulphocarbimide.

Allyl isosulphocyanate, $N(CS)''(C_3H_5)$, is interesting as being obtained from oil of mustard.

Carbamide and Urea, $CO(NH_2)_2$.—These compounds are the neutral amides of carbonic acid. Urea is the chief solid constituent of human urine, and is interesting as being the first organic compound synthesized (Wöhler, 1828). It was first produced artificially by heating a solution of ammonium cyanate: $CNO(NH_4) = CO(NH_2)_2$.

Urea may also be obtained by the action of ammonia on carbon oxydichloride: $COCl_2 + 4NH_3 = CO(NH_2)_2 + 2NH_4Cl$; by the action of ammonia on ethyl carbonate: $CO(OC_2H_5)_2 + 2NH_3 = CO(NH_2)_2 + 2C_2H_5.HO$; and by the action of heat on ammonium carbamate and carbonate: $2CO(NH_2)(ONH_4) = CO(NH_2)_2 + (NH_4)_2CO_3$, and $(NH_4)_2CO_3 - 2OH_2 = CO(NH_2)_2$.

Urea crystallizes in long white 4-sided prisms, very soluble in water and alcohol. It combines with acids, forming compounds like $CO(NH_2)_2.HCl$, $CO(NH_2)_2.HNO_3$, and with metallic oxides, forming such compounds as $CO(NH_2)_2.2HgO$. Heated with water to a very high temperature, it decomposes into carbon dioxide and ammonia: $CO(NH_2)_2 + OH_2 = CO_2 + 2NH_3$; by the action of nitrous acid it is decomposed into carbon dioxide, nitrogen, and water: $CO(NH_2)_2 + N_2O_3 = CO_2 + 2OH_2 + 2N_2$. Urea is also decomposed by chlorine with the formation of cyanuric acid, &c.: $6CO(NH_2)_2 + 3Cl_2 = 2H_3C_3N_3O_3 + 4NH_4Cl + N_2 + 2HCl$.

Urea combines with aldehydes, with the elimination of water, giving rise to a series of compounds termed *ureides.* By the action of heat on ammonium sulphocyanate, *sulphourea*, $CS(NH_2)_2$, is obtained.

Compound ureas are derived from urea by the replacement of amido hydrogen by hydrocarbon radicles. Some of the methods employed in their production are shown by the following equations:—

$$HCNO + N(C_2H_5)H_2 = CO\begin{matrix}\{NH(C_2H_5)\\\{NH_2\end{matrix}$$

Cyanic acid. Ethylamine. Ethyl-urea.

$$HCNO + N(C_2H_5)_2H = CO\begin{matrix}\{N(C_2H_5)_2\\\{NH_2\end{matrix}$$

Cyanic acid. Diethylamine. Diethyl-urea.

$$2N(C_6H_5)H_2 + CS_2 = CS\begin{matrix}\{N(C_6H_5)_2\\\{NH_2\end{matrix} + SH_2.$$

Aniline. Carbon disulphide. Diphenyl sulpho-urea.

Uric Acid ($C_5N_4H_4O_3$) is contained in human urine, serpents' excrement, guano, &c. It is a dibasic acid yielding a large number of derivatives by oxidation, &c. It has never been obtained artificially.

Unclassified Organic Compounds.

These are substances of which the formulæ have not yet been satisfactorily determined, owing to their complexity of composition and to the difficulty of obtaining them in a state of purity. The names and sources of some of these compounds are given below.

Mucilage, abundant in linseed, mallow root, &c.; allied to starch and gum; soluble in cold water.

Gum-tragacanth, a kind of mucilage, insoluble in water, but becoming soft and gelatinous.

Pectin ($C_{32}H_{48}O_{32}$?), a transparent jelly contained in most ripe fruits; soluble in water, precipitated by alcohol. It is probably allied to the carbohydrates (p. 490).

Resins, allied to the terpenes. Common resin (*colophony*), from pine, contains two acids, *abietic acid* ($C_{44}H_{64}O_5$) and *pinic acid* ($C_{20}H_{30}O_2$), the former crystalline, the latter amorphous. Other well-known resins are *lac, mastic, copal, sandarac, dragon's blood*, &c. *Amber* is probably a fossil resin.

Caoutchouc (*India-rubber*) and *gutta-percha* are the hardened juices of species of *Ficus, Euphorbia, Isonandra*, &c. These substances appear to consist of a mixture of terpenes (p. 485).

Balsams are natural mixtures of resins with volatile oils.

Bitumens result from the decay of vegetable matter out of contact with the air. *Pit-coal, lignite*, and *jet* are allied to bitumen. *Petroleum* and *rock-oil* have been referred to as paraffins (p. 482).

The remaining compounds we have to notice are of animal origin.

Albuminoid Substances or *Proteids.*—These substances contain carbon, hydrogen, nitrogen, oxygen, and small quantities of sulphur (0·8 to 1·6 per cent.). *Serum* of blood is an albuminous substance, soluble in water, precipitated by alcohol, and coagulated by heating. *Egg-albumen* is the chief constituent of white of egg; it differs from blood serum in being precipitated by ether. *Globulin* is present in blood serum, connective tissue, &c.; it is insoluble in water, soluble in dilute acids and alkalies. *Myosin*, allied to globulin, exists in muscular tissue, and *vitellin* in yolk of egg. *Casein* is an alkaline albuminate which occurs in milk, coagulable by certain animal membranes (such as rennet or stomach of calf), with the formation of cheese. *Fibrin* is the proteid which causes the clotting of blood; it is an elastic substance of filamentous structure, insoluble in water at ordinary temperatures. *Peptones* result from the action of gastric juice upon albuminous substances; they are soluble in water, and are not coagulated by boiling.

Hæmoglobin (which, with the other substances to be mentioned, is allied to the proteids) is the chief constituent of the red corpuscles of the blood of vertebrate animals; it can be obtained in the crystalline form from the blood of certain animals, and contains, in addition to the usual elements composing proteids, about 0·4 per cent. of iron. *Hæmatin* results from the decomposition of hæmoglobin.

Pepsine is the albuminous constituent of gastric juice, which converts proteids into peptones.

Mucin (*Mucus*) is the secretion from the salivary glands, and from all mucous membranes of the animal body

Gelatin and *Chondrin.*—The first of these substances is

produced by the action of boiling water on membranous tissue, skin, tendons, and bones. Isinglass is nearly pure gelatin from the swim-bladder of the sturgeon and other fishes. Common size and glue are examples of impure gelatin. Gelatin is soluble in water and precipitated by alcohol; the aqueous solution is completely precipitated by tannic acid (p. 495), this last reaction being the basis of the process of tanning. When hides are steeped in an infusion of oak-bark or of other substances yielding tannic acid, the gelatine of the hide by the action of the tannin is converted into leather. *Chondrin* is a gelatinous substance, obtained from the cartilage of the joints and ribs, which differs in some respects from gelatin.

Keratin is a name given to several substances left after the complete exhaustion of horn, nails, feathers, hair, etc., by various solvents.

Protagon is a phosphoretted fatty substance, forming the chief constituent of nerve tissue. Boiled with baryta water, it decomposes into stearic acid, glycerin, phosphoric acid, and other substances, among which is included trimethyl-oxethyl-ammonium hydrate, or *neurine*, $N(CH_3)_3(C_2H_4.HO)HO$. (R. ME.)

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CHEMNITZ, a town of the kingdom of Saxony, in the circle of Zwickau, 50 miles W.S.W. of Dresden by rail, in a beautiful plain at the foot of the Erzgebirge, watered by the River Chemnitz, an affluent of the Mulde. It is the first manufacturing town in the country, and in population ranks next to Dresden and Leipsic. Though in general well built and possessing a large number of handsome edifices, it has comparatively few of special interest; among the most important are St. James's church, the ancient town-house, the post-office, the theatre, the new realschule, and the exchange. It contains a Roman Catholic and five Protestant churches, and has three civic schools, a gymnasium, a royal industrial school, of great repute throughout Saxony, a school of practical designing, and an extensive Sunday school under the direction of the workmen's union. It is the seat of several large administrative offices, and a chamber of commerce and industry; and among its societies are two scholastic associations, a merchants' union, a scientific association, and an architectural and artistic society. The cotton goods, and especially the stockings, for which it is mainly celebrated, rival those of England in quality and cheapness; and it is also famous for the manufacture of spinning-machinery. There are nineteen distinct establishments for the weaving of woollen and half-

woollen cloth; and 3400 hand-looms are engaged in the same trade. The stocking weaving is prosecuted by sixty-three firms, partly in regular factories and partly by the domestic system. The dye-works number thirty-three, the print-works eight, the bleach-works six, and the chemical works six. There are about eighty establishments for engineering operations, one of which, founded about 1844 by Richard Hartmann, employs 4000 workmen, and manufactures steam-engines of all descriptions, mining and boring apparatus, boilers, and a great variety of implements. The export trade is, of course, very extensive; and in 1871 the value of the goods despatched to America alone amounted to $4,500,000. There is abundant railway communication in all directions. The population in 1849 was 30,753; in 1864, 54,875; and in 1871, 70,380. In the last of these years it was found that, with the exception of about 1800 Roman Catholics, 380 German Catholics, 48 Jews, and a few dissenters, the people were all Protestants.

Chemnitz was originally a settlement of the Sorbian Wends, which received its first Christian Church from Otto I. in 938. In the 12th century it obtained municipal rights from Lothaire II., and from the 13th to the 17th century it ranked as an imperial city. From its very commencement its prosperity was due mainly to its manufacturing industry, the nucleus of which seems to have been the linen-weaving of the Wends. To this were added extensive bleaching and woollen cloth establishments, which raised the town to great importance in the 15th century. In 1539 the Reformation was introduced, and 1546 saw the dissolution of the great Benedictine monastery which had been founded in 1125 by Lothaire at Schloss Chemnitz, about 2 miles north of the city. In the Thirty Years' War the city was plundered by both Swedes and Imperialists, and its trade was almost completely ruined. By the close of the century, however, it began to recover, chiefly through the introduction of cotton-weaving, which as early as 1739 employed 2000 looms. In 1775 the English quilt manufacture was commenced, and in 1799 the Arkwright system of cotton-weaving. After the peace of Paris there was another period of decay; but a revival set in about 1834 when Saxony joined the customs union. The cotton manufacture suffered considerably during the American Civil War, but by no means so severely as in the English towns.

CHEMNITZ, Martin (1522–1586), probably the ablest Lutheran theologian of the period immediately succeeding that of Luther himself, was born at Treuenbritzen in the mark of Brandenburg, on the 9th November, 1522. His father, though of noble rank, was in somewhat straitened circumstances, and Martin's education was frequently interrupted owing to pecuniary difficulties. In his fourteenth year he was sent to school at Wittenberg, where he had frequent opportunities of hearing Luther preach. He studied at the universities of Magdeburg (1539–42), Frankfort-on-the-Oder (1543), and Wittenberg (1545), devoting himself specially at the last of these, under the advice of Melanchthon, to mathematics and astrology. In 1547 he removed to Königsberg, where he was appointed in the following year rector of the cathedral school, and two years later (1550) librarian to Duke Albert of Prussia, whose patronage he had gained through his acquaintance with astrology. It was during his residence in Königsberg that Chemnitz first turned his attention seriously to theology, and that he first had an opportunity, in the celebrated controversy with Osiander on the doctrine of justification by faith, of displaying the polemical ability in which he was scarcely surpassed by the greatest of the Reformers. Osiander, who assailed the forensic and objective element in the Lutheran doctrine, was favored by Duke Albert, and, as the controversy increased in intensity, Chemnitz judged it expedient to resign his post of librarian and leave Königsberg. In 1553 he returned to Wittenberg, and immediately commenced to deliver lectures at the university on the *Loci Communes* of Melanchthon. These formed the basis of his *Loci Theologici* (Frankfort, 1591), a work which furnishes one of the best existing expositions of the Lutheran theology, as formulated and modified by Melanchthon. His audience was from the first exceptionally large, and a career of great influence seemed open to him at the university, when he was induced to make another change by accepting the office of pastor to the church in Brunswick, to which he removed in 1554. In this position he spent the remainder of his life, though he received numerous offers of important offices from various Protestant princes of Germany. He was unusually active in the duties of his charge, and he also took a leading part in the theological controversies of the time, always representing and defending strictly Lutheran views. In fact, it is in no small degree to his personal influence, exerted as it was at the critical period of its history, that the Lutheran Church owed the purity of its doctrine and the compactness of its organization. Against the Crypto-Calvinists he maintained the Lutheran doctrine of the Lord's Supper in a treatise *Repetitio sanæ doctrinæ de vera Præsentia Corporis et Sanguinis Domini in Cœna Sacra* (1560, translated into German, 1561). Against the Jesuits, on the other hand, he wrote some works of great power, which probably did a good deal to check the reaction from Lutheranism that seemed to be setting in. Chief of these were the *Theologiæ Jesuitarum præcipua Capita* (1562), a very incisive attack on the principles of the order, and his *Examen Concilii Tridentini*, in four parts, published at intervals (1565, 1566, 1572, and 1573). The latter is undoubtedly Chemnitz's greatest work. Roman Catholics themselves have not been slow to acknowledge its ability, and it may be questioned whether to this day anti-Tridentine literature can show anything more thorough or more acute. In conjunction with Mörlin, Chemnitz compiled the *Corpus Doctrinæ Prutenicum* (1567), a doctrinal work, which at once acquired great authority. Perhaps his chief service to the organization of the church was rendered when, in conjunction with Andreä and Selnecker, he induced the Lutherans of Saxony and Swabia to adopt the *Formula Concordiæ*, and so become one body. In the protracted negotiations which led to this result his learning and tact were of the greatest value.

Chemnitz resigned office owing to infirm health in 1584, and died at Brunswick on the 8th April, 1586. A very full account of his life by Schenkel is given in Herzog's *Real-Encyklopædie*.

CHÉNIER, André-Marie de (1762–1794), French poet, was born at Constantinople, where his father, Louis de Chénier, author of several works on Oriental history, was consul-general. Sent in infancy to France, he lived till his ninth year at Carcassonne, under the care of a paternal aunt; and in 1773, on his father's return, he was placed at the Parisian Collége de Navarre. At sixteen he was rhyming from Sappho and reading the Greek authors. At twenty (1782) he obtained a sub-lieutenancy in the regiment of Angoumois, then in garrison at Strasburg. He left Paris, and reported himself at headquarters. But military life had no charm for him, and neither the neighborhood of Brounck, whose *Analecta* was one of his favorite books, nor the classic tradition of the Alsatian capital, could bind him to his calling; in six months he threw up his commission and returned to Paris. There he studied hard, and wrote idylls (*Le Mendiant, L'Aveugle, Le Jeune Malade*); he sketched out plans of great poems; he sat and talked with Palissot, David, and Pindar-Lebrun. A serious illness was induced by excess of work; to complete his recovery he set out, in company with the brothers Trudaine, towards the end of 1784, for Switzerland, Italy, and the Archipelago. In 1786 he returned to Paris, plunged into study anew, and conceived the passion for Madame de Bonnenil which inspired so many of the perfect elegiacs afterwards to win regard and imitation from Hugo himself.

He was five and twenty, and at heart a Greek. The Idyllists and Anthologists were his masters. From their styles did he compound his own, and from them did he learn the exquisite purity of form, the admirable restraint, the chastened vigor of thought and diction that render him pre-eminent among modern poets. And with the *Élégies* and *Art d'Aimer*, which are the purely subjective fruit of this part of his life, he prepared the plans for other and greater structures. In *L'Invention*, a completed poem, he promulgated a noble theory of æsthetics; in the *Hermès*, an incomparable fragment, he made himself the Lucretius of his epoch; in *Suzanne*, which remains a mere *canevas*, he purposed to deal in the style of Milton with a biblical episode. A few only of his friends were admitted to his feast of poesy; and he continued for some time to work and wait. But his family were anxious that he should settle in life, and a secretaryship in the French Legation at London was offered him. It cost him much to accept it, as his fine idyll *La Liberté* remains to prove; but in the December of 1787 he left for England.

His residence beyond sea was unhappy enough. The

duties of his place occupied him scarcely at all; and among English poets he cared only for Milton, the purely intellectual quality of whose verse seems to have been peculiarly grateful to him. In 1790 he resigned his post, and returned to France. The Revolution was in full coil; and Chénier, who worshipped liberty and loathed anarchy, threw in his lot at once with the moderate party. Introduced into the brilliant "Societé de '89," he drew up for it a manifesto of principles (*Avis aux Français sur leurs Véritables Ennemis*), which, moderate in substance and aggressive in form, gained him the honors of a translation into Polish, together with a medal from King Stanislas, and brought down upon him, through the *Révolutions de France et de Brabant*, the wrath of Camille Desmoulins. In 1791 he addressed to David the painter his *Dithyrambe sur le Jeu de Paume*—one of the most Pindaric of modern odes; he was defeated in his candidature for a seat in the National Assembly; and in 1792 an invective against the Jacobins, published in the *Journal de Paris*, involved him in a quarrel with his brother, Joseph Chénier, whom he was afterwards to defend against the attacks of Burke. This dispute was followed by his Archilochian iambics, *Sur les Suisses Révoltés du Régiment de Châteauvieux*. The Tenth of August, in ruining the hopes of monarchy, ended his chances of political success, and he resolved to retire from the arena, and devote himself wholly to art. The trial of Louis XVI. brought him, however, once more to the front; he assisted in preparing the defence, the responsibility of which he offered to share with Malesherbes; and he drew up an appeal to the people which was rejected in favor of the letter afterwards printed in the *Moniteur*. He was broken in health and spirits; Paris was dangerous; he went to Rouen and Versailles. At the latter place he wrote the poems to "Fanny" and the *À Versailles*, so highly praised and subtly analyzed by Sainte-Beuve.

But he had never ceased to oppose and to stigmatize the action of the Jacobin section, and his mind was turned toward the inevitable end. It came at last. At Passy (6th January, 1794) his opposition to the arrest of a Madame de Pastoret, with whom he was staying, led to his own seizure and to his incarceration in the Saint-Lazare. A durance of some months ensued; he wrote for Mademoiselle de Coigny, duchess of Fleury, the beautiful elegy, *La Jeune Captive*, and for the Convention the furious iambics so often read and quoted. At the tribunal he appeared with forty-four others; thirty-eight were condemned to death. On the morrow (25th July, 1794) with Roucher the poet, Trenck, and the Counts de Montalembert and de Créqui, André Chénier was taken to death. As he descended the Conciergerie steps he said to Roucher, "*Je n'ai rien fait pour la posterité. Pourtant* (striking his forehead) *j'avais quelque chose là.*" According to Henri de Latouche, Roucher and Chénier, as the tumbrel rolled scaffoldwards, repeated to each other the first scene of the *Andromaque;* another account represents Roucher as noisily valiant, while Chénier was mute and thoughtful. Three days afterwards, in the same place, Robespierre and his fellows were executed, and the Terror was at an end.

The poems of André Chénier, with the exception of the *Dithyrambe* and the *Ode to Charlotte Corday*, both of which saw light during his life, remained unedited for five-and-twenty years. A selection from his manuscripts was published at last, with retouches, by Henri de Latouche, the novelist and journalist. The moment was opportune; young France was in revolt against the bastard classicism of the great century, and Chénier became a force in modern letters. Sainte-Beuve has compared his influence over the poets of the romantic movement of the second Renaissance —an influence that restrains and chastens—to that of Ingres over its painters. His greatest excellence now is one of form; and this is said entirely without prejudice as to his matter. His sympathy with Milton is a striking fact in his intellectual character, and one that will help not a little to a just appreciation of his poetical qualities. To the English reader, conscious and mindful of the rolling majesty of the Miltonic harmonies, the verse of Chénier, always vigorous and declamatory, often splendid and stately, sometimes passionate and lyrical, may seem ineffectual enough. To his countrymen it is otherwise: "*Une flûte de buis, un urchet d'or, une lyre d'ivoire,*" says Sainte-Beuve, "*le beau pur, en un mot, voilà André Chénier.*"

See Sainte-Beuve, *Critiques et Portraits*, tome ii.; *Tableau de la poésie française;* Becq de Fouquières, *Documents nouveaux sur André Chénier; Œuvres en prose d'André Chénier*, Paris, 1840. An edition of the poems in one volume forms part of the Bibliothèque Charpentier; a second, in three volumes, was published by Becq de Fouquières, 1862; a third, also in three volumes, is included in Lemerre's valuable series of reprints.

(W. E. H.)

CHÉNIER, Marie-Joseph de (1764–1811), poet and dramatist, was a younger brother of André Chénier, and, like him, was born at Constantinople, reared at Carcassonne, and educated at the Collége de Navarre. Entering the army at seventeen, he left it soon afterwards; and at twenty he produced *Azémire*, a tragedy, which had a languid sort of success. His next venture, *Charles IX.*, which commenced the renown of Talma, excited an extraordinary enthusiasm (1789), and still keeps the stage. In 1791 appeared *Henri VIII.* and *Calas*, with the performance of the first of which the Théâtre de la République was solemnly inaugurated; in 1792 he produced his *Caius Gracchus*, which was proscribed and burned at the instance of Albitte for an anti-anarchical hemistich (*Des lois et non du sang!*); and in 1793 his *Timoléon*, set in Méhul's music, was also proscribed. His brother's death on the scaffold is supposed to have diverted him from the theatre; and only once again, in 1804, with his unsuccessful *Cyrus*, did he attempt the scene. Long a prominent member of the Jacobins' Club, Joseph Chénier was one of the busiest of literary politicians, one of the most prolific of political poets. He was a member the Convention and of the Council of Five Hundred, over both of which he presided; he had a seat in the Tribunate; he belonged to the Committees of Public Instruction, of General Security, and of Public Safety. In 1801 he was one of the educational jury for the Seine; from 1803 to 1806 he was inspector-general of public instruction. In 1806 and 1807 he delivered a course of lectures at the Athénée on the language and literature of France from the earliest years; and in 1808, at the emperor's request, he prepared his *Tableau historique de l'état et du progrés de la littérature française*—a work, reprinted so late as 1862, in which he shows to great advantage, as a writer, as a critic, as a man. He died January 10, 1811. The list of his works is too long for quotation; a glance at them will indicate his industry and the suppleness and strength of his talent. He wrote hymns and national songs—among others, the famous *Chant du Départ;* odes—*Sur la Mort de Mirabeau, Sur l'Oligarchie de Robespierre*, &c.; tragedies, which never reached the stage—*Brutus et Cassius, Philippe Deux, Tibère;* translations from Sophocles and Lessing, from Gray and Horace, from Tacitus and Aristotle; with elegies, dithyrambics, and Ossianic rhapsodies. As a satirist he is said to possess great merit—see *La Calomnie* (1797) and the *Épître à Voltaire* (1806)—though he sins from an excess of severity, and is sometimes malignant and unjust.

See *Œuvres Complètes de Joseph Chénier*, 8 vols., Paris, 1823–1826; *Poésies*, Paris (Charpentier), 1844; *Chefs-d'œuvre des Auteurs Tragiques*, vol. ii.

CHEOPS, the name of an Egyptian king *Khufu*, called Cheops by Herodotus, Chembes by Diodorus, Souphis by Manetho, and Saophis by Eratosthenes. He was the second king of the fourth dynasty of Manetho, and the builder of the Great Pyramid at Gizeh, 120 stadia distant from Memphis and about 45 from the Nile. According to Diodorus, each side was 7 plethra long, and the height 6 plethra; or according to Herodotus, each side of the base was 8 plethra in extent, and the height the same. The former sides are supposed to have been each 764 feet long, their present dimensions being about 746 feet, while the actual present height is 450 feet, and the angle of the casing stones 51° 50′, according to the measurements of Perring. This wonder of the ancient world, the sepulchre of the monarch, was constructed at great expense and suffering, 100,000 men, changed every three months, being employed by forced labor ten years in constructing the causeway by which the blocks of stone were transported from the Tourah quarries, in the Arabian chain, to a quay on the banks of the Nile, where they were transported by boat from the other bank. Immense expense was entailed in the execution of this costly sepulchre, and according to a popular but improbable tradition, Cheops was compelled through want of money to sacrifice the honor of his daughter to complete the task. Other popular tales, according to the gloss or extract of Manetho, depicted him as impious towards the gods, closing the temples and stopping the wor

ship, but subsequently repenting, and writing a sacred book much esteemed by the Egyptians. His name was supposed to mean wealthy, or having much hair. The monumental information about Cheops does not confirm the Greek historians; on the contrary, it records the construction of temples in honor of the gods, the repair of the shrine and the gift of various figures of the temple of Isis and Athor close to his own pyramid, and his construction or repairs of the temple of the same goddess Athor, the Egyptian Venus, at Denderah or Tentyris. The sacred book may have been part of the Egyptian rituals, portions of which were attributed to the early kings of Egypt, and a medical papyrus records the discovery in his reign of a treatise on medicine in a temple of a goddess at the town of Debmut. Cheops carried on war at the Wady Magarah in the Peninsula of Sinai in Arabia, and a rock tablet represents him having conquered the hostile tribes in the presence of the god Thoth, who had revealed the mines of the locality. His oppression had so afflicted Egypt that the charges of impiety had attached to his name; but the tombs of his children reveal no change in the established religion, and his pyramid only differs from those of his predecessors and immediate successor by its rather larger size and greater beauty. His name Khufu, sometimes with the addition of that of the god Khnum as Khnum-Khufu, has been found on several monuments, and was found scrawled on the stones from the quarries of Tourah or the Mons Troicus employed in the so-called chambers of construction of the Great Pyramid. There is no known monument with the date of a regnal year of this monarch, so that it is uncertain if he reigned the sixty-three years attributed to him by Manetho, or the twenty-nine assigned by Eratosthenes. It is just possible, from fragment 30 of the Papyrus of Turin, that he may have lived ninety-five years and reigned the higher number, as generally recognized by Egyptologists. The date of Cheops according to Lepsius is 3090–3032 B. C., but great difference of opinion, amounting to nearly 2000 years, exists as to the time of Menes, from whom the lists separate him by the interval of 898 years. Priests of the Apis and Mnevis bulls are mentioned in the tombs of his period. (Herodotus, ii. 124; Diodorus, i. 64; De Rougé, *Recherches*, pp. 52, 54; Mariette, *Monuments de Boulaq*, pp. 207–209; Birch, in *Zeitschrift f. ägyptische Sprache*, 1871, pp. 61–64; Duemichen, *Bauurkunde*, pl. xvi., *a*, *b*; Lepsius, *Denkm.*, ii. 2.)

CHEPHREN, an Egyptian monarch, called in the hieroglyphs Khafra, by Herodotus Chephren, by Diodorus Cephren or Chabrias, by Manetho Souphis II., and by Eratosthenes Saophis II. He was, according to the legends, the son or brother of Cheops, and acted in the same tyrannical manner. Chephren built the second of the great pyramids at Gizeh close to the Sphinx and the Great Pyramid, and was said to be hated like his brother, his mummy not buried in the sepulchre but torn to pieces, and the sarcophagi emptied of their contents. The present length of the base of this pyramid is 690 feet 9 inches, and its perpendicular height 447 feet 6 inches, its angle 52° 20′, but it is not built with the same care. The wife of Chephren, named Merisankh, was priestess of the god Thoth, and Kheman, another prince of the family, priest of Thoth at Hermopolis. There is no reason for believing in the impiety of the monarch, or any oppression more than in the case of his predecessors and successor, all whose tombs were pyramids. Chephren also built the small temple behind the great Sphinx, but does not appear amongst the monarchs recorded at the Wady Magarah. The lists of Abydos interpose a king called Ra-tatef or Tatefra, between Cheops and Chephren, but his reign was probably short and insignificant, and he may have been the brother of Cheops. According to Herodotus, Chephren reigned 50, according to Manetho 66, and according to Eratosthenes 27 years, the longest time being probably correct. From fragment 30 of the hieratic canon of Turin it is probable that he lived 95 years, and his reign, according to Lepsius, was from 3032–2966 B.C. A splendid diorite statue of Chephren is in the museum of Boulaq, and others, broken and thrown long ago into the well of the temple near the Sphynx, supposed to have been destroyed by popular hatred with the remains of the tombs of his family in the Gizeh cemeteries, are the principal monuments of his reign. It is just possible a bull Apis was buried in his pyramid. (Herodotus, ii. 127, 128; Diodorus, ii. 64; Maspero, *Fragment d'un commentaire sur le second livre d'Herodote*, pp. 4–7; De Rougé, *Recherches*, pp. 52, 54, 62–64; Mariette, *Lettre à M. de Rougé*, p. 7; Lepsius, *Auswahl.*, taf. iii.)

CHEPSTOW, a market-town and river-port of England, in the county of Monmouth, on the Wye, 2 miles from its junction with the Severn, and 135 miles from London. It occupies the slope of a hill on the western bank of the river, and is environed by scenery of much beauty and grandeur. The town is generally well built, and the streets are broad and clean. The church, originally the conventual chapel of a Benedictine priory of Norman erection, was restored to its former dimensions by the rebuilding of the chancel and transepts in the beginning of the present century The western entrance and some other parts are richly decorated, and the interior contains many interesting monuments. The castle, founded in the 11th century by W. Fitz-Osborn, earl of Hereford, and almost wholly rebuilt in the 13th, is still a magnificent pile. It stands on the summit of a cliff which is washed by the Wye, and occupies about 3 acres of ground. The river is crossed by a fine iron bridge of five arches, erected in 1816, which has a total length of 532 feet and a span in the middle of 112 feet. There is free passage for large vessels as far as the bridge; but barges of from 18 to 30 tons can ascend as far as Hereford. From the narrowness and depth of the channel the tide rises suddenly, and to a great height, frequently above 50, and it is said even to 70 feet, forming a dangerous bore. There are no manufactures, but the trade is considerable. The exports are timber, bark, iron, coal, cider, and millstones. Population in 1851, 4295, and in 1871, 3347.

CHEQUE. "A check on a banker," says Mr. Justice Byles, "is in legal effect an inland bill of exchange drawn on a banker payable to bearer on demand. A check is consequently subject in general to the rules which regulate the rights and liabilities of parties to bills of exchange." Commercial usage has, however, imposed on cheques certain qualities which do not attach to other bills of exchange.

Before 1858 cheques were not subject to the stamp duties imposed on bills in general, if they complied with the following conditions, viz., to have been drawn on a banker, to have specified truly the place of drawing (which must have been within 75 miles from the banker's place of business), to have been payable to bearer on demand, not to have been post-dated, and not to have declared payment to be made in bills or notes. Severe penalties were imposed on persons making or receiving unstamped cheques not falling under this exemption. In 1858 a stamp duty of a penny was imposed on all cheques, and the restrictions as to place of drawing, post-dating, &c., abolished. Another restriction making cheques good for sums under twenty shillings is also abolished.

Although a drawer of a bill is not usually liable thereon until acceptance, a banker having effects belonging to his customer is bound to pay his customer's cheques within a reasonable time. There is what is called an implied contract that the banker should do so, and if it is broken the customer may recover damages. The rule as to presentment of bills within a reasonable time (*i.e.*, in general the day after issue) applies to cheques, but a drawer is not relieved by the holder's negligence in presenting unless he has been injured thereby, as for example by the failure of the banker in the interval. The habit of crossing cheques with the name of some banker is believed to have been originally intended as a direction to drawees to pay only to the bankers so named, but it was held at law that such crossing amounted only to a direction to pay to *some* banker. The words "and Co.," the name of the particular banker being left out, have the same effect. Payment of a crossed cheque otherwise than through a banker was at common law evidence of negligence on the part of the drawee, rendering him responsible to the drawer. The Act 19 and 20 Vict. c. 25 enacted that a cheque bearing across its face an addition of the name of any banker or of the words "and Company" should be payable only through some banker. Payment made otherwise than through a banker hitherto indirectly and practically invalid was thus made directly and as a matter of law invalid. In the construction of this statute it was held by the Court of Common Pleas, in the case of Simmons *v.* Taylor (27 *Law Journal*, 45), that the crossing was no part of the cheque and that its fraudulent obliteration was no forgery of the cheque, and that the payment, without negligence, of a cheque with the crossing so obliterated was good as against the drawer. This de-

cision led to the Act 21 and 22 Vict. c. 69, which made the crossing a part of the cheque and its fraudulent obliteration a felony. A holder may cross an uncrossed cheque, or prefix any banker's name to the words "and Co.," but if a particular banker is once named the cheque is henceforth payable through him alone. When a crossing has been obliterated a wrong payment of the cheque in consequence, if without fraud or negligence on the part of the banker, shall not be questioned. In a recent case (Smith *v.* Union Bank of London) the effect of these enactments was explained by the Court of Appeal in a manner which startled the commercial community. In that case the plaintiff had crossed a cheque received by him from a customer with the name of his own bankers. The check was stolen, and finally passed for full value to C, who paid it in to his bankers, and they in turn received payment of it from the defendants. The court held that the negotiability of the cheque was not affected by statute, that C had become the lawful holder, and that the plaintiff had no action against the defendants. The consequence of this decision was the Act 39 and 40 Vict. c. 81, which provided that when a cheque bears across its face an addition of the words "and Company," or any abbreviation thereof, between two parallel transverse lines, or of two parallel transverse lines simply, and either with or without the words "not negotiable," that addition shall be deemed a crossing, and the cheque shall be deemed to be crossed generally. When a cheque bears across its face an addition of the name of a banker, either with or without the words "not negotiable," that addition shall be deemed a crossing, and the cheque shall be deemed to be crossed specially, and to be crossed to that banker. When a cheque is uncrossed, the lawful holder may cross it generally or specially; when it is crossed generally, he may cross it specially, and whether crossed generally or specially he may add the words "not negotiable." When a cheque is crossed specially, the banker to whom it is specially crossed may again cross it specially to another banker as his agent for collection. If a cheque is crossed generally, the banker on whom it is drawn shall not pay it otherwise than to a banker; if crossed specially, not otherwise than to the banker specially named in the crossing or his agent for collection. When a cheque is crossed specially to more than one banker (except when crossed to an agent for collection) the banker on whom it is drawn shall refuse payment thereof. When a crossed cheque has been paid, either to the special banker in case of a special crossing, or to some banker in case of a general crossing, the banker and (if the cheque has come to the hands of the payee) the drawer shall be in the same position as if the cheque had been paid to and recovered by the true owner thereof. A banker paying crossed cheques otherwise than as authorized by this Act shall be liable to the true owner for any loss he may sustain. When a cheque is presented for payment which does not appear at the time to be crossed, or to have had a crossing which has been obliterated, or to have been altered otherwise than as authorized by the Act, a banker paying the same in good faith and without negligence shall not be liable by reason of the cheque having been crossed, obliterated, or altered, or by reason of payment having been made otherwise than to some banker, or to the banker named in the special crossing. If the crossed cheque bears the words "not negotiable," the person taking it takes and can give no better title to it than the person had from whom he took it.

A cheque is payment unless dishonored; but on the question whether a debt has been paid, it is not sufficient to produce a cheque drawn by the debtor in favor of the creditor, and paid by the banker, unless it can be shown to have passed through the creditor's hands. Where a check has been fraudulently altered, and a banker pays a larger sum than that originally written, he must bear the loss, and cannot charge his customer unless some act of his facilitated the forgery. Where a cheque was filled up in such a way as to make deception easy, the customer was held responsible for the loss.

A new description of draft on a banker is introduced by the Act 16 and 17 Vict. c. 59, § 19.

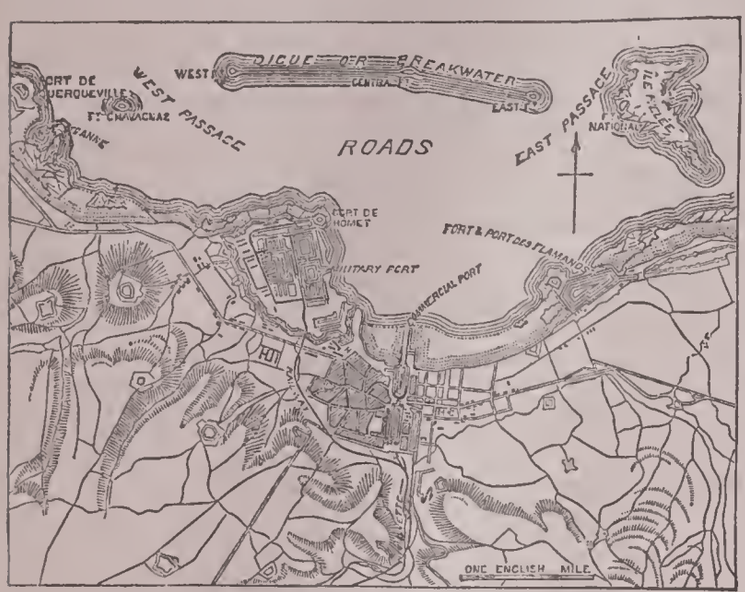
CHER, a central department of France, embracing the eastern part of the ancient province of Berry and part of Bourbonnais, bounded N. by the department of Loire, W. by Loir-et-Cher and Indre, S. by Allier and Creuse, and E. by Nièvre and Loire. It is situated between 46° 18′ and 47° 41′ N. lat. and between 1° 50′ and 3° 6′ E. long., and has an area of 2780 square miles. The surface of the department in general is extremely level, the only elevated districts being on the northern and north-western frontiers, which are skirted by a range of low hills. The principal rivers, besides the Cher and its tributaries, are the Grande Sauldre and Petite Sauldre on the N., but the Loire and Allier, though not falling within the department, drain the eastern districts, and are available for navigation. The Cher itself becomes navigable when it receives the Arnon and Yèvre, and the communications of the province are greatly facilitated by the Canal du Berry, which traverses it in all its length, the lateral canal of the Loire which stretches from Digoin to Briare, and the canal of the Sauldre. Except in the Sologne, a sandy and sterile tract in the north-west, the soil is generally fertile, but varies considerably in different localities. The most productive region is that on the east, which belongs to the valley of the Loire; the central districts are tolerably fertile but marshy, being often flooded by the Cher; while in the south and south-west there is a considerable extent of dry and fertile land. The department contains a comparatively large extent of pasturage, which has given rise to a considerable trade in horses, cattle, sheep, and wool for the northern markets. Among the agricultural productions hemp holds the first place; but wine, fruits, chestnuts, and truffles are also important articles of traffic. Mines of iron and coal are wrought; and marble, millstones, lithographic stones, manganese, gypsum, porcelain clay, and peat are procured in different parts. The smelting of iron-ore and the manufacture of steel and cutlery are carried on to a considerable extent. The other manufactures are of coarse cloth and canvas, cotton and woollen gauze, porcelain and toys. The department is divided into three arrondissements, cognominal with the chief towns of Bourges, Saint-Amand, and Sancerre, of which the first is the principal seat of administration. The total population in 1851 was 261,892, and in 1872, 335,392.

CHERASCO, a town of Italy, in the province of Cuneo and district of Mondovi, near the junction of the Stura and the Tanaro, 30 miles south-east of Turin, with which it is connected by railway. It is well built and is surrounded by walls. A canal from the Stura supplies it with water. The church of the Madonna del Popolo, which was completed in the 18th century, is worthy of notice; and there are two large triumphal arches and some fine mansions of the nobility. The principal manufacture is silk, and there is some trade in corn, wine, and truffles.

Cherasco (*Clerascum*, or *Cairascum*) is only two miles from the site of the old Roman town of *Pollentia*, where there are still remains of a theatre, an amphitheatre, a temple, and other buildings. In the Middle Ages it was one of the strongest fortresses of Northern Italy, and for a time it ranked as a free city. In 1631, it gave its name to a treaty between Spain, France, and Rome, in regard to the duchies of Montferrat and Mantua; and in 1633, to the peace between France and Savoy. In 1801, its fortifications were dismantled by the French. Pop. 8886.

CHERBOURG, a naval station, fortified town, and seaport of France, in the department of La Manche, on the northern shore of the peninsula of Cotentin, at the mouth of the small River Divette, in 49° 38′ N. lat., 1° 38′ W. long. It stands on a bay formed by Cape Levi on the E. and Cape La Hague on the W., and is distant 75 miles from the Isle of Wight, 41 miles W. by N. from St. Lo, and 212 in the same direction from Paris. The town in itself is small and unimportant. Its houses are built of stone and roofed with slate; but the streets are narrow, and the only public buildings of any interest are the tower (a remnant of the old fortifications), the church of La Trinité, in front of which is the colossal statue of Napoleon I. by Level; the Chapelle de Nôtre Dame du Vœu, formerly part of the abbey founded by the Empress Maude in the 12th century; the Hôtel de Ville, which contains the Henry Museum and the library; the bathing establishments, opened in 1827; and the theatre. The town is supplied with water from a reservoir completed in 1874 at Château d'Eau, about three-quarters of a mile distant, and capable of containing upwards of 500,000 gallons. Cherbourg derives its chief importance from its naval and commercial harbors, which are distant from each other about half a mile. The former is cut out of the rock, and is capable of accommodating fifty men-of-war of the largest size. The depth

of water at full tide is 50 feet, at low tide 25 feet. Connected with the harbor are the dry docks, the yards where the largest ships in the French navy are constructed, the magazines, the rope walks, and the various workshops requisite for a naval arsenal of the first class. The works are carefully guarded on every side by redoubts and fortifications, and are commanded by batteries on the surrounding hills so completely that the harbor of Cherbourg may be pronounced one of the strongest in the world. The commercial harbor at the mouth of the Divette communicates with the sea by a canal 650 feet in length and 54 in width. It consists of two parts, an outer harbor 262 yards long by 218 wide, and a basin 446 yards long and 138 wide, in which the depth of water is 19 feet at low tide, and will be increased by the dredging operations commenced in 1874. Outside these harbors is the triangular bay, which forms the roads of Cherbourg. This bay is admirably sheltered by the land on every side but the



Plan of Cherbourg (4·2 miles N. to S., 5·35 E. to W.).

north. To protect the shipping from the violence of the north winds the great *digue*, or break-water, has been constructed. This immense work is 2⅓ miles in length; its breadth at the base is 262 feet, and at the summit 101 feet. Its foundation was formed by massy wooden frames, which were sunk and filled with stones; and it is now protected from the waves by a parallel line of large blocks weighing each 44 tons. The industrial activity of Cherbourg is considerable, its principal products being cotton yarn, refined sugar, soda, leather, and chemicals. A lace factory gives employment to nearly 400 women. The chief articles of export are farm and dairy produce, more especially potatoes, butter, and pigs; and the imports consist mainly of coal, iron, timber, and cotton. The population in 1846 was 22,460; in 1872 it amounted to 34,785.

Cherbourg is supposed by some investigators to occupy the site of the Roman station of *Coriallum*, but nothing definite is known about its origin. The name was long regarded as a corruption of *Cæsaris Burgus*, or Cæsar's Borough, but there is at least as much probability that it is the same as the English Scarborough. The castle is mentioned in the 11th century, and the town certainly existed in the 10th. William the Conqueror supplied it with a hospital and a church; and Henry II. on several occasions chose it as his residence. In 1295, it was pillaged by an English fleet from Yarmouth; and in the 14th century it frequently suffered during the invasions of Normandy. Captured by the English in 1418 after a four months' siege, it was recovered by Charles VII. of France in 1450. An attempt was made under Louis XIV. to construct a military port; but the fortifications were dismantled in 1689, and further damage was inflicted by the English in 1758. Louis XVI. commenced the construction of the breakwater, and his plans were afterward carried out and extended by Napoleon I., who is said to have declared that he would renew at Cherbourg the wonders of Egypt, and raise his pyramid in the sea. It was left, however, to Louis Philippe, and particularly to Napoleon III., to complete his designs, and their successful realization was celebrated in 1858, in the presence of the queen of England, against whose dominions they had at one time been mainly directed. Between 1783 and the close of 1857, 66,862,000 francs had been expended on the works.

CHERIBON, or SHERIBON, a seaport town on the north coast of Java, capital of a residency of the same name, and the seat of a Dutch governor, is situated at the head of a wide bay 125 miles E.S.E. of Batavia, in 6° 48′ S. lat. and 108° 38′ E. long. It was formerly a place of importance, but it has never fully recovered from the effects of a disastrous plague which visited the place at the beginning of this century. The town and harbor are defended by a fort called the Beschermer or Protector, which also serves as a convict prison. A church, founded in 1842, is used in common by Protestants and Roman Catholics; the Mussulman population has its mosque, and the Chinese their *klin-ting* or temple. A school for European children was opened in 1824, and a Government school in 1854. The Chinese district is pretty populous; but no estimate exists of the actual number. At some distance from the town are the graves of the sultans, among whom the most remarkable is Ibnu Mulana, who introduced the Mahometan religion here in 1406. The district is very fertile, and produces the finest coffee raised in the island. Timber, cotton, indigo, sugar, and pepper are exported in large quantities. Total population of district in 1856, 769,331.

CHEROKEES, CHEROKESE, or, in the form employed by themselves, *Tsaraghee*, or *Chelake*, a tribe of North American Indians, now settled in the Indian Territory, where they occupy an area of 5960 square miles in the north-east and a strip along the north of about 8500. Before their removal thither they possessed a large tract of country now distributed among the States of Alabama, Georgia, Mississippi, Tennessee, and the western part of Florida. They were then distinguished into two great divisions, the Ottare or Otari, who dwelt in the mountainous districts, and the Airate or Erati, who inhabited the lower grounds; and they were further divided into seven clans, each of which prohibited intermarriage between its own members. They attached themselves to the English in the disputes and contests which arose between the European colonizers, formally recognized the English king in 1730, and in 1755 ceded a part of their territory and permitted the erection of English forts. Unfortunately this amity was interrupted not long after; but peace was again restored in 1761. The tribe was gradually advancing in civilization when the Revolutionary War broke out, and they sided with the Royalist party. This, of course, led to their subjugation by the new republic, and they were forced to surrender that part of their lands which lay to the south of the Savannah and east of the Chattahoochee. Peace was made in 1781, and in 1785 they recognized the supremacy of the United States, and were established in their possessions. The gradual advance of immigration soon led to disputes with the settlers, and the Cherokees were treated with the most high-handed injustice by the States, and more especially by Georgia. Exodus after exodus took place; a small part of the tribe desired a complete removal to another district; but the main body was neither to be bribed nor frightened from their country. An appeal was made to the United States Government; but it lent a deaf ear to their prayers, and Congress voted that a treaty concluded with a miserable minority should be regarded as binding on the whole tribe, which about that time numbered 27,000. A force of 2000 men was accordingly sent under General Scott, which compelled them to emigrate to their present position. After the settlement various disagreements between the Eastern and Western Cherokees continued for some time; but in 1839 a union was effected. In the civil war of 1862 they all at first sided with the South; but before long a strong party joined the North, and this led to a disastrous internecine struggle. On the close of the contest they were confirmed in the possession of their territory, but were forced to give a portion of their lands to their emancipated slaves. Since then they have peacefully advanced in prosperity and civilization; and under the influence of the Moravian, Baptist, Methodist, and Congregational missions they have been partially Christianized. In 1873 their numbers amounted to 17,217; their private property was worth $5,000,000; there were 63 schools attended by 1884 pupils; 89,250 acres were under cultivation, and their stock included 15,000 horses, 103,302 cattle, 3050 sheep, and 68,868 swine. They live in well-built villages, and maintain industrial habits. Their territory is distributed into

eight districts; and their chief town is Tahlequah, situated in the south-east corner of the country. A newspaper is published in the capital in English and Cherokee, and a literature is being gradually formed. Their language consists of two dialects,—a third, called Gidoowa, having been lost. The syllabic alphabet invented in 1821 by George Guess[1] is the character employed.

CHERRY (*Cerasus*). As a cultivated fruit-tree the cherry is generally supposed to be of Asiatic origin, whence, according to Pliny, it was brought to Italy by Lucullus after his defeat of Mithridates, king of Pontus, 68 B.C. As with most plants which have been long and extensively cultivated, it is a matter of difficulty, if not an impossibility, to identify the parent stock of the numerous cultivated varieties of cherry; but they are generally referred to two species, *Cerasus sylvestris*, the wild or corone cherry or geantree (the *mêrisier* of the French), and *C. vulgaris*, the common cherry-tree (French *cerisier*). The former species appears to be indigenous on the Mediterranean coasts, and in Central Europe including the British Islands; and it is probable that it is the latter species or some of its valuable cultivated varieties which was introduced by Lucullus.

The genus *Cerasus* includes trees of moderate size and shrubs, having smooth serrate leaves, white flowers, and a drupaceous fruit. They are natives of the temperate regions of both hemispheres; and the cultivated varieties ripen their fruit in Norway as far as 63° N. The geans are generally distinguished from the common cherry by the greater size of the trees, and the deeper color and comparative insipidity of the flesh in the ripe fruit, which adheres firmly to the "nut" or kernel; but among the very numerous cultivated varieties specific distinctions shade away so that the fruit cannot be ranged under these two heads. In the *Fruit Catalogue* published by the Horticultural Society in 1842, eighty varieties are enumerated, and to these considerable additions have since been made by cultivation both in Europe and America. The leading varieties are recognized as Bigarreaux, Dukes, Morellos, and Geans. Several varieties are cultivated as ornamental trees and on account of their flowers.

The cherry is a well flavored sub-acid fruit, and is much esteemed for dessert; but it should be used cautiously, as, especially if not quite ripe, it has a tendency to disorder the bowels. Some of the varieties are particularly selected for pies, tarts, &c., and others for the preparation of preserves, and for making cherry brandy. The fruit is also very extensively employed in the preparation of the liqueurs known as kirschwasser, ratafia, and maraschino. Kirschwasser is made chiefly on the upper Rhine from the wild black gean, and in the manufacture the entire fruit-flesh and kernels are pulped up and allowed to ferment. By distillation of the fermented pulp the liqueur is obtained in a pure colorless condition. Ratafia is similarly manufactured, also by preference from a gean. Maraschino, a highly valued liqueur, the best of which is produced at Zara in Dalmatia, differs from these in being distilled from a cherry called marasca, the pulp of which is mixed with honey, honey or sugar being added to the distillate for sweetening. It is also said that the flavor is heightened by the use of the leaves of the perfumed cherry, *Cerasus Mahaleb*.

The wood of the cherry tree is valued by cabinetmakers, and that of the gean tree is largely used in the manufacture of tobacco pipes. The American red cherry, *Cerasus serotina*, is much sought after, it being compact, fine-grained, not liable to warp, and susceptible of receiving a brilliant polish. The bark of this species is very highly esteemed in America as a mild tonic and sedative medicine, and is coming into use for the same purpose in Great Britain. The kernels of the perfumed cherry, *C. Mahaleb*, are used in the confectionery, and for scenting toilet soap. A gum exudes from the stem of cherry-trees similar in its properties to gum arabic.

CHERSO, an island of Illyria, included in the government of Trieste, in the Gulf of Quarnero, connected with the island of Osero by a bridge, and separated from the mainland by the channel of Farissina. It is about 35 miles in length, with an area of 105 square miles, and has about 7600 inhabitants. It is traversed by a range of mountains, forming natural terraces on which vines and olive trees flourish. The other parts of the island are covered with bushes of laurel and mastic, but there are scarcely any large trees. There is a scarcity of springs, and the houses are generally furnished with cisterns for rain water. The capital of the same name, on the western side of the island, has a cathedral, several churches and monasteries and 4673 inhabitants. In the centre of the island, at 40 Paris feet above the level of the sea, is an interesting lake called the Vrana or Crow's Lake, which, according to the hypothesis of Dr. Lorenz of Fiume, is connected with the island of Osero.

CHERSONESE, Chersonesus, or Cherronesus (from *χέρσος*, mainland, and *νῆσος*, island), is a word equivalent to peninsula. In ancient geography, the Chersonesus Thracica, Chersonesus Taurica or Scythica, and Chersonesus Cimbrica correspond respectively to the peninsula of the Dardanelles, the Crimea, and Jutland; and the Golden Chersonese (*ἡ χρυσῆ χερρόνησος*) is usually identified with the peninsula of Malacca. The Tauric Chersonese was further distinguished as the Great, in contrast to the Heracleotic or Little Chersonese at its south-western corner, where the town of Sebastopol now stands.

CHERTSEY (in Saxon *Ceortes Eye* or *Ceorta's Island*), a market-town of England, on the south bank of the Thames, in the county of Surrey, about 25 miles W.S.W. from London by railway. It is connected with Middlesex by a bridge of seven arches, built of Purbeck stone in 1785. The parish church, rebuilt in 1808 at a cost of £12,000, contains a tablet to Charles James Fox, who resided at St. Anne's Hill in the vicinity, and another to Lawrence Tomson, a translator of the New Testament in the 17th century. The principal educational establishments are supported by a foundation bequeathed in 1725 by the liberality of Sir William Perkins; and they afford a free education to upwards of 200 children. Hardly any remains are left of the great Benedictine abbey, which was rebuilt by Edgar in 963 on the site of an earlier monastery established by Earconwald, bishop of London, in the 7th century. Its buildings at one time included an area of 4 acres; but they fell into almost complete decay in the 17th century, and a "fair house" was erected out of the ruins by Sir Nicholas Carew of Beddington. The ground-plan can yet be traced; the fish ponds are still complete; and carved stones, coffins, and encaustic tiles of a peculiar manufacture are frequently exhumed. Among the abbots the most famous was John de Rutherwycke, who was appointed in 1307, and continued, till his death in 1346, to carry on a great system of alteration and extension, which almost made the abbey a new building. The house in which the poet Cowley spent the last years of his life is still extant, and the chamber in which he died is preserved unaltered. The town is the seat of a county court, and possesses a literary institute and an agricultural society. Its principal trade is in produce for the London markets. During the 7th century Chertsey was the residence of the South Saxon kings. Population of the parish in 1872, 7763; of the town, about 3000.

CHERUBIM (plural of cherub) were "celestial genii," and, in M. de Saulcy's opinion, little else can be positively affirmed (*Histoire de l'art Judaïque*, p. 24). Fresh light has, however, recently been thrown upon them from the cuneiform inscriptions, and we are no longer reduced to admit that "le vaste champ des hypothèses restera toujours ouvert." According to the Old Testament, the cherub united the functions of bearer and guardian of deity; or rather, perhaps, there was a divergence in the popular beliefs on this subject. In Ps. xviii. 10, 2 Sam. xxii. 11, Yahweh (the so-called Jehovah) is described as "riding upon a cherub," and in the parallel line as "swooping," the word applied in Deut. xxviii. 49 and elsewhere to the flight of the eagle. Putting the two phrases together, we may conclude that, according to one version of the myth—whether fully believed in or not by the Psalmist need not here be discussed—the cherub was either an eagle or a quadruped with eagle's wings. This result would seem to justify connecting the word with the Assyrian *kurubu*, a synonym of *kurukku* or *karakku*, the "circling" bird, *i.e.*, according to Friedrich Delitzsch, the vulture. On the other hand, the prophet Ezekiel (xxviii. 13–16), though agreeing with the Psalmist in mentioning but one cherub, describes him as "walking in the midst of stones of fire" (*i.e.*, thunderbolts), and as extending his wings over "the holy mountain of Elohim," in other words, as the attendant and guard rather than as the bearer of deity. And in the fuller account of Paradise in Genesis "*the* cherubim" (*i.e.*, the entire band of cherubs) are stationed "with (or near)

[1] [A half-breed, called also Sequoyah (1770–1843), by trade a silversmith, died in Mexico. His alphabet comprised eighty-five characters.—Am. Ed.]

the blade of the turning sword" (this, like the "tree of life," has a Babylonian analogue, and is a mythic phrase meaning the lightning,—see references below) "to guard the way to the tree of life" (Gen. iii. 24). Now, according to a talismanic inscription copied by Lenormant, *kirubu* is a synonym for the steer-god, whose winged image filled the place of guardian at the entrance of the Assyrian palaces. And in the fantastic description of Ezekiel penned by the river Chebar, one of the four faces of a cherub was that of an ox (Ezek. i. 10, after which the corrupt passage in x. 14, must, in spite of Lenormant, be corrected). We should, therefore, connect the word cherub primarily with the Assyrian *kirubu*, but also, as proposed above, with *kurubu*. The two forms seem to be co-ordinate and expressive of some quality common to the king of birds and the colossal steer. Their etymology is altogether uncertain, and possibly to be sought for (as Mr. Sayce has suggested) outside the sphere of Semitism. Partial parallels to the cherubim in non-Semitic mythologies are not uncommon, but are mostly deceptive. The most complete one is that of the winged γρυπές (a secondary form of kerubim), who not only watched over the treasures of the gods (*cf.* Herod. iv. 13, 116), but were also the bearers of deity, if at least Plutarch and Eustathius may be followed in identifying the τετρασκελὴς οἰωνός of Æsch. *Prom.* 395 with the griffin (see Hermann, *ad loc.*). Probably the griffin was imagined under more than one form. This was certainly the case with the Hebrew cherub, as appears not only from the passages referred to above, but from the inconsistencies of the single prophet Ezekiel (*cf.* i. 6, xli. 18). The significance of the mythical cherubim has been well pointed out by C. P. Tiele. They are probably the masses of clouds, which seem to guard the portals of the sky, and on which the sun-god appears to issue forth at break of day. This will account for the expressions used of the cherubim both of the heavenly and of the earthly "habitation" of Yahweh, expressions taken up by the Biblical writers from the folklore of their times.

For the Assyrian authorities, see Schrader, *Jenaer Litteraturzeitung*, 1874, p. 218; Delitzsch (the younger), *Assyrische Studien*, pp. 107, 108; and for the Babylonian lightning-myth, Lenormant, *Bérose*, p. 138; *Records of the Past*, vol. iii. pp. 127–129. Compare also Herder, *Werke*, vol. xxxiii. (*Geist der Ebraïschen Poesie*), pp. 168–180; Ewald, *Antiquities of Israel*, Eng. transl., p. 123; Riehm in *Theologische Studien und Kritiken*, 1871; Tiele, *Vergelijkende geschiedenis der oude godsdiensten*, vol. i. p. 366; and F. W. Farrar in Kitto's *Cyclopædia of Biblical Literature*, art. "Cherubim." (T. K. C.)

CHERUBINI, Maria Luigi Zenobio Carlo Salvatore (1760–1842), one of the greatest musical composers of modern times, was born at Florence, 14th September, 1760. His father was accompanyist (*maestro al cembalo*) at the Pergola theatre, and himself guided the first musical education of his son, whose talent began to evince itself at a very early period. "I commenced learning music," Cherubini says of himself, "at six years, composition at nine; the former I was taught by my father, the latter by Bartholomew Felici and his son Alexander." Italian music at that time was at a low ebb. The popular composers of *opera seria* chiefly aimed at inventing pleasing tunes and *fioriture* for the vocal display of the singers; the dignity and grandeur of the old Italian school were all but lost. To imbue himself with these great traditions of the past was the chief aim of young Cherubini's ambition, and for that purpose he went in 1777 to Bologna, where for four years he studied under Joseph Sarti, a well-known composer and theorist of the time, and himself the pupil of the celebrated Padre Martini, one of the greatest contrapuntists Italy has produced. It was in this school that Cherubini laid the foundation of that deep knowledge of his art which gives to all his works the impress of perfect mastership. It was also under Sarti's guidance that he made his first attempts at dramatic composition. They were preceded, however, by a mass written at the age of thirteen, and various other sacred compositions. Sarti was the composer of numerous operas, amongst which *Le Nozze di Domina* may be mentioned as the most successful one. It now became Cherubini's task to supply the music for the minor characters in his master's dramatic works, an excellent way of gaining versatility of style and resource, turned to full account by the young composer. His first independent work was called *Quinto Fabio*, an *opera seria*, in three acts, first performed in 1780, and soon followed by *Armida* (1782), *Adriano in Siria* (same year), and several other works of a similar kind. At this time of his life his artistic individuality was forming gradually; but as yet he had not emerged from the purely imitative stage of production. Absolute artistic value these juvenile works do not possess, but they tended to prepare Cherubini for greater things, and in the meantime secured him a dignified position amongst contemporary composers. In 1784 he was asked to write two works for the Italian opera in London, one of which, *La finta principessa*, was favorably received, while the other, *Giulio Sabino*, was "murdered" by the critics, to use the emphatic expression of a contemporary witness. In 1786 he left London, whither he had gone to be present at the production of his operas, and went to Paris. After a short stay in Italy he took up his permanent residence in the latter city.

Cherubini may be cited as a striking instance of the amalgamating power inherent in the French type of national culture; Spontini, Meyerbeer, and to some extent Gluck, submitted to the same spell. With the last-mentioned master Cherubini shares the grand declamatory pathos, the classic dignity which characterizes the Augustan age of French tragedy. A work like Cherubini's *Médée* is imbued with the same elevation of pathos which in Corneille's greatest tragedies makes us forget the stilted affectations of his heroes and heroines. The first opera composed by Cherubini in France is called *Démophoon*, words by Marmontel. Its merits were appreciated by connoisseurs, but it was not a popular success. This, however, was achieved in the most brilliant manner by Cherubini's next opera, *Lodoiska* (1791), which opens the series of great dramatic works belonging to the composer's second period. The representative production of this period is *Médée*, already alluded to. The main characteristics of the composer's style have also been briefly touched upon. From a mere musical point of view a bold though always strictly logical sequence of harmonies, a rich vein of melodious developments, and great brilliancy and originality of instrumental effects ought to be added.

By the production of *Médée* (1797) the composer's reputation was firmly established. All Paris was in rapturous admiration of his genius, with one exception—Napoleon Bonaparte. The young victorious general aspired to musical amateurship, and loved to speak authoritatively on that as on most other subjects. But it was not in Cherubini's character to bow to any man, however great, in matters artistic. Cherubini's repeated remonstrances against Napoleon's exaggerated enthusiasm for Paesiello, Zingarelli, and other ephemeral composers culminated in the blunt repartee,—"Citoyen-général, I perceive that you love only that music which does not prevent you from thinking of your politics." The emperor remembered the affront offered to the citizen-general, and the appointment of Imperial chapelmaster was given to Lesueur, in spite of the Italian composer's superior merits. But Cherubini does not seem to have suffered much under this disappointment. Two works replete with serenest joy owe their origin to the period alluded to—*Anacreon* (1803) and *Les deux Journées*, (1804). The last-mentioned work is Cherubini's masterpiece of comic opera. In it we admire the grace and true *gaieté de cœur*, which have made the comic opera of France deservedly famous amongst civilized nations. The libretto of *Les deux Journées*, although clever and piquant, does not offer many opportunities for musical expansion, the action, as is usual in French comic opera, being to a great extent carried on in spoken dialogue. But Cherubini has succeeded in delineating with a few graphic touches the import of his characters and situations. A peasant chorus in the third act, a Savoyard's song, and the couplets of Micheli, the jovial water-carrier, are insurpassable specimens of their *genre*, equal in melodious beauty and grace to anything that French composers have produced in these forms of art. Cherubini, indeed, ranks with the greatest masters of the French school,—with Gretry, Dalayrac, Auber, and Boieldieu, all of whom he infinitely surpasses as far as musical workmanship is concerned.

In 1805 Cherubini went to Vienna, in compliance with an invitation to compose an opera for the imperial theatre of that city. Here his chances of success were once more thwarted by his great antagonist Napoleon, who entered Vienna at the head of the victorious French army, and for a time interrupted all artistic enterprise. The personal meeting of emperor and composer was again of anything

but a friendly kind. Soon after the performance of his new work *Faniska* (1806) at Vienna, Cherubini returned to Paris, and for a long time kept an unbroken silence. His chief occupation was his lessons at the Conservatoire, besides which he filled up great part of the day by cutting the hearts and diamonds of ordinary playing cards into all kinds of fantastic figures and landscapes. The results of his extraordinary ingenuity, carefully framed, covered the walls of his study. An accidental circumstance at last roused him from this morbid indolence. He was staying at a country seat of the Prince de Chimay, where a new church was to be inaugurated. Timidly was an appeal made to him for a religious composition to be performed on the occasion, and in compliance with this request he wrote in a few weeks his great Mass in F. Thus at a time of life when most artists rest on their laurels he entered a new field of creative labor—that of sacred music. Of the works of Cherubini's third and perhaps his greatest period only the most important can be mentioned here. They are the Missa Solemnis in D, the coronation mass written for the consecration of Charles X., and the two requiems in C and D, the latter for male voices. Besides these he wrote numerous smaller compositions for the service of the Chapel Royal, most of which are still unpublished. The most striking feature of Cherubini's sacred compositions is their solemn grandeur of conception, combined with an unequalled mastership of artistic treatment.

The Restoration of the Bourbons drew Cherubini from his long seclusion. The royal family were eager to show their favor to the opponent of Napoleon Bonaparte. Cherubini was created composer and conductor to the Chapel Royal, and in 1821 obtained the permanent directorship of the Conservatoire. His days were prolonged beyond the ordinary age of men, and after having witnessed and partly celebrated numberless revolutions in his adopted country, the more than septuagenarian retained sufficient vigor of mind to write one of his most charming operas when Louis Philippe was king in France. It is called *Ali Baba*, and was first performed in 1833. To the list of his dramatic compositions ought also to be added another important opera, *Les Abencerrages*, written in 1813, but treated with undeserved neglect by the public. He also wrote several pieces of chamber music, amongst which six quartets for strings, and one quintet and six sonatas for the pianoforte may be mentioned. A great number of his compositions, moreover, remained in manuscript at his death, March 15, 1842. Cherubini's external bearing was frequently harsh and arrogant; his prejudice against Beethoven, both personally and artistically, is a deplorable instance of his one-sidedness. But his more intimate friends found him kind and faithful. His love of order was carried to excess. All his music was carefully labelled and distributed in pigeon-holes, and even his pocket-handkerchiefs were numbered for consecutive use. To this extreme carefulness we owe a complete catalogue of his own compositions from 1773–1841, edited by M. Bottée de Toulmon, under the title of *Notice des Manuscrits autographes de la musique composée par M. L. Z. C. S. Cherubini.* We also possess by him a valuable *Cours de contrepoint et de fugue*, the letterpress of which is written by his pupil the well-known composer Halévy. An English biography—*Cherubini, Memorials illustrative of his Life* (Lond. 1874)—has been written by Mr. E. Bellasis. An interesting article containing personal reminiscences of Cherubini by the German composer Ferdinand Hiller appeared in *Macmillan's Magazine* in 1875. (F. H.)

CHERUSCI, a tribe of ancient Germany, whose country was bounded on the E. by the Elbe and on the W. by the Weser. In the time of Augustus the cruelty of Varus, who commanded the Roman army on their frontier, drove them into war, and they annihilated the legions sent against them. In the 4th century they had become members of the Frankish confederation.

CHESHIRE,[1] a maritime county in the north-west of England, is bounded on the N. by the Mersey, which separates it from Lancashire, on the N.E. by Yorkshire, on the E. by Derbyshire and Staffordshire, on the S. by Shropshire and Denbighshire, on the W. by Flintshire, and on the N.W. by the Irish Sea. Its greatest length from east to west is about 48 miles, and its greatest breadth from south to north about 33 miles. It possesses an area of 705,493 statute acres, or 1102 square miles; and its population in 1871 was 561,201 persons (males, 271,033; females 290,168). Since the first census in 1801, the population has increased by 368,396 persons, or 191 per cent., and since 1851 the increase has amounted to 105,476 persons, or 23 per cent. in twenty years.

The formation of the county is generally flat, with some hills on the east on the Derbyshire and Yorkshire boundary, which extend also to the Staffordshire side. There are also lower hills near Chester and Flintshire, and at Alderley Edge and Beeston insulated hills standing up out of the prevailing level. The principal geological formation is the New Red Sandstone, which occupies nearly the whole of the central and western part of the county. A small patch of lias occurs in the south. The Coal Measures extend along the eastern side on the borders of Staffordshire and Derbyshire, and also are worked on the banks of the Dee below Chester. The principal mineral produce is salt, which is found as rock-salt in mines at Northwich, and is manufactured there and at Winsford, Middlewich, Sandbach, and Lawton, from the brine-springs overlying the rock-salt. Lead and copper are also found, though not in great quantities. Copper was worked at Alderley Edge at an early period, but the works were discontinued until lately, when they have been recommenced.

The flora of the central plain of Cheshire, which represents its most characteristic vegetation, is intermediate between that of the northern and southern counties of Britain. The botany of the high-lands east of Macclesfield is nearly ericetal in its nature, akin to that of the West Riding of Yorkshire, whilst in the west the botany of Wirral shows more variety than that of the Midland region, and is more southern in its character. The curious system of marl-pits, and the frequent inland meres, each of which has a vegetation of its own, render Mid Cheshire pre-eminent among English counties for the development of such species as Carex and Potamogeton. Two rare species may be cited to prove the strong admixture of northern elements in the flora, viz., *Arundo stricta* at Oakmere and *Saxifraga Hercules*, now unfortunately extinct, at Knutsford. As compared with one near or south of London, a Cheshire arable field shows a lamentable paucity of species. A botanist would only in a day's walk mark 150 species of flowering plants, as against 300 species marked in the same time in Kent or Sussex.

The principal rivers in Cheshire are the Dee, which, rising in the Welsh mountains, forms the boundary between the county and Denbighshire and Flintshire, and ultimately, having formed a wide navigable estuary below Chester, falls into the Irish Sea; the Mersey, which rises in the Yorkshire hills, forms the county boundary along the whole of its northern side, and having given the opportunity for the formation of the ports of Liverpool, Birkenhead, and Runcorn, also falls into the Irish Sea; and the Weaver, which, rising in the south-west of the county, traverses it in a north-westerly course, and being joined by the Dane at Northwich, emptics itself into the Mersey at Weston Point. By means of a series of locks, the Weaver has been made navigable for vessels of 200 tons as far as Winsford, and thus furnishes a means of transportation for the salt produced in the locality. The profits of the navigation, which was originally undertaken by a few Cheshire squires, belong to the county, and are paid over annually to the relief of the county rates. At present, in consequence of a large outlay in further deepening and improving the navigation, all payments to the county treasury are suspended, but on an average of late years from £16,000 to £20,000 has been paid over.

Distributed over the surface of the county are small lakes or meres, and it seems to have been a point of honor for the old houses of the gentry to have been built on their banks. Combermere, Tatton, Rostherne, Tabley, Doddington, Marbury, and Mere, with a host of smaller waters, are dotted over the county; whilst nearly in every field are old marl-pits, whence in former days the sole supply of manure for the permanent pastures was obtained.

The climate is temperate and damp; the soil is varied and irregular, but a large proportion of it is a thin-skinned clay. In only one spot of the county is the soil said to be fertile enough to feed a bullock to the acre. The agriculture of the county, which some twenty-five years ago was backward and discreditable, has marvellously improved in the last quarter of the century. The land, which was wet and full of rushes, has been drained; its fertility has been

[1] See Vol. XXI., Plate VIII.

mcreased by the periodical application of bone-dust; the old crooked fences have been removed or straightened; and the farm-houses and buildings, which were insufficient for the decent accommodation of man and beast, have been replaced on many estates by modern structures well adapted for their purposes. Dairy-farming is the description of agriculture still principally pursued, and in March, 1875, there were, according to the Board of Trade returns, 96,170 cows in the county, whose milk if all converted into cheese would have yielded a produce of about 16,000 tons of cheese. But though the tendency to make cheese in some parts of the county still prevails, the influence of the larger population gathered together round the purely agricultural part of the county has greatly diminished the production of the staple article, whilst the competition of American cheese has made the manufacture of all but the best qualities unprofitable. Liverpool, Manchester, Stockport, Macclesfield, the cotton districts in the north-east of the county, and the Staffordshire Potteries on the south-west, all demand a supply of milk, meat, and garden produce, and the facilities of transit afforded by the railways have in many cases already changed, and gradually in many more will change, the character of Cheshire agriculture. Although in some cases the Cheshire tenant-farmer is little more than a laborer owning cows, working as hard as his own laborers, and with as little or less education, yet there are now a large number of farms as well and skilfully cultivated and producing as large produce to the acre (thanks to the facilities of obtaining manure from the larger towns) as any in the United Kingdom.

During the years 1865 and 1866 a mighty calamity swept over this county. The cattle plague, which had in 1745 destroyed 30,000 head of cattle, appeared in the second week of October, 1865, on the southern border of the county. Spreading itself there, and breaking out almost simultaneously on the north-west, west, and east, it had by the 21st February, 1866, destroyed 36,823 head of stock. On that day an Act of Parliament was passed to authorize slaughter and to give compensation, and in consequence 35,675 cattle were killed. A loan was granted from the Treasury, on the security of the county rate, of £270,000 to pay the compensation for losses after the 22d February, which entails an annual charge on the county rates of £14,583, 14s. 10d. until the year 1896. Although by this terrible loss many individuals were ruined, and for the time great distress was caused, yet on the whole the agriculture of the district was benefited. Landlords discovered that stringent clauses in their leases might safely be modified; tenant-farmers became convinced that cheesemaking was not the whole duty of the agriculturist, and the possibility and even the necessity of new ways of farming, and of the introduction of sheep or feeding-stock, became apparent.

From the agricultural returns for 1875 (which, however, are not complete) it appears that the average acreage devoted in Cheshire to corn crops is exceptionally low, being 16·2, while the average of all England is 31·2. The following table shows the distribution of the acreage in the county, and the numbers of live stock, in the years 1872 and 1875:—

	Oats.	Wheat.	Barley, Beans, &c.	Potatoes.	Turnips and Mangolds.	Vetches, Carrots, &c.	Grass under rotation.
1872	46,446	34,195	10,072	20,921	10,001	2,501	64,769
1875	44,908	30,745	9,325	18,770	11,054	1,862	57,400

	Horses.	Cattle.	Sheep.	Pigs.
1872	18,818	155,654	108,377	67,379
1875	20,499	162,466	111,330	61,209

In the latter year there were 84,981 acres under corn crops, and 31,686 under green crops, both showing a decrease as compared with 1872.

The county is intersected by railways in every direction. At Crewe the London and North-Western Railway divides into three sections, and takes its passengers or goods to Manchester, Liverpool, Chester, and the North. From Stockport and Manchester the Cheshire lines run into the centre of the county and across Delamere Forest to Chester; and there are lines from Chester to Birkenhead, to Manchester, to Shrewsbury, and into the different parts of North and South Wales.

The canals, too, still convey goods from Runcorn and Ellesmere-port to the Staffordshire potteries, and afford means of communication between Manchester, Liverpool and the interior of the county.

The principal towns are Chester, Birkenhead, Macclesfield, Stockport, Northwich, Crewe, and Congleton. At Stockport the manufacture of hats and cotton is carried on, and Macclesfield and Congleton are the seats of the silk manufacture. At Crewe are situated the great workshops of the London and North-Western Railway, and round the station, where in 1841 there was a wooden box to take the tickets and one solitary farmhouse, there is now crowded a population of nearly 30,000 inhabitants. The trade of Northwich and Winsford is the manufacture of salt, by the evaporation of the water from the brine. During the year 1875 it is calculated that 1,500,000 tons of salt were produced, of which 1,000,000 were for export, 350,000 for chemical works, 100,000 for agricultural purposes, and 50,000 for domestic use. In that year there were in Cheshire 1261 salt-pans, employing over 3000 men. About 150 men are engaged in rock-salt mining, and the carriage of salt on the Mersey and Weaver employs at least 1000 men and 500 boys. Steamers are now largely employed in the inland navigation, between thirty and forty being engaged in the carrying trade.

Besides being in part a manufacturing and in part a purely agricultural county, Cheshire, more perhaps than any place except the districts round the metropolis, is the home of business men. The manufacturers of Manchester, the merchants of Liverpool, the gentlemen employed in the pottery trade, all have their villas here. At Alderley and Bowdon near Manchester, in the Wirrall hundred on the banks of the Mersey, at Alsager on the Staffordshire border, are to be found congeries of the dwellings of rich men, which vie in their appointments and surroundings with the houses of the great landowners of the county. Perhaps no stronger proof can be given of this fact than that, in the return lately furnished to the House of Commons of a summary of the returns of owners of land, the number of holdings between 1 acre and 10 is reported to be 3166 out of a total number of 23,720, and the average rental per acre is £24, 13s. These proportions are in the whole return for England and Wales exceeded only in the ex-metropolitan parts of Surrey and Middlesex, and in the mining and manufacturing counties of Lancashire and Glamorganshire.

Cheshire is emphatically a county full of large estates. In the return just quoted may be found the fact that the rental of estates between 5000 and 10,000 acres amounts to 20·4 of the total value of the county, a larger percentage than in any English county save one. Of the owners of more than 10,000 acres Lord Tollemache of Helmingham owns 25,380; the marquis of Cholmondeley, 16,842; the duke of Westminster, 15,001; Sir Henry Delves Broughton, 13,832; the Rev. T. France Hayhurst, 10,650; and Lord Crewe, 10,148; whilst Lord Egerton of Tatton, Lord Harrington, Lord Stamford and Warrington, Lord Derby, Sir P. D. M. Grey Egerton, Lord Haddington, Lord De Tabley, Lord Delamere, Lord Stanley of Alderley, Lord Kilmorey, Lord Shrewsbury, Mr. Legh of Lyme, Mr. Leigh of Adlington, Mr. R. E. Warburton, Sir Charles Shakerley, and Mr. Bromley Davenport make up the seventeen who are returned as owning between 5000 and 10,000 acres each. This list of landowners is composed of men whose names, with one exception, are historic in Cheshire, so small, spite of the neighborhood of Liverpool and Manchester, have been the transfers of the large estates from their original owners to the capitalists of the present day.

For Parliamentary representation the county is divided into East, West, and Mid Cheshire, each of the three sections returning two members to the House of Commons. In East Cheshire the registered electors in 1876 were 6587; in Mid Cheshire, 8241; and in West Cheshire, 10,178. There are besides represented within the county the boroughs of Macclesfield and Birkenhead, part of the city of Chester, the limits of which extend into Wales, and parts of the boroughs of Warrington, Stockport, Ashton-under-Lyne, and Stalybridge, all of which extend more or less into Lancashire. There is one court of quarter sessions in the county, which holds its meetings alternately at Chester and Knutsford, and is adjourned from one place to the other for the trial of prisoners at intermediate sessions. The ratable value of the county as assessed to the county rates is £2,690,701.

Perhaps no county has advanced more in material prosperity than Cheshire has in the last half-century. In none have more places of public worship, both of the Church of England and of the various Nonconformist bodies, been erected. In none have more schools been built. The wages of the agricultural laborers are high; and from the ranks of that body has the army of engineers, porters, and high-class artificers, who are employed in the manufacturing districts and at Crewe, been largely recruited. Yet still the county is cursed with the sin of drunkenness, and with the evil consequences of that sin, in a fearful degree. Whilst serious crime has decreased steadily there has been an increase of all the light offences.

The history of Cheshire is intimately connected with that of the city of Chester. In the time of King Alfred the present county formed part of the province of Mercia, but it was afterwards separated, and by William the Conqueror it was constituted a county-palatine. William bestowed the earldom on his nephew Hugo Lupus, and the title has belonged since then to the heir-apparent of the English Crown. The palatinate privileges existed intact until the reign of Henry VIII., when they were much curtailed in favor of the Crown, and after the Civil War of the Commonwealth they were almost wholly removed. The county was first represented in Parliament during the reign of Edward VI.

Two Roman roads traversed Cheshire, the north-west branch of Watling Street, running from Chester through Northwich to Stratford, where it crossed the Mersey into Lancashire, and the Via Devana which entered from Salop and extended to Chester. Many handsome and interesting mansions exist in the county, some of them being admirable specimens of Elizabethan architecture. Among the most noteworthy may be mentioned Bramall Hall near Stockport, Brereton Hall near Sandbach, Crewe Hall, the seat of Lord Crewe, and Eaton Hall, the seat of the duke of Westminster. (G. W. L.)

CHESNE, Andre du. See Duchesne.

CHESNEY, Charles Cornwallis (1826–1876), brevet-colonel in the corps of Royal Engineers, born 29th September, 1826, was the third son of Charles Cornwallis Chesney, captain on the retired list of the Bengal Artillery. Educated at Tiverton grammar school and Mount Radford school, Exeter, and afterwards at the Royal Military Academy, Woolwich, he obtained his first commission as second-lieutenant of engineers in 1845, passing out of the academy with distinction at the head of his term. His early service was spent in the ordinary course of regimental duty at home and abroad, and being stationed in New Zealand during the Crimean War, he lost the opportunity of serving in the only considerable military operations in Europe in which the present generation of British soldiers has been engaged, while India, the great school of war for the English army, was until lately closed to officers of the Royal Artillery and Engineers. Among the various reforms in our military system which followed from that war was the impetus given to military education; military history was now for the first time introduced into the course of instruction at our military colleges, and in 1858 Charles Chesney, who had brought himself under notice by an essay on the subject, prepared under a sort of competition invited by the authorities, was appointed professor of military history at Sandhurst. In 1864 Captain Chesney succeeded Colonel Hamley in the corresponding chair at the Staff College. To the admirable teaching of these two officers may be ascribed in great measure the intelligent appreciation of the relation of military history to the practical business of war now manifested throughout the commissioned ranks of the British army; their published writings have been received with great favor on the Continent and in America.

Chesney's first published work was an account of the civil war in Virginia, which went through several editions; and although written in the heat of the struggle, and on the partial information then available, it may still be read with profit. But the work which attained the greatest reputation was his *Waterloo Lectures*, prepared from the notes of lectures orally delivered at the Staff College. Up to this time the English literature on the Waterloo campaign, although voluminous, was made up of personal reminiscences of actors in the great scene, or of formal records such as Siborne's accurate but tedious narrative, useful materials for history rather than history itself; the French accounts have mainly taken the form of fiction, the so-called history of Lamartine being as much a work of fancy as the romance of Victor Hugo, while the professedly sober pages of Thiers are not much more to be relied on. In Chesney's lucid and vigorous account of the momentous struggle, while it illustrates both the strategy and tactics which culminated in the final catastrophe, the mistakes committed by Napoleon are laid bare, and for the first time an English writer is found to point out that the dispositions of the great duke were not wholly faultless. Yet such criticism is in truth the sincerest praise, since to those who, knowing anything of war, know that even the highest combinations are at best a groping in partial darkness, the capacity of a great leader will be more perfectly appreciated by a right estimate of his mistakes than by a blind attribution of infallibility. And in the *Waterloo Lectures* the Prussians are for the first time credited by an English pen with their proper share in the victory. On this point there had hitherto been an English as well as a Napoleonic legend. The *Waterloo Lectures* attracted much attention abroad as well as at home; on the appearance of the French edition, published at Brussels, another account of the campaign, written at the instance of the emperor Napoleon III., and quite in the spirit of the Napoleonic legend, was published immediately afterwards in Paris in a cover to correspond exactly with the Brussels edition, and with the obvious intention that it should circulate in place of the other,—a delicate test of the appreciation of the original on the part of the French Government.

Chesney was for many years a constant contributor to the newspaper press and to periodic literature, devoting himself for the most part to the critical treatment of military operations, and professional subjects generally. Some of his essays on military biography, contributed mainly to the *Edinburgh Review*, were afterwards published separately. His style is forcible, easy, and eminently clear, his judgment impartial and sagacious, and although his mode of treating military operations may be open to the criticism that it does not make sufficient allowance for the moral element in war—the infirmities of troops and the blunders of generals,—it may be said on the other hand that the whole truth is never told about battles at the time, and cannot be found out afterwards, and that in the long run the less there is of the personal in history, and the broader and more general the statement, the nearer will the historian come to describing what happened.

In 1868 Charles Chesney, who on promotion to field rank had returned to regimental duty, was appointed a member of the Royal Commission on Military Education which sat during that and the following year, under the presidency first of Earl de Grey and afterwards of Lord Dufferin, and to whose recommendations are due the improved organization of our military colleges, and the development of military education throughout the principal military stations of the British army. In 1871, immediately after the conclusion of the Franco-German war, he was sent on a special mission to France and Germany, and furnished to the Government a series of valuable reports on the different siege operations which had been carried out during the war, including especially the two sieges of Paris, and on the condition of the fortresses and military condition and organization of the two powers. These reports were published in a large volume, only a few copies of which have been issued confidentially.

Never seeking regimental or staff preferment, Colonel Chesney never obtained any, but he held at the time of his death a quite unique position in the army, altogether apart from and above his actual place in it. Consulted by officers of all grades on professional matters, his ready and vigorous pen was often placed at the service of the Government to illustrate and defend in the press the different measures of reform lately adopted in military organization; while probably few have done more to raise the intellectual standard of the English army and its estimation in that respect among the more intelligent spirits of foreign armies. Constantly engaged in literary pursuits, he was nevertheless laborious and exemplary in the discharge of his public duties, while managing also to devote a large part of his time to charitable and religious offices. He was abstemious to a fault; and, overwork of both mind and body telling at last on a frail constitution, he died after a short illness on the 19th March, 1876, at the age of forty-nine years, to the regret of the whole army, and of a very large circle of friends both within and without the service,

to whom he had become endeared in a remarkable degree by his generous, self-denying, and sympathetic disposition. At the time of his death he was serving as Commanding Royal Engineer of the London district.

Colonel Chesney's principal works were:—*A Military View of Recent Campaigns in Virginia and Maryland*, 1863; *Campaigns in Virginia and Maryland*, 2d edition, 1865; *The Military Resources of Prussia and France, and Recent Changes in the Art of War; Essays by Charles Chesney and Henry Reeve*, republished jointly from the *Edinburgh Review*, 1870; *Waterloo Lectures*, 3d edition, 1874; *Essays in Modern Military Biography*, reprinted chiefly from the *Edinburgh Review*, 1874. (G. C.)

CHESS, simply defined, is an intellectual pastime. It recreates not so much by way of amusement properly so termed, as by taking possession of the mental faculties and diverting them from their accustomed grooves. The cerebral organ, after being much occupied in business, or greatly worried by cares, or in any way beset by painful reflections, finds in the absorbing and abstracting properties of chess that temporary relief which lighter pastimes will not always afford. The reason of this is not far to seek. Cares are caused by looking forward to or apprehending things to come, and, as such, are neutralized by that foresight which the conduct of a game of chess demands. Again, mental perturbations, however much varied, can but be the employment of the imagining and reasoning faculties in the digestion of the particular cause of annoyance or pain; but these same faculties are required, and their exclusive exercise demanded, in providing for the emergencies of the intellectual combat, and in solving the ever varying problems that arise in the course thereof. It is very commonly supposed that chess is a difficult game, whether to acquire or practice. This, however, is a mistake. The moves may be learned in half an hour, and a week's practice will evoke a sufficient amount of skill to afford pleasure both to the learner and his tutor. The intelligent novice will soon be convinced that an ignorant manipulation of the pieces does not conduce to success, and he will seek for instruction in the right manner of opening the game; the various débuts are after all simple, and he will find no difficulty in acquiring them one after the other. Six months will suffice for this purpose if his understanding be not enslaved by obstinacy, indolence, or self-esteem, and the rest goes with his natural capacity. A merely average intelligence is sufficient for a very fair amount of proficiency and strength; while intellect not much above the common mean will suffice (assuming here natural aptitude) to lead right up to the second class of players, viz., those to whom the masters of the game can only concede the small odds of "pawn and move." Those wishing to improve will find it very beneficial to play upon even terms with players stronger than themselves; for a persistence in taking odds, besides having a discouraging and debilitating effect upon the weaker player, takes the game out of its proper grooves, and tends to produce positions not naturally arising in the ordinary course of the game as developed from the recognized openings. In fact, the reception of odds incapacitates a player from acquiring an insight into the principles of the science of chess, and from comprehending the latent meanings and conceptions upon which combinations and a proper plan of warfare are founded; while, upon the contrary, playing on even terms throws the combatant at once upon his own judgment, and by causing him to study his opponent's play, leads necessarily to a material improvement in his own style.

To turn now to the elements of the game. The accompanying diagrams represent chess boards, and it will be perceived that they respectively consist of sixty-four checkered squares.

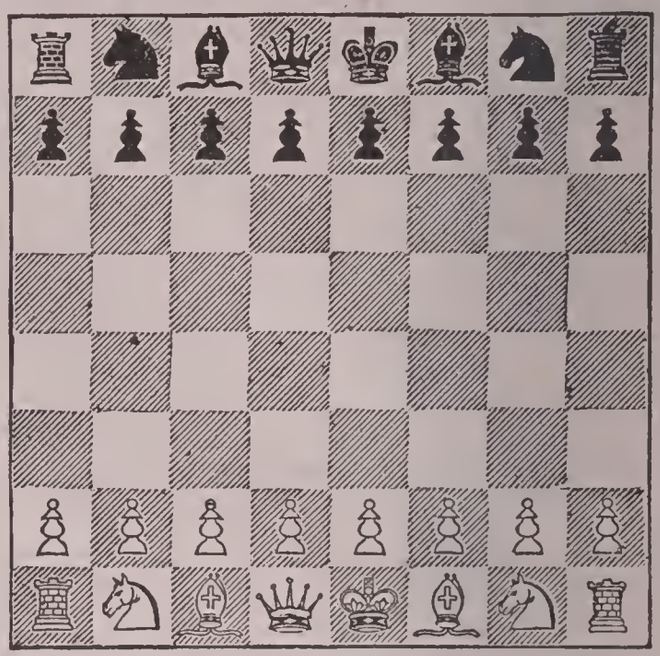
In diagram 1 the chessmen are arranged as they should be at the commencement of the battle, while diagram 2 shows the denomination of the squares according to the English and German systems of notation, to be explained hereafter. Under diagram 1 are the names of the various "Pieces," for so the superior officers are termed—each side, white and black, having a king, a queen, two rooks, two knights, and two bishops. The eight common men in front are called Pawns.

MOVES OF THE DIFFERENT CHESSMEN.—Briefly described, the powers of the various pieces and of the pawns are as follows.

The king may move in any direction—forward, backward, laterally, or diagonally; but he can move only one square at a time. Under certain conditions he has once in the game a peculiar privilege called castling, which will be explained further on.

The queen moves in any straight or diagonal direction, whether forward, backward, or laterally. There is no limit to her range, except when her progress is stopped by any

BLACK.



Rook. Knight. Bishop. Queen. King. Bishop. Knight. Rook.

WHITE.

DIAGRAM 1.—Showing the arrangement of the pieces at the commencement of a game.

piece or pawn. She is the most powerful piece on the board, for her action is a union of those of the rook and bishop. At the commencement of the game the queen always stands upon a square of her own color.

The rooks move in straight lines—forward, backward, or

BLACK.

	a	b	c	d	e	f	g	h	
8	QR 8	QK^t 8	QB 8	Q 8	K 8	KB 8	KK^t 8	KR 8	8
7	QR 7	QK^t 7	QB 7	Q 7	K 7	KB 7	KK^t 7	KR 7	7
6	QR 6	QK^t 6	QB 6	Q 6	K 6	KB 6	KK^t 6	KR 6	6
5	QR 5	QK^t 5	QB 5	Q 5	K 5	KB 5	KK^t 5	KR 5	5
4	QR 4	QK^t 4	QB 4	Q 4	K 4	KB 4	KK^t 4	KR 4	4
3	QR 3	QK^t 3	QB 3	Q 3	K 3	KB 3	KK^t 3	KR 3	3
2	QR 2	QK^t 2	QB 2	Q 2	K 2	KB 2	KK^t 2	KR 2	2
1	QR sq	QK^t sq	QB sq	Q sq	K sq	KB sq	KK^t sq	KR sq	1
	a	b	c	d	e	f	g	h	

WHITE.

DIAGRAM 2.—Showing English and German Methods of Notation.

laterally; they cannot move diagonally. Their range is, like the queen's, unlimited.

The bishops move diagonally in any direction whether backward or forward. They have an unlimited range, with the same exception as before. It is evident that

bishops standing originally on differently colored squares can never meet.

The knights have a mode of moving which it is not easy to describe. Their range is not unlimited, like that of the pieces just noticed, but is restricted in a particular way. They move from one corner of any rectangle of three squares by two to the opposite corner; thus in diagram 3, the white knight can move to the square occupied by the black one and *vice versa*. To illustrate the move further, suppose that in diagram 2 a knight stands on the square marked K4 counting from the white side of the board; that knight can move to any of the following squares, viz., to K B 2, Q 2, K Kt 3, Q B 3, K Kt 5, Q B 5, K B 6, and Q 6. The squares which the knight appears to pass over in moving may be occupied by other pieces, but his move has nothing whatever to do with those intervening squares. A knight may thus vault over any piece or pawn, whether adverse or friendly; the knights are the only pieces which possess this privilege. It will be perceived that the *locus* of the knight, unlike that of the bishop, changes color at every move.

Diagram 3.

The king, queen, rooks, and bishops may capture any foeman which stands anywhere within their respective ranges; and the knights can capture the adverse men which stand upon the squares to which they can leap. A capture is effected by the piece which takes occupying the square of the piece which is taken, the latter being then removed from the board. The king cannot capture any man which is protected by another man.

The motions and capturing powers of the pawns are as follows:—each pawn for his first move may advance either one or two squares straight forward, but afterwards one square only, and this whether upon starting he exercised his privilege of moving two squares or not. A pawn can never move backwards. He can only capture diagonally,—that is to say, if any adverse piece or pawn stand upon the first diagonal square, either to right or left, such adverse piece or pawn can be captured and removed from the board, the captor taking its place, but a pawn cannot take any man standing directly in front of it. In other words, a pawn moves straight forward except when he captures, in which case he moves diagonally, and for capturing purposes he can only, even for his first move, advance one square. When a pawn arrives at an eighth square, viz., at the extreme limit of the board, he may be promoted, that is to say, he may, at the option of his owner, become a queen, rook, bishop, or knight; and it matters not how many queens or other pieces a player may have on the board at one time.

Check and Checkmate.—The king can never be captured, but when any piece or pawn attacks him, he is said to be "in check," and the fact of his being so attacked should be announced by the adverse player saying "check," whereupon the king must move from the square he occupies, or be screened from the check by the interposition of one of his own men or the attacking piece must be captured. If, however, the king, being thus in check, cannot move to another square without being still in check, and there is no piece or pawn which can be interposed, and the checking piece or pawn cannot be taken, then it is "checkmate," whereupon the game terminates, the player whose king has been thus checkmated being the loser. The position of the king when in check being the same as that of any piece when exposed to be captured, with the only difference that the king cannot be taken, it follows that the pawn gives check just in the same way that he captures, viz., diagonally. One king cannot give check to the other, nor can a king be moved into check.

Stalemate.—When the king is not in check, but his owner has no move left save such as would place the king in check, this is "stalemate," and the game is drawn.

Castling.—This is a peculiar move permitted to the king once in the game; it is performed in combination with either the king's rook or the queen's rook, and in either case by the king being moved two squares laterally, while the rook is placed on the other side of him. But the king cannot castle after having been moved, nor with a rook that has moved, nor when any piece either white or black stands between him and the rook, nor if he is in check, nor when he has to cross over a square commanded by an adverse piece or pawn; the rook can, however, move from or cross over such a square. It will be perceived that after castling with the king's rook the latter will occupy the K B square, while the king stands on the K Kt square, and if with the queen's rook, the latter will occupy the queen's square while the king stands on the Q B square. This move will easily be understood with the aid of diagram 2.

Taking en Passant.—This is a privilege possessed by any of the pawns under the following circumstances:—If a pawn, say of the white color, stands upon a fifth square, say upon K 5 counting from the white side, and a black pawn in the supposed case moves to Q 4 or K B 4 counting from the black side, the white pawn can take the black pawn "en passant." For the purposes of such capture the latter is dealt with as though he had only moved to Q 3 or K B 3, and the white pawn taking him diagonally then occupies the square the captured pawn would have reached had he moved but one square.

Drawn Game.—This arises from a stalemate (noticed above), or from either player not having sufficient force wherewith to effect checkmate, as when there are only two kings left on the board, or king and bishop against king, or king and one or even two knights against king. The same consequence follows from either player being able to give perpetual check to the adverse king. There are also cases in which one of the players can call upon the other to give checkmate in fifty moves, the result of failure being that the game is drawn. The right to make this requisition arises in various positions, to explain all of which would take up much space; it is sufficient to say that when neither side has any pawns left on the board the player with the inferior force may make the fifty moves call.

Other Chess Terms.—A "minor piece" means either a knight or bishop. "Gaining the exchange" signifies giving a minor piece in exchange for a rook. A "passed pawn" is one that has no adverse pawn either in front or on either of the adjoining files. It may be as well to explain that a "file" is simply a line of squares extending vertically from one end of the board to the other. There are therefore eight files, and they are respectively named after the pieces which occupy the first squares on either side, as, *e.g.*, the "king's file," which extends from one king to the other, and so forth. An "open file" is one on which no piece or pawn of either color is standing. "Gambit" is a word derived from the Italian *gambetto*, a tripping up of the heels; it is a term used to signify an opening in which a pawn is sacrificed to obtain an attack. An "opening," or "début," is a certain set method of commencing the game; there are regular and irregular openings. A "check by discovery" is given when a player, by moving one of his pieces, checks with another of them. "Double check," as its name implies, means attacking the king at once with two pieces,—one of the pieces in this case giving check by discovery.

Value of the Pieces.—The relative worth of the chess men cannot be definitely stated on account of the increase or decrease of their powers according to the position of the game, but striking an average, and taking the pawn as the unit, the following will be an estimate near enough for practical purposes:—pawn 1, bishop 3·25, knight 3·25, rook 5, queen 9·50. Three minor pieces may more often than not be advantageously exchanged for the queen. The knight is generally stronger than the bishop in the end game, but two bishops are usually stronger than two knights, more especially in open positions.

Laws.—The laws of chess differ, although not very materially, in different countries. Various steps have been taken, but as yet without success, to secure the adoption of a universally authoritative code. In competitions among English players the particular laws to be observed are specially agreed on,—the regulations most generally adopted being those laid down at length in Staunton's *Chess Praxis*, or the modification of the *Praxis* laws issued in the name of the British Chess Association in 1862.

The following rules may be here indicated. The board must be so placed that each combatant has a white square in his right hand corner. A player touching any of his own men or those of his adversary (except accidentally) without previously saying "*j'adoube*," or "I adjust," or words to that effect, may be compelled to move or capture (as the case may be) the man so touched; if this cannot be done he must move his king, but if that be likewise im-

possible, there is then no penalty. If a player make a false or illegal move or capture, he must, at the choice of his opponent, and according to the case, move his own man legally, capture the man legally, or move any other man legally movable. In practice, the usual demand is that the offender shall move his king. After four moves have been made on each side, any such illegality is waived, and the game must be played out as it stands. Should the king be left in check, all the moves subsequently made must be retraced and the check replied to.

Modes of Notation.—The English and German systems of notation (*i. e.* the manner of describing the moves made in a game) are different. According to the English method each player counts from his own side of the board, and the moves are denoted according to the names of the files and the numbers of the squares. Thus when a player for his first move advances the king's pawn two squares, it is described as follows:—"1 P to K 4;" for the pawn has moved to the fourth square of the king's file. The following moves of the Giuoco Piano Opening, with the aid of diagram 2, will enable the reader to understand the principles of the British notation, wherein it may also be observed that only the initials of the pieces are now used:—

White.	Black.
1. P to K 4	1. P to K 4
2. K Kt to K B 3 (*i.e.*, King's Knight to the third square of the King's Bishop's file.)	2. Q Kt to Q B 3 (*i.e.*, Queen's knight to the third square of the Queen's Bishop's file.)
3. K B to Q B 4 (King's Bishop to the fourth square of the Queen's Bishop's file.)	3. K B to Q B 4 (same as White's third move.)
4. P to Q B 3 (Pawn to the third square of the Q B file.)	4. K Kt to K B 3 (same as White's second move.)
5. P to Q 4 (Pawn to the fourth square of the Queen's file.)	5. P takes P (King's Pawn takes White's Queen's Pawn.)
6. P takes P (Queen's Bishop's Pawn takes Pawn at the fifth square of the adverse Queen's file.)	6. K B to Q Kt 5 (ch) (King's Bishop to the fifth square of the Queen's Knight's file, giving check to the White King.)

It is now usual to express the notation as concisely as possible; thus, the third moves of White and Black would be given as 3 B to B 4, because it is clear that only the fourth square of the queen's bishop's file is intended. In like manner White's fourth move would be described as 4 P to B 3, and Black's fourth move as 4 Kt to B 3. Sometimes instead of the word "takes" a cross is used, thus—6 P × P.

The German notation employs the alphabetical characters *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h*, proceeding from left to right, and the numerals 1, 2, 3, 4, 5, 6, 7, and 8, running upwards, these being always calculated from the White side of the board (see diagram 2). Thus the White Queen's Rook's square is *a*1; the Black Queen's Rook's square, *a*8; the White Queen's square is *d*1; the Black Queen's square, *d*8; the White King's square, *e*1; the Black King's square, *e*8, and so with the other pieces and squares. The German names of the pieces are as follows:—King, *König;* Queen, *Dame;* Rook, *Thurm;* Bishop, *Laufer;* Knight, *Springer;* Pawn, *Bauer.*

The initials only of the pieces are given, the pawns (*Bauern*) being understood. The Germans use the following signs in their notation, viz.:—for "check" (†); "checkmate" (‡); "takes" (:); "castles on King's side" (0-0); "castles on queen's side" (0-0-0); for "best move" a note of admiration (!); for "weak move" a note of interrogation (?). The Giuoco Piano opening moves just rendered in the English will now be given in the German notation, which will make the latter easily intelligible:—

White.	Black.
1. e2–e4.	1. e7–e5
2. S g1–f3	2. S b8–c6
3. L f1–c4	3. L f8–c5
4. c2–c3	4. S g8–f6 !
5. d2–d4	5. e5–d4 :
6. c3–d4 :	6. L c5–b4 †

Both in the English and German notations the moves are often rendered in a tabular form, thus:—1. $\frac{\text{P to K 4}}{\text{P to K 4}}$; 1. $\frac{\text{e2–e4}}{\text{e7–e5}}$, the moves above the line being White's and below the line Black's.

Illustrative Games.—There are various text-books upon the beginnings and endings of games, to one or other of which the learner should have recourse. Some of them are mentioned further on; but it would be invidious to enter upon any comparison of merits, or to recommend any work in particular. The following are given as indicative illustrations of certain of the leading openings; but, necessarily, no attempt can be made here to impart detailed instruction on this important branch of the game:—

Giuoco Piano.

White.	Black.
1. P to K 4	1. P to K 4
2. K Kt to B 3	2. Q Kt to B 3
3. B to B 4	3. B to B 4
4. P to B 3	4. Kt to K B 3
5. P to Q 4	5. P takes P
6. P takes P	6. B to Kt 5 (ch)
7. B to Q 2	7. B takes B (ch)
8. Q Kt takes B	8. P to Q 4
9. P takes P	9. K Kt takes P
10. Q to Kt 3	10. Q Kt to K 2
11. Castles (K's side)	11. Castles.

Even game.

Ruy Lopez.

White.	Black.
1. P to K 4	1. P to K 4
2. K Kt to B 3	2. Q Kt to B 3
3. B to Kt 5	3. P to Q R 3
4. B to R 4	4. Kt to B 3
5. P to Q 4	5. P takes P
6. P to K 5	6. Kt to K 5
7. Castles	7. B to K 2
8. R to K sq	8. Kt to B 4
9. B takes Kt	9. Q P takes B
10. Kt takes P	10. Castles
11. Kt to Q B 3	11. P to K B 3

Even game.

Scotch Gambit.

White.	Black.
1. P to K 4	1. P to K 4
2. K Kt to B 3	2. Q Kt to B 3
3. P to Q 4	3. P takes P
4. B to Q B 4	4. B to B 4
5. P to B 3	5. Kt to B 3
6. P takes P	

The position here arrived at is the same as in the Giuoco Piano opening above.

Evans Gambit.

White.	Black.
1. P to K 4	1. P to K 4
2. K Kt to B 3	2. Q Kt to B 3
3. B to B 4	3. B to B 4
4. P to Q Kt 4	4. B takes Kt P
5. P to B 3	5. B to B 4
6. P to Q 4	6. P takes P
7. Castles	7. P to Q 3
8. P takes P	8. B to Kt 3

White has for his ninth move three approved continuations, viz., B to Kt 2, P to Q 5, and Kt to B 3. To take one of them,—

9. P to Q 5	9. Kt to R 4
10. B to Kt 2	10. Kt to K 2
11. B to Q 3	11. Castles
12. Kt to B 3	12. Kt to Kt 3
13. Kt to K 2	13. P to Q B 4
14. Q to Q 2	14. P to B 3
15. K to R sq	15. B to B 2
16. Q R to B sq	16. R to Kt sq

The game may be considered about even.

King's Knight's Gambit (proper).

White.	Black.
1. P to K 4	1. P to K 4
2. P to K B 4	2. P takes P
3. K Kt to B 3	3. P to K Kt 4
4. B to B 4	4. B to Kt 2
5. Castles	5. P to Q 3
6. P to Q 4	6. P to K R 3
7. P to B 3	7. Kt to K 2

Black has the advantage.

Allgaier-Kieseritzki Gambit.

White.	Black.
1. P to K 4	1. P to K 4
2. P to K B 4	2. P takes P
3. Kt to K B 3	3. P to K Kt 4
4. P to K R 4	4. P to Kt 5
5. Kt to K 5	5. K Kt to B 3
6. B to B 4	6. P to Q 4
7. P takes P	7. B to Kt 2
8. P to Q 4	8. Castles
9. B takes P	9. Kt takes P
10. B takes Kt	10. Q takes B
11. Castles	11. P to Q B 4

Black has the better game.

King's Bishop's Gambit.

White.	Black.
1. P to K 4	1. P to K 4
2. P to K B 4	2. P takes P
3. B to B 4	3. P to Q 4
4. B takes P	4. Q to R 5 (ch)
5. K to B sq	5. P to K Kt 4
6. K Kt to B 3	6. Q to R 4
7. P to Q 4	7. B to Kt 2
8. P to K R 4	8. P to K R 3
9. Kt to B 3	9. Kt to K 2
10. K to Kt sq	10. P to Kt 5
11. Kt to K 5	11. B takes Kt
12. P takes B	12. Q takes K P
13. Q to B sq	13. P to B 6
14. P takes P	14. Q to Kt 6 (ch)
15. Q to Kt 2	

Drawn game.

Salvio Gambit.

White.	Black.
1. P to K 4	1. P to K 4
2. P to K B 4	2. P takes P
3. K Kt to B 3	3. P to K Kt 4
4. B to B 4	4. P to Kt 5
5. Kt to K 5	5. Q to R 5 (ch)
6. K to B sq	6. Kt to K R 3
7. P to Q 4	7. P to B 6
8. Kt to Q B 3	8. P to Q 3
9. Kt to Q 3	9. P takes P (ch)
10. K takes P	10. B to Kt 2
11 Kt to Q B 4	11. Kt to B 3
12 B to K 3	12. Castles
13 Q Kt to Q 5	13. Q to Q sq
14. P to B 3	

White has a slight advantage.

Muzio Gambit.

1. $\frac{\text{P to K 4}}{\text{P to K 4}}$ 2. $\frac{\text{P to K B 4}}{\text{P takes P}}$ 3. $\frac{\text{K Kt to B 3}}{\text{P to K Kt 4}}$ 4. $\frac{\text{B to B 4}}{\text{P to Kt 5}}$

White.	Black.
5. Castles	5. P takes Kt
6. Q takes P	6. Q to B 3
7. P to K 5	7. Q takes P
8. P to Q 3	8. B to R 3
9. B to Q 2	9. Kt to K 2
10. Kt to B 3	10. Q Kt to B 3
11. Q R to K sq	11. Q to K B 4
12. R to K 4	12. Castles
13. Q B takes P	13. B to Kt 2
14. Q to K 2	14. P to Q 4
15. B takes B P	15. Q to Kt 4
16. P to K R 4	16. Q to Kt 3
17. Kt takes P	17. Kt takes Kt
18. B takes Kt	18. B to B 4
19. Q R to K B 4	19. B to K 3
20. B takes B	20. P takes B
21. R to K 4	21. R takes R (ch)
22. K takes R	22. R to B sq (ch)
23. K to Kt sq	23. Kt to Q 5

And Black has the better game.

Queen's Gambit.

White.	Black.
1. P to Q 4	1. P to Q 4
2. P to Q B 4	2. P takes P
3. P to K 3	3. P to K 4
4. B takes P	4. P takes P
5. P takes P	5. B to Q 3
6. Kt to K B 3	6. Kt to K B 3.
7. Castles	7. Castles
8. P to K R 3	8. P to K R 3
9. Kt to Q B 3	9. P to Q B 3

The game is about equal, though White has a somewhat freer position.

The two following games are brilliant specimens of the style of those eminent players, Herr Anderssen and Mr. Paul Morphy. The manner in which White in the first game forces the victory, though losing piece after piece, scarcely finds a parallel in the records of chess strategy.

King's Bishop's Gambit.

White.	Black.
Herr Anderssen.	Herr Kieseritzki.
1. P to K 4	1. P to K 4
2. P to K B 4	2. P takes P
3. B to B 4	3. Q to R 5 (ch)
4. K to B sq	4. P to Q Kt 4
5. B takes Kt P	5. Kt to K B 3
6. Kt to K B 3	6. Q to R 3
7. P to Q 3	7. Kt to R 4
8. Kt to R 4	8. Q to Kt 4
9. Kt to B 5	9. P to Q B 3
10. P to K Kt 4	10. Kt to B 3
11. R to Kt sq	11. P takes B
12. P to K R 4	12. Q to Kt 3
13. P to R 5	13. Q to Kt 4
14. Q to B 3	14. Kt to Kt sq
15. B takes P	15. Q to B 3
16. Kt to B 3	16. B to B 4
17. Kt to Q 5	17. Q takes Kt P
18. B to Q 6	18. Q takes R (ch)
19. K to K 2	19. B takes R
20. P to K 5	20. Kt to Q R 3

White gives checkmate in three moves.

Philidor's Defence.

White.	Black.
Mr. Barnes.	Mr. Morphy.
1. P to K 4	1. P to K 4
2. Kt to K B 3	2. P to Q 3
3. P to Q 4	3. P to K B 4
4. P takes K P	4. B P takes P
5. Kt to Kt 5	5. P to Q 4
6. P to K 6	6. B to Q B 4
7. Kt to B 7	7. Q to B 3
8. B to K 3	8. P to Q 5
9. B to K Kt 5	9. Q to B 4
10. Kt takes R	10. Q takes B
11. B to B 4	11. Kt to Q B 3
12. Kt to B 7	12. Q takes P
13. R to B sq	13. Kt to B 3
14. P to K B 3	14. Kt to Q Kt 5
15. Kt to Q R 3	15. B takes P
16. B takes B	16. Kt to Q 6 (ch)
17. Q takes Kt	17. P takes Q
18. Castles	18. B takes Kt
19. B to Kt 3	19. P to Q 7 (ch)
20. K to Kt sq	20. B to B 4
21. Kt to K 5	21. K to B sq
22. Kt to Q 3	22. R to K sq
23. Kt takes B	23. Q takes R

And White resigns.

END-GAMES AND PROBLEMS.—Considerable attention has been devoted by writers on chess to the examination of end-games, and many of the particular combinations of forces that are apt to occur have been fully and carefully analyzed. The study of and taste for problems have become very general in the chess community, especially within the last twenty years; and to minister to the growing public demand for such compositions is now an important function of chess periodicals, and of the numerous serial publications that devote a column to chess. The six problems given below[1] are prize-winners. The solutions (necessarily the leading variations only) will be found at the close of the article, p. 524.

VARIOUS THEORIES AS TO THE INVENTION OF CHESS.—The origin of the game of chess is lost in obscurity, a fact which has rather invited than repelled learned speculations on the subject. The invention of the pastime has been variously ascribed to the Greeks, Romans, Babylonians, Scythians, Egyptians, Jews, Persians, Chinese, Hindus, Arabians, Araucanians, Castilians, Irish, and Welsh. Not content with upholding the claims of nations or races, some have endeavored to fix upon particular individuals as the originators of the game; and, amongst others, the following have found supporters:—Japhet, Shem, King Solomon, the wife of Ravan king of Ceylon, the philosopher Xerxes, the Grecian prince Palamedes, Hermes, Aristotle, the brothers Lydo and Tyrrhene, Semiramis, Zenobia, Attalus who died about 200 B.C., and the mandarin

[1] PROBLEM NO. 1.

By J. Kling.

(Adjudged the best two-move problem of the British Chess Association Tourney, 1872.)

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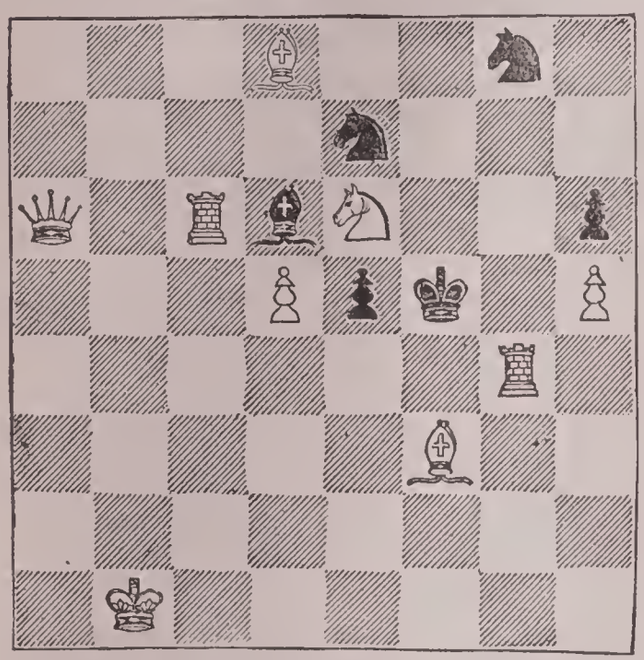

WHITE.

White to play and mate in two moves.

PROBLEM NO. 2.

By the Rev. George M'Arthur.

(The prize problem of the Cambridge Tourney, 1860.)

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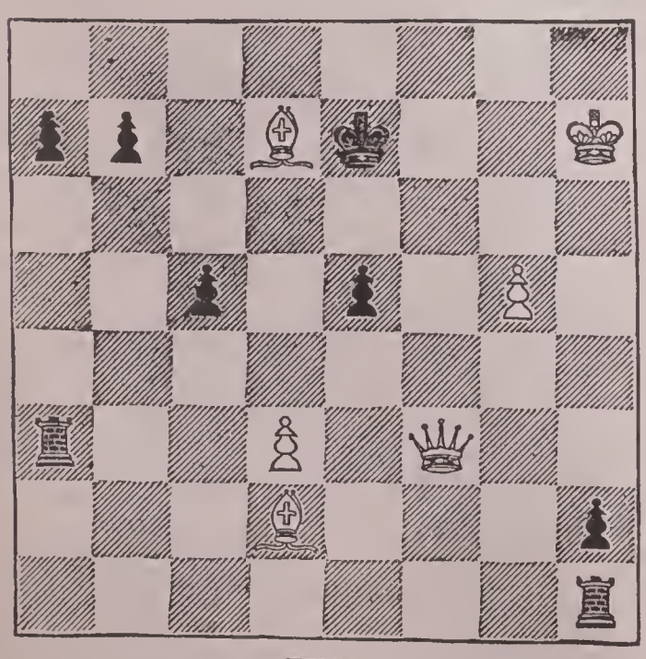

WHITE.

White to play and mate in three moves.

PROBLEM NO. 3.

By F. Healey.

(One of the first-prize set of the Bristol Tourney, 1861.)

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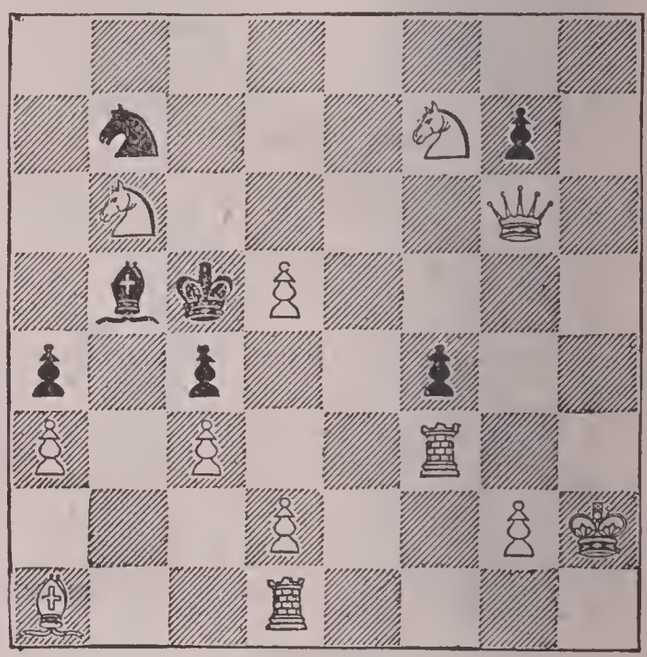

WHITE.

White to play and mate in three moves.

PROBLEM NO. 4.

By S. Loyd.

(One of the second-prize set of the Paris Tourney, 1867.)

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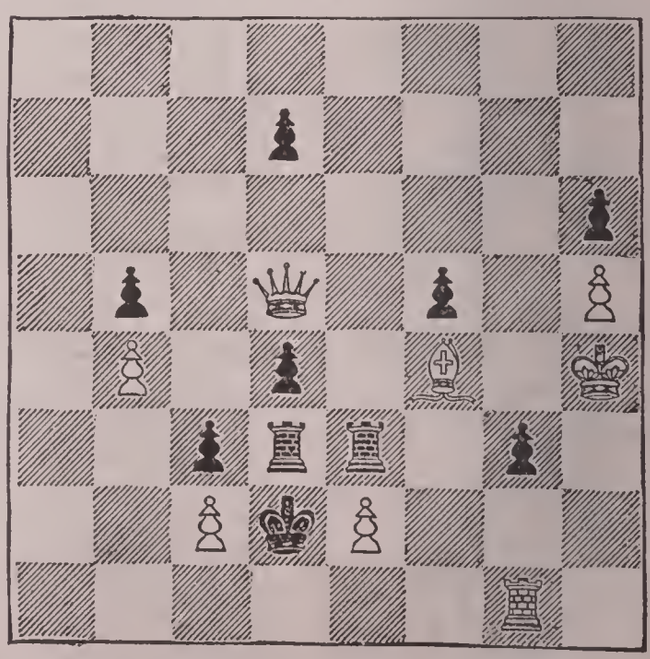

WHITE.

White to play and mate in four moves.

Hansing, the Brahman Sissa, and Shatrensha, stated to be a celebrated Persian astronomer. Many of these ascriptions are of course fabulous, others rest upon little authority, and some of them proceed from easily traceable errors, so where the Roman games of *Ludus Latrunculorum* and *Ludus Calculorum*, the Welsh recreation of *Tawlbwrdd, i.e.*, throw-board, and the ancient Irish pastime of *Fithcheall* are assumed to be synonymous with chess; whereas, so far as the Romans and Welsh are concerned, the contrary can be proved, while from what little is known of the Irish game it appears not to have been a sedentary game at all, but most likely an open-air recreation. The claims of the Chinese were advocated in a letter addressed by Mr. Eyles Irwin in 1793 to the Earl Charlemont. This paper was published in the *Transactions of the Royal Irish Academy*, and its purport was that chess, called in the Chinese tongue *chong-ki*, which, according to Mr. Irwin, means the "royal game," was invented in the reign of Kao Tsu, otherwise Lin Pang, then king, but afterwards emperor of Kiangnan, by a mandarin named Hansing, who was in command of an army invading the Shensi country, and who wanted to amuse his soldiers when in winter quarters so that they might no longer clamor to return home. According to the narrative, this invasion of the Shensi country by Hansing took place about 174 B.C. Captain Hiram Cox, in a commentary upon the above letter, states that the game is called by the Chinese *choke-choo-hong ki*, literally, "the play of the science of war." (See also a paper published by the Hon. Daines Barrington in the 9th vol. of the *Archæologia*.) Mr. N. Bland, M.R.A.S., in his *Persian Chess* (London, 1850), endeavors to prove that the Persians were the inventors of chess, and he maintains that the game, after being born in Persia, found a home in India, whence, after a series of ages, it was brought back to its original birthplace. The view, however, which has been most seriously put forward, and which has obtained the most credence, is that which attributes the origin of chess to the Hindus. Dr. Hyde of Oxford, writing in 1694 (*De Ludis Orientalibus*), seems to have been the first to propound this theory. He, however, labored under two somewhat serious disadvantages; he appears to have been ignorant of the game itself, and the treasures of ancient Hindu knowledge contained in Sanskrit records were not accessible in his time. About 1783–89 Sir William Jones took up the mantle of Hyde, and in an essay published in the 2d vol. of *Asiatic Researches*, argued that Hindustan was the cradle of chess, the game having been known there from time immemorial by the name of *chaturanga*, that is, the four "angas," or members of an army which are said in the *Amarakosha* to be elephants, horses, chariots, and foot soldiers. As applicable to real armies, the term chaturanga is frequently used by the epic poets of India. Sir William Jones was resident in Bengal, and was president of the Asiatic Society of that province; he commenced the study of Sanskrit to assist him in his judicial functions, and was the first who possessed real and profound knowledge of that language; he was, besides, well acquainted with and fond of chess, so that altogether he was more advantageously situated than Hyde for forming an opinion upon the matter. His essay is substantially a translation of and a commentary upon the *Bhawishya Purana*, in which is given a description of a four-handed game of chess played with dice. A pundit named Rhadhakant informed him that this was mentioned in the oldest law books, as also that it was invented by the wife of Ravan, king of Lanka (Ceylon), in the second age of the world, in order to amuse that monarch while Rama was besieging his metropolis. This account claims for chess an existence of 4000 or 5000 years. Sir William, however, grounds his opinions as to the Hindu origin of chess upon the testimony of the Persians, and not upon the above manuscript; while he considers the game described therein to be more modern than the Persian game. Though sure that the latter came from and was invented in India, he yet, with commendable candor, admits that he could not find any account of it in the classical writings of the Brahmans. He lays it down that chess under the Sanskrit name chaturanga was exported from India into Persia in the 6th century of our era; that by a natural corruption the old Persians changed the name into chatrang, but their country was soon afterwards taken possession of by the Arabs, who had neither the initial nor final letter of the word in their alphabet, wherefore, they altered it farther into Shatranj, which name found its way presently into the modern Persian, and ultimately into the dialects of India.

So far Sir William Jones; but Captain Hiram Cox, in a letter upon Burmese chess, written in 1799, and published in the 7th vol. of *Asiatic Researches*, refers to the above essay, and considers the four-handed game described in the above-mentioned Sanskrit manuscript to be the most ancient form of chess,—the Burmese and Persian games coming successively second and third in order of precedence. Later on, viz., in the 11th and 24th vols. of the *Archæologia*, Mr. Francis Douce and Sir Frederick Madden expressed themselves in favor of the views held by Hyde and his followers.

This brings us to the issue of Professor Duncan Forbes's

PROBLEM No. 5.

By Lieutenant S. A. Sorensen.

(One of the first-prize set of the British Chess Association Tourney, 1872, and also adjudged the best four-move problem of the Tourney.)

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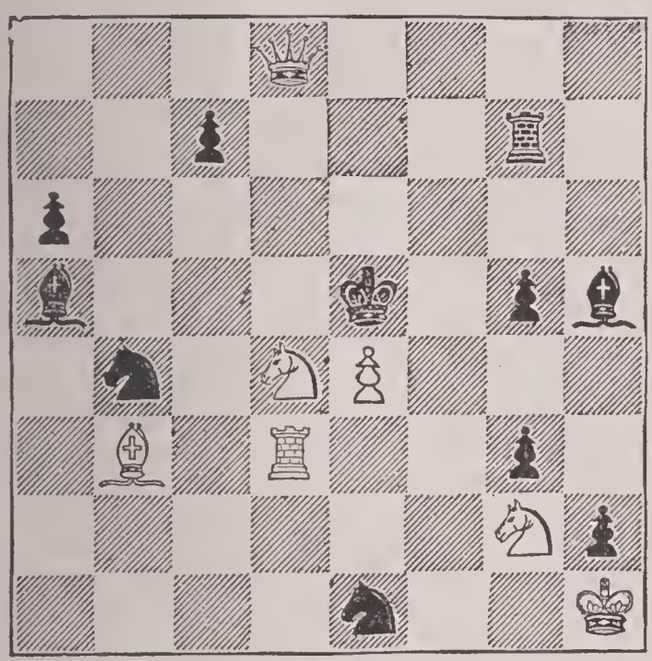

WHITE.

White to play and mate in four moves.

PROBLEM No. 6.

By Dr. Conrad Bayer.

(One of the first-prize set of the British Chess Association Tourney, 1862, and also adjudged the best problem in the Tourney.)

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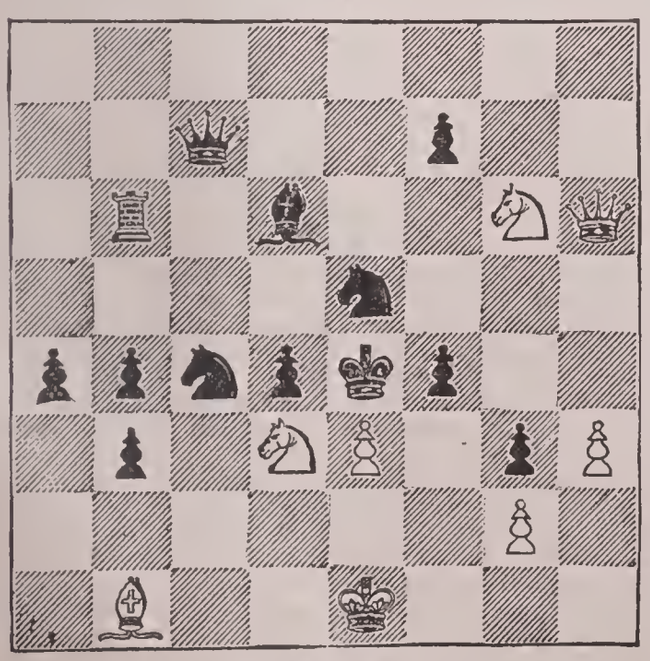


WHITE.

White to play and mate in five moves.

History of Chess, in 1860, in which Captain Cox's views, as founded upon Sir William Jones's Sanskrit manuscript, are upheld and developed into an elaborate theory. Professor Forbes holds that the four-handed game of chaturanga described in the *Bhawishya Purana* was the primeval form of chess; that it was invented by a people whose language was Sanskrit (*i.e.*, the Hindus); and that it was known and practised in India from a time lost in the depths of a remote antiquity, but, as he considers, for a period the duration of which may have been from 3000 to 4000 years before the 6th century of the Christian era. He endeavors to show, though certainly quite speculatively, for he adduces no proof, how the four armies commanded by four kings in Sir William Jones's manuscript became converted into two opposing armies, on which conversion he says that two of the kings were reduced to a subordinate position, and became "monitors" or "counsellors," one standing by the side of the white and the other of the black king, these counsellors being the farzins from which we derive our queens. Among other points he argues, apparently with justice, that chaturanga was evidently the root of shatranj, for the latter word he states is a mere exotic in the language of the inhabitants of Persia, defying all the ingenuity of their grammarians to make it their own.

Van der Linde, in his exhaustive work, *Geschichte und Litteratur des Schachspiels* (Berlin, 1874), has much to say of the origin theories, nearly all of which he treats as so many myths. He agrees with those who consider that the Persians received the game from the Hindus; but the elaborate chaturanga theories of Forbes receive but scant mercy at the hands of the learned Dutch author. Van der Linde argues that chaturanga is always used of an army, and never of a game, by the old Indian poets; that all Sanskrit scholars are agreed that chess is mentioned in none of the really ancient Hindu records; that the *Puranas* generally, though formerly considered to be extremely old, are held in the light of modern researches to reach no further back in reality than the 10th century,—while, moreover, the copies of the *Bhawishya Purana* which are in the British Museum and Berlin Library do not contain the extract relied upon by Forbes, though it is to be found in the *Raghunandana*, which was translated by Weber in 1872, and is stated by Bühler to date from the 16th century. The ultimate outcome of Van der Linde's studies appears to be that chess certainly existed in Hindustan in the 8th century, and that probably that country is the land of its birth. While putting forth nothing as positive which cannot be proved, he inclines to the idea that the game originated among the Buddhists, whose religion was prevalent in India from the 3d to the 9th century. According to their ideas, war and the slaying of one's fellowman, for any purpose whatever, is criminal, and the punishment of the warrior in the next world will be much worse than that of the simple murderer; but they ministered to the combative propensities of human nature by inventing the bloodless warfare of chess as a harmless imitation of and a substitution for the carnage of the battle-field. In opposition to Forbes, therefore, and agreeing with Sir William Jones, Van der Linde takes the view that the four-handed game of the above-mentioned manuscript is a comparatively modern adaptation of the primal Hindu chess, and he altogether denies that there is any proof of the game in whatever form having the antiquity attributed to it. Certainly, internal evidences seem to contradict the view of Sir William Jones's manuscript being a very ancient testimony; for it mentions two great sages, Vyasa and Gotama, the former as teaching chaturanga to Prince Yudhishthira, and the other as giving an opinion upon certain principles of the game; but this could not well be, seeing that it was played with dice, and all games of hazard were positively forbidden by Menu. It would appear also that Indian manuscripts cannot be absolutely relied on in evidence of the antiquity of their contents; for the climate has the effect of destroying such writings in a period of 300 or 400 years. They must therefore be from time to time re-copied, and in this way later interpolations might easily creep in.

Von der Lasa, who had, in an article prefixed to the *Handbuch* in 1864, accepted Forbes's views, withdraws his support in a review of the work just noticed, published in the September and November numbers of the *Deutsche Schachzeitung*, 1874, and expresses his adherence to the opinions set forth by Van der Linde.

Altogether, therefore, we find the best authorities agreeing that chess existed in India before it is known to have been played anywhere else,—a fact which naturally leads them to fix upon that country as its probable birth-place. In this supposition they are strengthened by the names of the game and of some of the pieces. Shatranj, as Forbes has well pointed out, is a foreign word among the Persians and Arabians, whereas its natural derivation from the term chaturanga will strike an ordinarily educated as well as a scholarly mind. Again, al-fil, the Arabic name of the bishop, means the elephant, otherwise alephhind, the Indian ox. As to how long chess has really existed, unless we choose to rely upon evident myths and old fables, we shall find no ground whatever for attributing to it the great antiquity that some have maintained. Our earliest authority is Masudi, an Arabic author who wrote about 950 A.D. According to him, shatranj had existed long before his time; but the spirit of historic criticism will not permit of our unreservedly accepting his testimony in that regard. Say that he may speak not only for his own generation but for a couple of centuries before, and that will give an existence to chess of over a thousand years, a respectable period of time enough, and one to be satisfied with until a greater duration be proved.

Chess in Early and Mediæval Times.—The dimness which shrouds from view the origin of chess naturally obscures also its early history. All kinds of fables and legends lie in the way of the inquirer, and obstruct his progress, so that until a comparatively recent date a firm historical foundation is not to be found. We have seen that chess crossed over from India into Persia, and became known in the latter country by the name of shatranj. Some have understood that word to mean "the play of the king;" but undoubtedly Sir William Jones's derivation carries with it the most plausibility, if indeed his reasons may not be said to amount to a demonstration of the correctness of his view. But how and when the game was introduced into Persia we have no means of knowing. True, the Persian poet Firdusi, in his historical poem, the *Shahnama*, gives an account of the introduction of shatranj into Persia in the reign of Naushirawan (Chosroes), to whom came ambassadors from the sovereign of Hind, *i.e.*, India, with a chess-board and men, asking him to solve if he could the secrets of the game, and otherwise to pay tribute. Naushirawan was the contemporary of Justinian, and reigned in the 6th century of our era. Professor Forbes seems to think that this poem may be looked upon as substantially an authentic history and credited as such. This appears, however, to be somewhat dangerous, especially as Firdusi lived some 450 years after the supposed event took place. Other Persian and Arabian writers state that shatranj came into Persia from India, and there appears, as we have seen, such a consensus of opinion as may be considered to settle that part of the question. We have then the game passing from the Hindus to the Persians, thence to the Arabians after they took possession of Persia in the 7th century, and from whom directly or indirectly it came to various parts of Europe, at a time which cannot be definitely fixed upon, but which was either in or before the 11th century. That the source of the European game is Arabic is clearly enough deducible, not merely from the words "check" and "mate," which are evidently from *Shāh māt*, but also from the names of some of the pieces, to be noticed further on. There are various chess legends having reference to the 7th and 8th centuries, but these may be passed by as presenting no appearance of historical verity; and equally unworthy of credence appear the many Oriental and Occidental romances which revolve around those two great central figures, Harun al Rashid and Charlemagne. There is no proof that either of them knew anything of chess, or, so far as the latter is concerned, that it had been introduced into Europe in his time. True, there is an account given in Gustavus Selenus, taken from various old chronicles, as to the son of Prince Okar or Otkar of Bavaria having been killed by a blow on the temple struck by a son of Pepin after a game of chess; and there is another well-known tradition as to the magnificent chess-board and set of men said to have been sent over as a present by the Empress Irene to Charlemagne. But both tales are not less mythical than the romance which relates how the great Frankish monarch lost his kingdom over a game of chess to Guerin de Montglave; for Van der Linde shows that there was no

Bavarian prince of the name of Okar or Otkar at the period alluded to, and in an equally relentless manner the skeptical Dutch writer breaks down the tradition about Irene's chessmen. With respect to Harun al Rashid, among the various stories told which connect him with chess, there is one which at first sight may seem entitled to some degree of credit. In the annals of the Moslems by Abulfeda, there is given a copy of a letter stated to be "From Nicephorus, emperor of the Romans, to Harun, sovereign of the Arabs," which (using Professor Forbes's translation), after the usual compliments, runs thus:—"The empress (Irene) into whose place I have succeeded, looked upon you as a *Rukh* and herself as a mere *Pawn*, therefore she submitted to pay you a tribute more than the double of which she ought to have exacted from you. All this has been owing to female weakness and timidity. Now, however, I insist that you, immediately on reading this letter, repay to me all the sums of money you ever received from her. If you hesitate, the sword shall settle our accounts." Harun's reply, written on the back of the Byzantine emperor's letter, was terse and to the point. It ran thus:—"In the name of God the merciful and gracious. From Harun, the commander of the faithful, to the Roman dog Nicephorus. I have read thine epistle, thou son of an infidel mother; my answer to it thou shalt *see*, not *hear*." Harun was as good as his word, for he marched immediately as far as Heraclea, devastating the Roman territories with fire and sword, and soon compelled Nicephorus to sue for peace. Now the points which give authority to this narrative and the alleged correspondence are that the relations which they assume between Irene and Nicephorus on the one hand and the warlike caliph on the other are confirmed by the history of those times, while, also, the straightforward brevity of Harun's reply commends itself as what one might expect from his soldier-like character. Still, the fact must be remembered, that Abulfeda lived about five centuries after the time to which he refers. Perhaps we may assume it to be not improbable that the correspondence is genuine; but the words "rukh" and "pawn" may have been substituted for other terms of comparison originally made use of.

As to how chess was introduced into Western and Central Europe nothing is really known. The Spaniards very likely received it from their Moslem conquerors, the Italians not improbably from the Byzantines, and in either case it would pass northwards to France, going on thence to Scandinavia and England. Some say that chess was introduced into Europe at the time of the Crusades, the theory being that the Christian warriors learned to play it at Constantinople. This supposition is negatived by a curious epistle of Cardinal Damianus, bishop of Ostia, to Pope Alexander II. written about 1061 A.D., which, assuming its authenticity, shows that chess was known in Italy before the date of the first crusade. The cardinal, as it seems, had imposed a penance upon a bishop whom he had found diverting himself at chess; and in his letter to the Pope he repeats the language he had held to the erring prelate, viz., "Was it right, I say, and consistent with thy duty, to sport away thy evenings amidst the vanity of chess, and defile the hand which offers up the body of the Lord, the tongue that mediates between God and man, with the pollution of a sacrilegious game?" Following up the same idea the statutes of the church of Elna, in the 3d vol. of the *Councils of Spain*, say, "Clerks playing at dice or chess shall be *ipso facto* excommunicated." Eudes de Sully, bishop of Paris under Philip Augustus, is stated in the *Ordonn. des Rois de France*, to have forbidden clerks to play the game, and according to the *Hist. Eccles.* of Fleury, St. Louis king of France condemned to a fine all who should play it. Ecclesiastical authorities, however, seem to have differed among themselves upon the question whether chess was or was not a lawful game according to the canons, and Peirino, *De Prælat.* chap. 1, holds that it was permissible for ecclesiastics to play thereat. Among those who have taken an unfavorable view of the game may be mentioned John Huss, who, when in prison, deplored his having played at chess, whereby he had lost time and risked being subject to violent passions. Among authentic records of the game may be quoted the *Alexiad* of the Princess Anna Comnena, in which she relates how her father, the Emperor Alexius, used to divert his mind from the cares of state by playing at chess with his relatives. This emperor died in 1118. Concerning chess in England there is the usual mingle-mangle of the legendary and the possibly true. Snorre Sturleson relates that as Canute was playing at chess with Earl Ulfr, a quarrel arose, which resulted in the latter upsetting the board, with the further consequence of his being murdered in church a few days afterwards by Canute's orders. Carlyle, in his recent work, *The Early Kings of Norway*, repeats this tale, but Van der Linde treats it as a myth; and certainly the act imputed to the great-minded Dane seems altogether inconsistent with his character. The *Ramsey Chronicle* relates how Bishop Utheric, coming to Canute at night upon urgent business, found the monarch and his courtiers recreating themselves at dice and chess. There is nothing intrinsically improbable in this last narrative; but Canute died about 1035, and the date therefore is suspiciously early. Moreover, allowance must be made for the ease with which chroniclers turned other games, such as tables, &c., into chess. William the Conqueror, Henry I., John, and Edward I. are variously stated to have played at chess, but such assertions must be taken *quantum valeant*. Not devoid of plausibility is the allegation that the Court of Exchequer derives its name from *Eschiquier;* though whether, in support of the same idea, we are to believe, as is stated by an old writer, that at the coronation of Richard I. in 1189, six earls and barons carried a chess-board with the royal insignia to represent the said court is another thing. According to Edmonson's *Heraldry*, twenty-six English families bore chess rooks in their coats of arms. Altogether, strewed about the chronicles and writings of the Middle Ages are many allusions to the game, but the subject cannot be further elucidated here; though a word or two about the pieces and the changes they have undergone may be worth adding.

The king seems always to have had the same move as at present; but it is said he could formerly be captured. There seems no recorded proof, however, of his ever having been subject to this liability in the real shatranj. His castling privilege is a European invention; in lieu thereof he formerly leaped two and even three squares, and also to his Kt 2d, which would be a knight's move. Castling dates no further back than the first half of the 16th century. The queen has suffered curious changes in name, sex, and power. In shatranj she was called farz or firz (also farzan, farzin, and farzi), signifying a "counsellor," "minister," or "general." This was Latinized into farzia or fercia. The French slightly altered the latter form into fierce, fierge, and as some say, vierge, which, if true, might explain her becoming a female. Another and much more probable account has it that whereas a pawn on reaching an eighth square became a farzin, and not formerly any other piece, which promotion was of the same kind as at draughts (in French, *dames*), so she became a dame or queen as in the latter game, and thence dama, donna, &c. There are old Latin manuscripts in which the terms ferzia and regina are used indifferently. The queen formerly moved only one square diagonally, and was consequently the weakest piece on the board. The immense power she now possesses seems to have been conferred upon her so late as about the middle of the 15th century, and there can be little doubt that her investiture therewith arose analogically through the similarity of the powers of promotion possessed alike by the pawns and the common men in draughts. It will be noticed that under the old system the queens could never meet each other, for they operated on diagonals of different colors. The bishop's scope of action was also very limited formerly; he could only move two squares diagonally, and had no power over the intermediate squares, which he could leap over whether they were occupied or not. One result of the peculiar motion of the bishops was that they could never encounter each other even when running on diagonals of the same color. This limitation of their powers prevailed in Europe until the 15th century. This piece, according to Forbes, was called among the Persians, pil, an elephant, but the Arabs, not having the letter *p* in their alphabet, wrote it fil, or with their definite article al-fil, whence alphilus, alfinus, alfiere, the latter being the word used by the Italians; while the French no doubt get their fol and fou from the same source. The pawns formerly could move only one square at starting; their powers in this respect were increased about the early part of the 16th century. It was customary for them on arriving at an eighth square to be

exchanged only for a farzin (queen), and not any other piece; therefore, the plurality of queens is not, as some suppose, a new doctrine. The rooks and knights appear to have always had the same powers as at present. As to the chess boards they were formerly uncolored, and it is not until the 13th century that we hear of checkered boards being used in Europe.

Modern History of Chess.—The remarkable, not to say revolutionary, changes which, commencing about the middle of the 15th century, transformed the mediæval shatranj into our modern chess, took place most probably first in France, and thence made their way into Spain, where the new game was called *Axedrez de la Dama*, being also adopted by the Italians under the name of chess *alla rabiosa*. This revolution of the ancient method of play is contemporaneous with that tide of discovery which set in shortly after the conquest of Constantinople, and culminated in the introduction of typography, the discovery of America, the enunciation of the Copernican theory, &c. The time of the first important writer on modern chess, the Spaniard Ruy Lopez de Segura (1561), is also the period when the latest improvement, castling, was introduced, for his book (*Libro de la invencion liberal y arte del juego del Axedrez*), though treating of it as already in use, also gives the old mode of play, which consisted of a solitary leap of the king. Shortly afterwards, the old shatranj disappears altogether, the struggle for existence resulting as usual in the victory of the stronger. Of Lopez it may be said that he was the first who merits the name of chess analyst, as he gives reasons for his different variations in the openings, and for holding different opinions from his predecessor Damiano. At this time flourished the flower of the Spanish and Italian schools of chess—the former represented by Lopez, Ceron, Santa Maria, Busnardo, and Avalos; the latter by Giovanni Leonardo da Cutri (il Puttino), and Paolo Boi (il Syracusano). In the years 1562–1575, both Italian masters visited Spain, and defeated their Spanish antagonists, so that this period is rightly considered as that when international chess tournaments first took place. The following century yielded a great number of chess writers, but scarcely any great players; and, in fact, during the whole 17th century, we find but one worthy to be mentioned, viz., the very ingenious Giacchino Greco (il Calabrese), whose recorded games abound in the most beautiful, but often not very sound, combinations. The middle of the 18th century inaugurates a new era in chess, for now the compilations and reprints of very indifferent writers were abandoned by the student and relegated to the collections of bibliophilists. Instead we find real chess-players and painstaking analysts. The leading man of this time was François André Danican Philidor. He was born the 7th of September, 1726, at Dreux, near Paris, played chess very early, and was trained by the M. de Kemur Sir de Legal, the then star of the Café de la Régence, which has been the centre of French chess ever since the commencement of the 18th century. In 1747 Philidor visited England, and defeated the Arabian player Phillip Stamma by 8 games to 1 and 1 draw. In 1749 he published in London his *Analyse des Echecs*, a book which went through more editions and was more translated than a score of other works upon the game. In fact it was the chess Koran. During more than half a century Philidor travelled much in England, Holland, and Germany; but unfortunately he never went to Italy, the only country where he could have found opponents of first-rate skill. Italy was represented in Philidor's time by a trio renowned in the history of chess as forming the Modenese school—Ercole del Rio, Lolli, and Ponziani. The style of these experts was less sound than that of Philidor, but certainly a much finer and, in principle, a better one. It may be added that as an analyst the Frenchman was in many points refuted by Ercole del Rio, who wrote under the *nom de plume* of the Anonymous Modenese. Blindfold chess play, already exhibited in the 11th century by Arabian and Persian experts, was taken up afresh by Philidor, who played on many occasions three games simultaneously without sight of board or men. These exhibitions were given in London, which he visited every season from 1784 as the guest of the Chess Club in St. James's Street; and he died in that city on the 24th of August, 1795. As eminent players of this period must be mentioned Count Ph. J. van Zuylen van Nyevelt (1743–1826), and the German J. Allgaier (1763–1823), after whom is called a well-known brilliant variation of the King's Gambit. Philidor's mantle was taken up by Alexander Louis Honoré Lebreton Deschapelles (1780–1847), who possessed undoubtedly a great genius for the game, and was its champion for many years, notwithstanding that he lacked all knowledge of the theory. The only player who is known to have fought Deschapelles not unsuccessfully on even terms is the veteran John Cochrane. The Frenchman generally declined to play except at odds, and he was ever ready to handicap himself liberally. He lost, however, a match (1821) to W. Lewis, to whom he conceded the pawn and move, the Englishman winning 1 and drawing the 2 others. Deschapelles's greatest pupil, and the strongest player France ever possessed, was Louis Charles Mahé de Labourdonnais—born in 1797—who was the leader of the French school from 1821 until his death in December, 1840. His most memorable achievement was his contest with the English champion, Alexander Macdonnell, in a series of matches which resulted in the French player winning in the proportion of 3 to 2 of all the games played.

The English school of chess commenced about the beginning of the present century, and Sarratt was its first leader. He flourished from 1808 to 1821, and was followed by his great pupil W. Lewis, who, however, exhibited his skill in practical play for a short time only, and will be principally remembered for his writings, which stamp him as a great and original chess analyst. His literary career belongs to the period from 1818 to 1848, and he died in 1869. A. Macdonnell has been already mentioned; he was born in 1798 and died in 1835. He was a very ingenious and brilliant player, but lacked soundness. To the same period belongs also Captain Evans, the inventor of the celebrated Evans Gambit (1828), who died at a very advanced age in 1873; Perigal, who participated in the correspondence matches against Edinburgh and Paris; George Walker, for thirty years chess editor of *Bell's Life in London*, who is still alive; and John Cochrane, who has crossed swords with every strong player from Deschapelles downwards, and is still in constant play. In the same period Germany possessed but one player who was above the mediocrities of the time,—J. Mendheim, whose name is connected with Berlin chess, in which city he resided from 1810 to 1836. The fifth decennium of the 19th century is marked by the fact that the chess sceptre departed from the French school, and was grasped by the English. After Labourdonnais's death Fournié de Saint-Amant became the leading player in France; as such he visited England in the early part of 1843, and contended successfully against the best English players, including Howard Staunton; but the latter soon took his revenge, for in November and December, 1843, the great match between Staunton and Saint-Amant took place in Paris, the English champion winning by 11 games to 6 with 4 draws. During the succeeding eight years Staunton maintained his reputation by defeating in matches upon even terms Popert, Horwitz, and Harrwitz, besides a number of strong amateurs to whom he conceded large odds. He had also two other matches with Harrwitz, one at pawn and two moves, and the other at pawn and move—the former being won by Staunton, and the latter lost by him. Staunton's services in the cause of chess literature are adverted to below. That they were very great, and that the game in England owes much of its present popularity to him is not to be questioned, as also that for thirty years he occupied a position in the English chess world possessed by none of his contemporaries. Staunton was defeated by Anderssen at the London tournament in 1851, and from that time his match-playing career concluded. He died suddenly on the 22d of June, 1874, at the age of sixty-four. Among the contemporaries of Staunton, mention should certainly not be omitted of Henry Thomas Buckle, author of the *History of Civilization*. His remarkable powers as a chess-player were principally exibited in games played only for recreation at Simpson's Chess divan, wherein he was successful over Kieseritzki, and used to concede odds to strong players such as Barnes, Bird, &c. He beat Anderssen in 1851—when the Breslau player was at the height of his strength—in a series of 15 well-contested games played between them, by a majority of one game, and he also about the same time defeated Löwenthal in a match.

In the ten years 1830–1840 a new school arose in Berlin,

the seven leaders of which have been called the Pleiades. These were Bledow (1795–1846), Bilguer (1815–1840), Hanstein (1810–1850), Mayet (1810–1868), Schorn (1802–1850), B. Horwitz, born in 1809 and now living in London, and last, but not least, the eminent player and chess author, Von Heydebrandt und der Lasa, at present the imperial German ambassador at Copenhagen. As belonging to the same period must be mentioned the three Hungarian players,—Grimm, who died in Turkish Asia, whither he had fled after the insurrection of 1848; Szen, known by his successful combats with Labourdonnais (who conceded the Pesth player pawn and two moves, but lost 11 games out of 12), his competition in the 1851 tourney, as also his general play with the strongest adepts of his time; and J. Löwenthal, lately deceased, whose career, however, belongs more naturally to the period of later British chess. Among other proofs of the skill of these Hungarians is the correspondence match in 1843–45 between Pesth and Paris, won by the former.

The first modern international chess tournament, held at London in 1851, marks the commencement of the present epoch, and was the forerunner of various similar contests between strong players of different nationalities. This tourney brought forward a player who, so far as beauty of combination goes, stands even to the present moment without a rival, viz., A. Anderssen, born in Breslau the 6th of July, 1818. Before his appearance in England he had defeated all his German antagonists, and at the above-mentioned tournament he took the first prize, having successively beaten L. Kieseritzki, Szen, Staunton, and Mr. Wyvill, M.P. Anderssen played the same year in the tournament of the London Club, and again took first honors. In 1857 he competed in the Manchester tourney, but lost in the last round to Löwenthal, who consequently won the first prize Anderssen having the second. In December, 1858, Anderssen was beaten by Morphy in a match played at Paris, the score being 7 games to 2 and 2 drawn. In 1860 the indefatigable Breslau player again visited Paris, and played successfully against J. Kolisch; and he also defeated the latter in 1861 in a set match played at London by 4 games to 3. In the London tournament of 1862, Anderssen took the first prize; but in 1866 he lost a match to Steinitz, the winner's score being 8 to 6. In 1869 Anderssen came out first in the North German and Rhenish tournaments, and again in 1870 at the Baden-Baden congress; but in the spring of 1871 he lost a match to Zukertort, score 5 to 2, and he took but the third prize at the Vienna congress of 1873. Altogether he has shown himself the most soldier-like of chess players, ever ready for the fight, and never caring to rest upon his reputation. Among those who may be reckoned as more or less owing their training to him are the following eminent players:—D. Harrwitz, J. Dufresne, Max Lange, B. Suhle, P. Hirschfeld, G. R. Neumann, E. Schallopp, S. Mieses, J. H. Zukertort, and many others.

Paul Morphy, who beat Anderssen by such a decisive majority of games, is considered by many competent judges, and probably with truth, to have been the strongest chess player that ever lived. His career was short but brilliant. Born in New Orleans on the 22d of June, 1837, he was taught chess by his father when only ten years of age, and in two years time became a strong player, able to contend with success against his uncle Mr. Ernest Morphy and Mr. Eugene Rousseau, both high-class experts. When not quite thirteen he played three games with Löwenthal, and won two of them, the other being drawn. He was twenty years of age when he competed in the New York congress of 1857, where he won the first prize, having defeated C. H. Stanley, L. Paulsen, and other strong American amateurs. In 1858 he visited Europe, and there met with a series of triumphs. He arrived first in England, and there defeated by large majorities Boden, Medley, Mongredien, Owen, Bird, and others. He also, in a match played in London, beat Löwenthal by 9 games to 3 and 2 drawn. In September of the same year (1858) he played a match at Paris with Harrwitz, whom he defeated by 5 to 2 and 1 drawn; and later on he obtained a victory over Anderssen as above stated. During his stay in Europe he on two or three occasions played without sight of board or men and simultaneously against eight strong players, each time with great success. He returned to America in May, 1859, and here his chess career virtually finishes. He continued to play in his own circle, but with decreasing interest in the game, until 1866, when he totally abandoned its practice and has never played since.

Wilhelm Steinitz, born at Prague in 1836, and for the last fourteen years resident in London, took the sixth prize at the London congress of 1862. Immediately afterwards he defeated Blackburne in a match by 7 to 1 and 2 draws. In 1866 he beat Anderssen in a match by 8 games to 6; and in 1867 he took the third prize at the Paris tournament. In 1868 he carried off the first prize in the British Chess Association handicap, in 1870 the second prize of the Baden-Baden tournament, and in 1872 the first prize of the London grand tourney. In the last-mentioned year he defeated Zukertort in a match by 7 games to 1 and 4 draws. In 1873 he carried off the first prize at the Vienna congress; and in 1876 he defeated Blackburne, winning 7 games right off. He has also won matches against Dubois, Mongredien, Deacon, and Bird, and in 1872–4 he, in conjunction with W. N. Potter, conducted and won a telegraphic correspondence match for London against Vienna.

One of the special characteristics of the present time is the extraordinary power of playing blindfold chess which we now so often see exhibited. In Philidor's age it was considered an almost incredible wonder that he should be able to play three simultaneous games without seeing board or men, but Paulsen, Blackburne, and Zukertort have often played 10 or 12 simultaneous blindfold games, while even as many as 14 and 15 have been so played.

With the following summary of tournaments contested during the last 25 years, the modern history of chess may conclude:—

1851. London. 1 Anderssen, 2 Wyvill, 3 Williams, 4 Staunton, 5 Szen, 6 Kennedy, 7 Horwitz, 8 Mucklow.
1857. Manchester. 1 Löwenthal, 2 Anderssen.
" New York. 1 Morphy, 2 L. Paulsen.
1858. Birmingham. 1 Löwenthal, 2 Falkbeer.
1860. Cambridge. 1 Kolisch, 2 Stanley.
1861. Bristol. 1 L. Paulsen, 2 Boden.
1862. London. 1 Anderssen, 2 L. Paulsen, 3 Owen, 4 G. MacDonnell, 5 S. Dubois, 6 Steinitz.
1865. Dublin. 1 Steinitz, 2 MacDonnell.
1866. Redcar. 1 De Vere.
" English Championship Cup. De Vere.
" British Chess Association. 1 Steinitz, 2 Green.
1867. Paris. 1 Kolisch, 2 Winawer, 3 Steinitz, 4 Neumann.
" Dundee. 1 Neumann, 2 Steinitz, 3 De Vere and MacDonnell.
1868. English Championship Cup. 1 Blackburne, 2 De Vere.
" British Chess Association Handicap. 1 Steinitz, 2 Wisker, 3 Blackburne.
1870. Baden-Baden. 1 Anderssen, 2 Steinitz, 3 Blackburne and Neumann.
" English Championship Cup. 1 Wisker, 2 Burn.
1870–71. City of London Handicap. 1 Potter, 2 De Vere.
1871–72. Do. 1 Steinitz, 2 Keats (at odds).
1872. London. 1 Steinitz, 2 Blackburne, 3 Zukertort.
" English Championship Cup. 1 Wisker (becoming permanent holder of the Cup), 2 De Vere.
1873. Vienna. 1 Steinitz, 2 Blackburne, 3 Anderssen, 4 Rosenthal.
1876. London. 1 Blackburne, 2 Zukertort, 3 Potter.

LITERATURE OF THE GAME. The number of works that have been written upon chess in various languages is very large; and only a few of the principal books on this subject can be cursorily alluded to here. Confining ourselves to those authors who have treated of the practice and science of the game, we may begin with Jacobus de Cessolis, otherwise Jacopo Dacciesole, whose main object, however, though he gives the motives, &c., was to teach morals rather than chess. He was a Dominican friar, and his treatise, *Solatium Ludi Scacchorum, scilicet, Libellus de Moribus Hominum et Officiis Nobilium*, was written before the year 1200. It was afterwards translated into French, and in the year 1474 Caxton, under the title of *The Game and Playe of the Chesse*, printed an English translation of the French version. It has been held by many that this was the first book printed in England.

In 1490 we have *Die Gottinger Handschrift*, a work containing nine different openings and fifty problems. The author of this manuscript is not known. It is supposed that both he and Lucena were indebted to an earlier source, now unknown. Then comes Vicent, a Spanish writer, whose book bears date 1495. This is pretty well all we know about him, for only the title page has been preserved, the rest of the work having been lost in the first Carlist war, forty years ago. Of Lucena, another Spanish author who wrote in or about 1497, we are better informed. His treatise (*Repeticion des Amores y Arte de Axedres*)

comprises various practical chess matters, including 150 positions, illustrated by 160 well executed wood-cuts. Various of those positions are identical with those in *Die Gottinger Handschrift*. Damiano's work is an unacknowledged reproduction of Lucena's. In the sixteenth century works upon the game were written by Damiano (as just mentioned), Ruy Lopez, and Horatio Gianutio della Mantia; in the seventeenth century by Salvio, Polerio, Gustavus Selenus, Carrera, Greco, Fr. Antonio, and the authors of the *Traité de Lausaune;* in the eighteenth century by Bertin, Stamma, Ercole del Rio, Lolli, Cozio, Philidor, Ponziani, Stein, Van Nyevelt, Allgaier, and Peter Pratt; in the present century by J. F. W. Koch and C. F. Koch, Sarratt, John Cochrane, Wm. Lewis, Silberschmidt, Ghulam Kassim and James Cochrane, George Walker, A. MacDonnell, Jaenisch, Petroff, Von Bilguer, Von der Lasa, Staunton, Kling and Horwitz, Bledow, Dubois, Kieseritzki, Max Lange, Löwenthal, Dufresne, Neumann, Suhle, Zukertort, Preti, and others. The titles of several recent works by English writers are quoted below.

English chess owes much to W. Lewis and George Walker for their multifarious literary labors in the early part of the present century, the former being the best original analyst that England has yet produced. But to Howard Staunton must be ascribed the most important share in creating the popularity which the game has achieved in this country. His victory over St. Amant in 1843, and his successful career as a match player during the ensuing eight years, tended in the first place to attract the popular attention, while his works gave a style and a shape to the practice of the game amongst his countrymen such as contributed much towards laying the basis of that high degree of excellence which now characterizes chess playing in England. Staunton's first work, the *Chess Player's Handbook*, was published in 1847, and again (revised) in 1848. For want of further adequate revision many of its variations are now out of date, while later additions and discoveries naturally find no place therein; but taking the *Handbook* as it was when issued, very high praise must be bestowed upon the author for the good judgment, ability, and painstaking labor evidenced in the compilation of the work. If there be anything wanting in original analysis, this is more than compensated for by the care, acumen, learning, and research which enabled him to utilize and condense in a clear, intelligible, and attractive form all the stores of knowledge then accessible. His other works are the *Chess Player's Text Book* and *The Chess Player's Companion* (1849), the latter being a collection of his own games, the *Chess Praxis* (1860), and various smaller treatises. As has been already stated, the laws of the game, as laid down in the *Praxis*, form the basis of the rules adopted by the British Chess Association in 1862, the main differences between the two codes arising from a mitigation in the Association laws of some of the severe penalties laid down in the *Praxis*, and the enactment of the "Dummy Pawn" rule, whereby a pawn on reaching an eighth square may, if the player chooses, remain a pawn. In 1840 Staunton established the *Chess Player's Chronicle*, which periodical he continued to edit until 1856, while for four years—commencing in 1865—he carried on the *Chess World*. Moreover, he was the chess editor of the *Illustrated London News* during a period of thirty years, viz., from 1844 till his death in 1874. The services which he rendered to chess in thus popularizing the game and successfully engrafting it upon our periodical literature have been admitted in all quarters. In this respect also George Walker's work in *Bell's Life in London*, of which publication he was the chess editor for forty years, should not go without special acknowledgment. To Staunton's works must now be added his posthumous *Chess Theory and Practice*, edited and prepared for the press by R. B. Wormald, 1876.

Among continental chess authorities Von Heydebrandt und der Lasa (more usually known by his second title) stands pre-eminent. The German *Handbuch*, the famous volume with which his name is inseparably associated, was commenced in 1843 by Von Bilguer, who died before the first edition was completed. The second, third, fourth, and fifth editions (the last published in 1874) were successively edited and revised by Von der Lasa, and the book now stands a lasting monument of his genius and industry.

Of recent English works upon the openings the following may be mentioned:—*The Book of Chess*, by G. H. Selkirk, 1868; *Key to the Chess Openings*, by Thomas Long, 1871; *Positions in the Chess Openings*, by the same author, 1874; *Chess Openings*, by F. W. Longman, 1874; *Synopsis of the Chess Openings*, by Wm. Cook, 1874; *The Chess Player's Manual*, by G. H. D. Gossip, 1875; and *The Chess Openings*, by Robert B. Wormald, 1875. There has also lately appeared a selection of games, compiled by H. E. Bird, under the title of *Chess Masterpieces*, 1875; and likewise the following collections of problems, viz., *Chess Problems*, by J. Pierce, M.A., and W. T. Pierce, 1873; *Supplement to Chess Problems*, by the same authors, 1874; and *English Chess Problems*, a selection of chess problems by the best English composers living and lately deceased, also put forth by the brothers Pierce, 1876.

Solutions of Problems at pages 516, 517.

PROBLEM No. 1.

1. Q to Q R sq	1. Anything
2. R or Kt mates accordingly	

PROBLEM No. 2.

1. B to Kt 5	1. K to K 3
2. Q to K B 5 (ch)	2. Any move
3. Q or B mates	
	If 1. K to Q 3
2. Q to B 7 &c.	
	If 1. K to Q sq
2. Q takes P	
	If 1. R to R 3, or R to K B 8
2. Q takes P (ch)	

PROBLEM No. 3.

1. R to K R sq	1. B to K sq
2. Q to Q Kt sq	2. Any move
3. Q mates accordingly	

PROBLEM No. 4.

1. Q to R 8	1. P to Kt 7
2. Q to K Kt 8	2. P moves
3. Q to Q 5	3. K takes either Pawn
4. Q mates	

PROBLEM No. 5.

1. R to K B 3	1. Kt takes R
2. Kt to B 6 (ch)	2. K takes P
3. Q to Q 5 (ch)	3. Kt takes Q
4. B mates	
	If 1. Kt takes Kt or R to K B 2
2. Kt to B 6 (ch)	2. K takes P (best)
3. Q to Q 4 (ch)	3. K takes R
4. B mates	

PROBLEM No. 6.

1. Kt from Kt 6 takes P	1. P takes P
2. Q to K 6	2. P takes Q
3. Kt to B 5 (double ch)	3. K to Q 5 (best)
4. Kt from K B 4 takes P (ch)	4. K moves
5. Kt or B mates	
	If 1. Kt to B 6 (ch)
2. P takes Kt (ch) &c.	
	If 1. Kt takes Kt (ch)
2. B takes Kt (ch) &c.	

(W. N. P.)

CHESTER, an ancient city of England in West Cheshire, the capital of the county, situated on the river Dee, 20 miles from the open sea, 16 miles S.E. of Liverpool, and 179 miles N.W. of London by rail. The city is divided into four principal blocks by the four principal streets—Northgate Street, Eastgate Street, Bridge Street, and Watergate Street, which radiate at right angles from the Cross, and terminate in the four gates. These four streets exhibit in what are called "the Rows" a characteristic feature of the city. Their origin is a mystery, and has given rise to much controversy and speculation. In Eastgate Street, Bridge Street, and Watergate Street, the Rows exist on each side of the street throughout the greater part of their length, and may be described as continuous galleries open to the street, over and under which the houses lining the streets project, and which are formed as it were out of the front first-floor of the houses, approached by flights of steps from the roadway. The Rows are flagged or boarded under foot and ceiled above, thus forming a covered way, standing in the same relation to the shops, which are at their back, as the foot pavement does in other towns. In Northgate Street, on the other hand, the Row on the west side is formed as it were out of the ground floor of the houses, having cellars beneath, while on the east side the Row is formed at the same elevation as in the other three principal streets. In these streets are several examples of the old timbered houses of the 17th century, and some good specimens of modern imitations of them,—all combining to give a picturesque and foreign character to the town. There is also a chamber with stone groined roof of the 14th century in the basement of a house in Eastgate Street, and another of a similar character in Watergate Street. A mortuary chapel of the early part of the 13th century exists in the basement of a house in Bridge Street.

Chester is the only city in England that still possesses its walls perfect in their entire circuit of two miles. The gateways have all been rebuilt within the last hundred years,—the north and east gates on the site of the Roman gates. The Grosvenor Bridge, a single span of stone 200 feet in length,

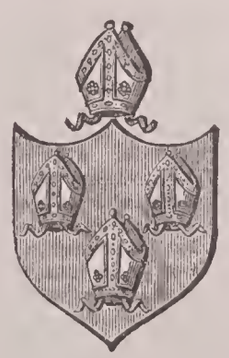
the largest, save one over the Danube, it is believed, in Europe, carries the road to Wrexham and Shrewsbury over the Dee on the south-west, while the old bridge of seven arches is interesting on account of its antiquity and picturesque appearance. The city possesses but few public buildings besides the cathedral and the churches. The castle, with the exception of "Cæsar's Tower," and a round tower with adjacent buildings in the upper ward, was taken down towards the end of the last century, and replaced by a gateway, a barracks, a county hall, a jail, and assize courts,—all buildings of pure classic architecture after the design of Thomas Harrison, a local architect, who was also the architect of the Grosvenor Bridge. In Northgate Street stands the town hall, a handsome stone building of Continental-Gothic design, which replaced the old Exchange, burnt down in 1862. The market-place, a little to the south of it, was opened to the public in 1863. Near the north-west angle of the city walls is the infirmary, founded in 1761, capable of holding 100 beds, and furnished with a fever ward in a detached building to the east of it. The savings-bank is a pretty Gothic structure in Grosvenor Street, erected in 1853. The Grosvenor Hotel, rebuilt by its owner, the late marquis of Westminster, is a handsome building near the east gate, the upper stories being timbered in accordance with the style of the old houses in the city. Besides these may be mentioned the general post-office, designed after the Elizabethan style, the custom-house, the free library, the music hall, and the training college. Among the most interesting of the ancient houses are Derby House, bearing the date 1591, Bishop Lloyd's House, and God's Providence House in Watergate Street, and the Bear and Billet in Lower Bridge Street; the three last bear dates in the 17th century. The Natural Science Society, founded by Canon Kingsley, and the Archæological Society have their lecture-rooms and museums at the Old Albion in Lower Bridge Street.

Plan of Chester.

City Arms.

Besides the Benedictine Abbey of St. Werburgh, the Franciscans, the Dominicans, and the Carmelites had houses in Chester, and the sites of the first and last are still commemorated in the names of Grey Friars and White Friars; St. John's, without the walls, was a collegiate church, with a dean, seven prebendaries, and four vicars. Chester was for a time in the diocese of Lichfield and Coventry, but in 1075, Peter, then bishop, restored the seat of the see to Chester, and made St. John's his cathedral; his successor, however, removed the seat back to Coventry, and in 1541 Henry VIII. erected Chester into an independent see, and the Abbey church of St. Werburgh into the cathedral of the diocese. He richly endowed the cathedral, and constituted in it a dean and six prebendaries, now reduced to four, who are styled canons. The King's school for public education was founded by the same patron, and in it the king provided that 24 poor scholars should be taught free of charge. The school has now, however, been remodelled, and placed under a board of governors by the Endowed Schools Commissioners. Within the walls are the parish churches of St. Oswald, founded about 1093; St. Peter, founded before the Conquest; St. Michael, probably founded before 1118; St. Bridget, founded prior to 1224; the Holy and Undivided Trinity, founded in or before the 12th century; St. Mary, founded probably in the 12th century; St. Martin, founded prior to 1250; and St. Olave, founded prior to the 12th century. The two last-named parishes are amalgamated with St. Bridget and St. Michael respectively. In the suburbs are St. John's, St. Paul in Boughton, Christ Church in Newton, All Saints in Hoole, and St. Thomas. Among the Nonconformist places of worship, which represent all the principal denominations, may be mentioned the Unitarian Chapel in Crook Lane, built originally by the followers of Matthew Henry, one of the ejected ministers. For the recreation of the inhabitants provision is made by the New Grosvenor Park, presented to the town in 1867 by the marquis of Westminster, and the Roodee, a level tract at the base of the city walls appropriated as a race-course.

The original charter which the city received from Earl Ranulph was confirmed, and the privileges extended, by many subsequent charters granted by different sovereigns and princes. Of these the most important were that of Edward I., which granted the office of coroner, defined and extended the jurisdiction of the courts of civil and criminal jurisdiction, and granted freedom from toll, &c., to the citizens throughout his dominions; that of Edward, the Black Prince, which defined and particularized the boundaries of the city, giving it a circuit of 12 or 14 miles, and granted jurisdiction of the river Dee to the mayor and citizens from a spot then and still called "Iron Bridge" above the city, to a point near Hoylake at the mouth of the river; and lastly, the charter of Henry VII., which ordained that the corporation should consist of a mayor, 24 aldermen, and 40 common councilmen, to be elected annually, created the office of recorder, regulated and gave exclusive jurisdiction to the mayor's and sheriff's courts, empowered the mayor to have his sword of state carried (in the absence of the king and his heirs) before all others with point upwards, and finally erected the city into a county by itself with a separate commission of the peace. The corporation thus constituted continued till the passing of the Municipal Corporations Act, under which the government of the city is now vested in the mayor, 10 aldermen, and 30 councilmen. The recorder is now a barrister appointed by the Crown. He is the judge of the local courts, called the Portmote (originally the mayor's court), the Pentice (originally held before the two sheriffs in a building now pulled down, called the Pentice), and the Passage Courts now fallen into disuse. He also presides at the city court of quarter sessions, which now alone retains a limited criminal jurisdiction, which once the city courts possessed even to the infliction of capital punishment.



Arms of Bishopric.

The population of the municipal (as distinguished from the parliamentary) borough was, according to the census of 1861, 31,110, and in 1871, 35,257 (16,910 males and

18,347 females). The area of the municipal borough is 3437 acres, and that of the parliamentary, which includes parts of Hoole, Saltney, Great Boughton, and Newtown, 3455 acres, containing a population in 1871 of 38,390, and returning two members to Parliament. The trade of the town is nominally represented by 23 guilds. Within the walls there is no extensive manufacture carried on, save that of shoes and boots for exportation and the wholesale home trade, and furniture and upholstery. In the suburbs shot and white and sheet lead are very largely manufactured, and flour of superior quality is produced. There are also several iron foundries, and the more humble manufacture of pipe-making has been carried on from a remote period. As a port there can be little doubt that Chester was at one time of importance, but the silting up of the channel of the Dee affected its commerce injuriously as early as the 15th century, and now the shipping trade is inconsiderable.

The history of Chester reaches back to very early times. Higden ascribes the foundation of the town to a very remote period; but the Welsh name by which it was even in Higden's day and is still known—Caerlleon Vawr or Caerlleon ar Dyfyrdwy, which means the "great camp or station of the legion on Dee,"—points to a Roman origin. It is the *Deva* of the Roman Itineraries, and from its position at the head of the then most important estuary on this part of the coast, and at a point where several Roman roads converged, it must soon have risen in prosperity and importance. The dignity of a Roman *colonia* has been claimed for it by some writers, but there is no certain evidence on which such a claim can be grounded. The pick and spade, however, have revealed numerous proofs that it was "no mean city." Among numerous altars from time to time exhumed is one of rare occurrence with a Greek inscription, and dedicated by Hermogenes, a physician. Of the latest discoveries the most remarkable was made in pulling down the Feathers Hotel on the east side of Bridge Street, when the remains of a fine basilica were brought to light, having a row of seven Corinthian pillars on either side once supporting its roof, and a series of apartments on its south side,—probably in connection with baths,—floored with tessellated and herring-bone tile pavements, and warmed by an extensive hypocaust, a portion of which is still to be seen underneath some adjoining houses.

The town was walled, and in form was rectangular and equilateral or nearly so, but was not co-extensive with the present city. The four principal streets followed generally the line of the present streets running north and south and east and west, crossing each other in the centre of the town. The southern wall of the town, running from a point near the distance chair in the race-course, past St. Bridget's rectory eastwards, cut across the present city, about the top of Lower Bridge Street, just below St. Michael's Church, and joined the wall on the eastern side somewhere a little to the north of what are now called "The Wishing Steps," and there was probably a tower at each angle of the wall. A Roman arch, however, still existing and impinging upon the Koep or "Cæsar's" Tower in the Castle, and also another arch (now removed), incorporated into the walls near the old bridge, and called "The Ship Gate," attest the existence of some outwork overhanging the river for the protection probably of the trajectus by which the Roman roads to the south and west, emerging from the town by the southern gate, crossed at a point just below. The renowned XXth Legion was stationed here from an early period of the Roman occupation to as late as the third century.

After the departure of the Romans, Chester appears to have been possessed in turn by Britons, Saxons, and Danes; in 894 it was found a deserted city by the Danes, who then took possession, and were in turn starved out by a besieging Saxon army. Earl Ethelred restored it in 908, extending its walls so as to embrace the castle. After the defeat of the Danes by Edmund in 942, Chester for a time enjoyed comparative repose. Athelstan revived its mint; Edgar received homage of his vassals there; and Harold's queen found a home there after the battle of Hastings. Mercia had up to this time been governed by its earl. Beyond Chester lay the still hostile Welsh, for the reduction of whom the place afforded an important basis of operations, this led to the establishment after the Conquest of the Norman earldom of Chester, which was first granted to Gherbod, a noble Fleming. After him Hugh Lupus, the nephew of the Conqueror, was invested as earl of Chester, with sovereign or palatinate authority over the tract of country now represented by the county of Cheshire, and the coast-line of Flintshire, as far as Rhuddlan, with Chester as the seat of his Government. In the castle, built, or at least reconstructed by Earl Hugh, the earl assembled his court or council; and here too sat the exchequer and other courts. Earl Hugh was the founder of the Benedictine Abbey of St. Werburgh, which he richly endowed. It was during the rule of these Norman earls that Chester received at the hands of Earl Ranulph I. its first charter, and took rank as a city, but the language of this charter indicates that Chester already possessed some municipal privileges. Under this charter were established local courts of civil and criminal jurisdiction, which were the germs of the Portmote, Pentice, and Passage Courts. On the death of Earl John in 1237, Henry III. seized the earldom, and it has ever since been an apanage of the Crown. The county, however, retained its palatinate character, and Chester still continued to be the seat of its jurisdiction. Though no longer the metropolis of an almost independent dominion, Chester still, as the capital of the palatinate and the key to North Wales, yet unsubdued, ranked high among the cities of the west of England, was often honored by royal visits, and was the object of attack and defence during the many civil wars. In 1256 she narrowly escaped the fury of Llewelyn, who, we are told, carried fire and sword to her very gates. Edward I. visited the city on several occasions; in 1276 he summoned Llewelyn to do him homage here, and the next year he marched through with a powerful army to Rhuddlan. In 1300 his son Edward, the first English Prince of Wales, here received the final submission of the Welsh to the sovereignty of England. Hither Henry of Lancaster led his captive sovereign, Richard II., from Flint Castle, and imprisoned him in a tower over the outer gateway of the Castle. In 1459 Queen Margaret visited the city, and Henry VII., accompanied by his queen and mother, in 1494. In 1507, 1517, and 1550, Chester shared with other places the visitation of the sweating sickness, which carried off many of its inhabitants. It was also so severely scourged by the plague, 1602 to 1605, that the city fairs were suspended, and the court of exchequer removed to Tarvin, and the assizes to Nantwich. In 1647–48 this epidemic for the last time raged with a terrible fatality; from June 22 to April 20 it is said that 2099 persons perished of the plague in the several city parishes. But of all the events in the history of Chester, there is none so memorable as the protracted siege which the city endured in its loyalty to Charles I. The king, having hoisted his standard at Nottingham, arrived at Chester in the autumn of 1642, where he was enthusiastically received. The sacrifices made by the citizens for the royal cause were great. In 1644, the pecuniary levies upon them amounted to as much as £200 every fortnight. The siege began in July, 1643, and in the autumn of 1645 the assailants, despairing of taking it by assault, converted the siege into a blockade. In 1646–7 the citizens were in such extremities as to be in want of the commonest necessaries of life. It was only after a tenth summons that, on February 3, 1646, they at last agreed to the articles of surrender, by which the garrison were allowed to march out with all the honors of war, the safety of the persons and property of the citizens with liberty to trade was secured, and the sanctity of the sacred edifices and their title deeds preserved. In 1659 Sir George Booth and a large party of the citizens seized the garrison for Charles II., then still an exile, but they were afterwards repulsed in an action fought near Winnington bridge, by Lambert, the Parliamentary general. In 1660 the joy felt by the citizens at the Restoration, was expressed by the magnificent reception accorded to the learned Dr. Brian Walton, the new bishop of Chester, on his coming to take possession of his see. The spirit of the inhabitants evinced, however, a change in 1683, when the presence of the duke of Monmouth was the cause of a tumultuous mob, who, after committing other acts of violence, forced the cathedral doors, destroyed most of the painted glass, demolished the font, and did other damage there. James II. visited the city in 1687, and his successor, William III., in 1690. Coming to more modern times, the city accorded a hearty and brilliant welcome to the Prince of Wales on the 14th October, 1869, when he honored them with his presence to open the new Town Hall.

(W. W. F.)

CHESTER, a city of the United States, in the county of Delaware, Pennsylvania, on the right bank of the Delaware River, 10 miles south-west of Philadelphia by the railway to Wilmington. It has five or six churches two high schools, and a national hall, and carries on the manufactures of cotton and woollen goods, machinery, and carriages. Founded by the Swedes in 1643 under the name of Upland, it ranks as the oldest town in the State, and was the seat of the provisional assembly held by Penn in 1682. From that date till the formation of Delaware county in 1789, it was the chief town of the county of Chester,—a position now held by the city of West Chester. Population in 1850, 1667; and in 1870, 9485.

CHESTERFIELD, a municipal borough and market-town of England, in East Derbyshire, 12 miles south of Sheffield by the Midland Railway. It is situated on the Rother and Hipper, and is the terminus of a canal extending a distance of 46 miles to the Trent at Stockwith. It is irregularly built, with narrow streets, but has a spacious market-place. The church of All-Saints is a large and elegant edifice of the 13th century, with a remarkable twisted spire 230 feet high, which has given rise to considerable discussion as to whether it was so constructed or

owes its deformity to the warping of the woodwork. There are eight or nine dissenting churches, a free grammar school, founded by Queen Elizabeth, and rebuilt in 1710 and 1845, a girls' industrial school established in 1819, and various other educational institutions, a municipal hall erected in 1849, a market-hall (which dates from 1855–7 and contains a corn-exchange), a town-library, a mechanics' institute, a prison, assembly rooms, a hospital, a theatre, and an institute of mining, civil, and mechanical engineers. The manufactures include cotton, silk, earthenware, machinery, and tobacco; and there are coal, iron, and lead mines in the vicinity. Races are held on Whittington Common, about a mile from the town, in the neighborhood of the famous Revolution House. The population of the municipal borough in 1861 was 9836, and in 1871 it was 11,427. Chesterfield was a Roman station on the road from Derby to York, and its name is partly of Roman origin. At the time of the Conquest it was of but little importance, but in the reign of King John it received a charter of incorporation. In the year 1266 the rebellious barons were defeated in the neighborhood by Henry, the nephew of Henry III. In 1642 the town was occupied by the forces of Sir John Gell, and in 1643 by Sir Thomas Fairfax.

CHESTERFIELD, Philip Dormer Stanhope, Fourth Earl of (1694–1773), the son of Philip Stanhope, the third earl, and Elizabeth Savile, daughter of the marquis of Halifax, was born in London. Deprived at an early age of his mother, the care of the little Lord Stanhope devolved upon his grandmother, the marchioness of Halifax, a lady of culture and connection, whose house was frequented by the most distinguished Whigs of the epoch. He soon began to prove himself possessed of that systematic spirit of conduct and effort which appeared so much in his life and character. Divined by Ruvigny, earl of Galway, who perceived in him a nascent aptitude for pleasure and politics overlaid with a strong natural tendency to indolence, he was advised by that nobleman, if he would become a man of mark, to rise early; he acquired the habit, and kept it. His education, commenced under a private tutor, was continued (1712) at Trinity Hall, Cambridge; here he seems to have read hard, and to have acquired a considerable knowledge of ancient and modern languages. The great orators of all times were a special object of study with him, and he describes his boyish pedantry pleasantly enough, but by no means without a touch of self-satisfaction in the memory. His university training was supplemented (1714) by a Continental tour, untrammelled by a governor; at the Hague his ambition for the applause awarded to adventure made a gamester of him, and at Paris he began, from the same motive, that worship of the conventional Venus, the serious inculcation of which has earned for him the largest and most unenviable part of his reputation.

The death of Anne and the accession of George I. opened up a career for him and brought him back to England. His relative James Stanhope, the king's favorite minister, procured for him the place of gentleman of the bedchamber to the prince of Wales. In 1715 he entered the House of Commons as member for St. Germans, and when the impeachment of James, duke of Ormond (June 21, 1715), came before the House, he used the occasion to put to proof his old rhetorical studies. His maiden speech was youthfully fluent and dogmatic; but on its conclusion the orator was reminded, with many compliments, by an honorable member, that he wanted six weeks of his majority, and consequently that he was amenable to a heavy fine for speaking in the House. Lord Stanhope quitted the Commons with a low bow, and started for the Continent. From Paris he rendered the Government important service by gathering and transmitting information respecting the Jacobite plot; and in 1716 he returned to England, resumed his seat, and took frequent part in the debates. In that year came the quarrel between the king and the heir apparent. Stanhope, whose politic instinct obliged him to worship the rising rather than the setting sun, remained faithful to the prince, although the ministry made several attempts to win him over. In 1723 a vote for the Government got him the place of captain of the yeomen of the guard; his happy reply to his predecessor, Lord Townshend, is a fine example of *spirituel* urbanity, and is valuable as indicating, among other examples, his contempt for the money-jobbing system that obtained at court. In 1725, on the revival of the Bath, the red ribbon was offered to him, but was declined.

In 1726 his father died, and Lord Stanhope became earl of Chesterfield. He took his seat in the Upper House, and his oratory, never effective in the Commons by reason of its want of force and excess of finish, at once became a power. In 1727, on the accession of George II., Chesterfield was sent to the Hague as ambassador. In this place his tact and temper, his dexterity and discrimination, enabled him to do good service, and he was rewarded with Walpole's friendship, a Garter, and the place of Lord High Steward. In 1732 there was born to him by a certain Madame du Bouchet, the son, Philip Stanhope, for whose advice and instruction were afterwards written the famous *Letters*. In the same year, being somewhat broken in health and fortune by his sojourn abroad, he resigned his embassy and returned to England. A few months' rest enabled him to resume his seat in the Lords, of which he was one of the acknowledged leaders. He supported the ministry, but his allegiance was not the blind fealty Walpole exacted of his followers. The Excise Bill, the great premier's favorite measure, was vehemently opposed by him in the Lords, and by his three brothers in the Commons. Walpole bent before the storm, and abandoned the measure; but Chesterfield was summarily dismissed from his Stewardship. For the next two years he led the opposition in the Upper House, leaving no stone unturned to effect the downfall of the man who had wronged him. In 1742 Walpole fell, and Carteret reigned in his stead. The new ministry, however, had not Chesterfield either in its ranks or among its supporters. He remained in opposition, distinguishing himself by the courtly bitterness of his attacks on George II., who learned to hate him violently. In 1744 the king was compelled to abandon Carteret, and the coalition or "Broad Bottom" party, led by Chesterfield and Pitt, came into office. In the troublous state of European politics the earl's conduct and experience were more useful abroad than at home, and he was sent to the Hague as ambassador a second time. The success of his mission was complete; and on his return a few weeks afterwards he received the lord-lieutenancy of Ireland, a place he had long coveted.

Short as it was, Chesterfield's Irish administration was of great service to his country, and is unquestionably that part of his political life which does him most honor. To have conceived and carried out a policy which, with certain reservations, Burke himself might have originated and owned is indeed no small title to regard. The earl showed himself finely capable in practice as in theory, vigorous and tolerant, a man to be feared, and a leader to be followed; he took the government entirely into his own hands, repressed the jobbery traditional to the office, established schools and manufactures, and at once conciliated and kept in check the Orange and Popish factions. In 1746, however, he had to exchange the lord-lieutenancy for the place of Secretary of State. With a curious respect for those theories his familiarity with the secret social history of France had caused him to entertain, he hoped and attempted to retain a hold over the king through the influence of Lady Yarmouth, though the futility of such means had already been demonstrated to him by his relations with Queen Caroline's "*ma bonne Howard*." The influence of Newcastle and Sandwich, however, was too strong for him; he was thwarted and over-reached; and in 1748, he resigned the seals, and returned to cards and his books with the admirable composure which was one of his most striking characteristics.

The dukedom offered him by George II., whose ill-will his fine tact had overcome, was refused. He continued for some years to attend the Upper House, and to take part in its proceedings. In 1751, seconded by Lord Macclesfield, President of the Royal Society, and Bradley, the eminent mathematician, he distinguished himself greatly in the debates on the calendar, and succeeded in making the new style a fact. Deafness, however, was gradually affecting him, and he withdrew little by little from society and the practice of politics. In 1754 occurred the famous dispute with Johnson over the dedication to the *English Dictionary*. This quarrel (to which are owing the doctor's noble letter and some half dozen of his roughest *mots*, and the earl's clever portrait of the "intelligent Hottentot"), with the neglect it assumed on Chesterfield's part, has been fatal to his reputation as a man of heart. During the twenty years

of life that followed this episode, Chesterfield wrote and read a great deal but went little into society. In 1768 died Philip Stanhope, the child of so many hopes; and the earl, who had no children by his wife, Melusina von Schulemberg, illegitimate daughter of George I., whom he married in 1733, adopted his godson the heir to the title and estates. His famous jest (which even Johnson allowed to have merit),—"Tyrawley and I have been dead these two years, but we don't choose to have it known"—is the best description possible of his humor and condition during the latter part of this period of decline. To the deafness was added blindness, but his memory and his fine manners only left him with life; his last words ("Give Dayrolles a chair") prove that he had neither forgotten his friend nor the way to receive him. He died on the 24th of March, 1773.

Chesterfield was selfish, calculating, and contemptuous; he was not naturally generous, and he practised dissimulation till it became part of his nature. In spite of his brilliant talents, and of the admirable training he received, his life, on the whole, cannot be pronounced a success. His anxiety and the pains he took to become an orator have been already noticed, and Horace Walpole, who had heard all the great orators, preferred a speech of Chesterfield's to any other; yet the earl's eloquence is not to be compared with that of Pitt. Samuel Johnson, who was not perhaps the best judge in the world, pronounced his manners to have been "exquisitely elegant;" yet as a courtier he was utterly worsted by Robert Walpole, whose manners were anything but refined, and even by Newcastle. He desired to be known as a protector of letters and literary men; and his want of heart or head over the *Dictionary* dedication, though explained and excused by Croker, none the less inspired the famous change in a famous line—"Toil, envy, want, *the patron*, or the jail." His published writings have had with posterity a very indifferent success; his literary reputation rests on a volume of letters never designed to appear in print. The son for whom he worked so hard and thought so deeply failed especially where his father had most desired he should succeed, becoming, not a fine gentleman, but a commonplace book-worm. As a politician and statesman, Chesterfield's fame rests on his short but brilliant administration of Ireland. As an author he stands or falls by the *Letters to his Son*, first published by Stanhope's widow in 1774. The *Letters* are brilliantly written,—full of elegant wisdom, of keen wit, of admirable portrait-painting, of exquisite observation and deduction. Against the charge of an undue insistence on the external graces of manner Chesterfield has been adequately defended by Lord Stanhope (*History*, iii. 34). Against the often iterated accusation of immorality, it should be remembered that the *Letters* reflected the morality of the age, and that their author only systematized and reduced to writing the principles of conduct by which, deliberately or unconsciously, the best and the worst of his contemporaries were governed.

See Chesterfield's *Miscellaneous Works*, London, 1777–8, 2 vols. 4to; and *Letters to his Son* (edited by Lord Mahon), London, 1845–51, 5 vols. See also Lord Mahon (Stanhope), *History of England from the Peace of Utrecht to the Peace of Versailles.*

CHESTER-LE-STREET, a market-town of England in the county of Durham, near the River Wear, six miles north of Durham, on the North-Eastern Railway. The principal building is the parish church of St. Mary and St. Cuthbert, an interesting old Gothic structure, restored in 1862, with a tower 156 feet in height. There is a union workhouse at the south end of the town, which consists of two long parallel streets. Chester-le-Street is a place of considerable antiquity; under the name of *Cuneceastre*, it was made the see of a bishop in 882, and continued to be the head of the diocese till the Danish invasion of 995. During that time the church was the repository of the shrine of St. Cuthbert, which was then removed to Durham. About a mile along the river is Lumley Castle, the seat of the earl of Scarborough, and about two miles to the northward lies Lambton Castle, the residence of the earl of Durham, built in 1797 on the site of the old House of Harraton. The iron manufacture is prosecuted to a considerable extent, and about 4000 persons are employed in the coal mines of the neighborhood. In 1871 the population of the town was 2450, and of the township, 4205.

CHESTNUT. The Spanish or Sweet Chestnut, *Castanea vesca* (natural order, *Corylaceæ*), is a stately and magnificent tree, native of the countries bordering on the Mediterranean, but also ripening its fruit in sheltered situations as far north as Scotland. It lives very long, attains a large size, spreading its branches widely, and it has large lanceolate serrate leaves, long pendulous male catkins, with fewer inconspicuous female flowers, the fruit being an echinate capsule, containing from two to five nuts, of which seldom more than three are mature. The largest known chestnut tree is the famous *Castagno di cento cavalli*, or the chestnut of a hundred horses, on the slopes of Mount Etna, a tree which when measured nearly a hundred years ago, by Count Borch, was found to have a circumference of 190 feet. By many observers it has been maintained that this colossal tree consisted of a fusion of several trunks; but many specimens not much smaller exist in the neighborhood, and by digging around it has been found that all the trunks end in one root. The wood of the sweet chestnut is valued by cabinet-makers and coopers; and among European timbers it was at one time esteemed second to the oak, which it so closely resembles that in old wood-work the two timbers are very difficult to distinguish. Chestnuts (the fruit of the tree) are extensively imported into Great Britain, and roasted are much eaten as a delicacy. In a raw state they have a sweet taste, but are difficult of digestion. The trees are very abundant in the south of Europe, and chestnuts bulk largely in the food resources of the poor in Spain, Italy, Switzerland, and Germany. In Italy the kernels are ground into meal, and used for thickening soups, and even for bread-making. In North America, the fruits of an allied species, *C. americana*, are similarly eaten.

The Horse Chestnut, *Æsculus Hippocastanum*, is in no way allied to the sweet chestnut except in name. It is a strikingly beautiful tree, especially in spring, with its large digitate leaves, and conspicuous spikes of white flowers. A useful starch may be extracted from its kernels, but this has not hitherto been practised on an economic basis. The entire tree must be regarded as more ornamental than useful.

CHEVIOT HILLS, a range extending a distance of about 35 miles along the confines of England and Scotland, mainly situated in Northumberland, but partly also in Roxburgh. The western portion consists principally of carboniferous strata, while the eastern is chiefly composed of igneous rocks. They attain their greatest height, of 2684 feet, in Cheviot Peak, which lies eight miles southwest of Wooler, in Northumberland; and next in elevation is Carter Fell, which slightly exceeds 2000 feet. The range is now chiefly famous for a valuable breed of sheep, which find abundant pasture on its smooth declivities; but in earlier days it was the scene of many an episode of border warfare, and its name is inseparably associated with the ballad of *Chevy Chase.*

CHÉZY, Antoine Leonard (1773–1832), a French orientalist, was born at Neuilly in 1773. He was intended by his father for the profession of engineering; but his taste was for philology; and in 1790 he sought and obtained a post in the Oriental department of the national library. About 1803 he commenced the study of Sanskrit, though he possessed neither grammar nor dictionary, and, by means of great labor, he obtained so complete a knowledge of the language that he composed in it verses which are said to possess great elegance. He had besides a considerable acquaintance with other Eastern languages; and his attainments place him in a high rank among Orientalists. His merits were recognized by his appointment to the chair of Sanskrit in the Collége de France, in 1803, and to the dignity of chevalier of the legion of honor.

Among other works he left—*Extrait du livre des Merveilles de la Nature, par Mohammed; Medjouin et Léila*, from the Persian; *Yadjanadatta Badha*, and *Sakountala*, from the Sanskrit; *L'Anthologie érotique d'Amrou; Grammaire sanscrite; Vocabulaire sanscrit, pracrit, et français; Chrestomathie persanne; Chrestomathie sanscrite.*

CHHATISGARH, a division or commissionership of British India, under the jurisdiction of the chief-commissioner of the Central Provinces, comprising the districts of Ráipur, Biláspur, and Sambalpur, and seven small feudatory states, between 16° 50′ and 23° 10′ N. lat., and between 80° 30′ and 83° 15′ E. long. It is bounded on the

N. by Soházpur in the Rewah state and by the Sirgujá and Udáipur states of Chutiá Nágpur; on the E. by the Orissa tributary states and the northern districts of Madras; on the S. by the Bastár state of the Central Provinces; and on the W. by the districts of Chándá, Bhándárá, Bálághát, Seoni, and Mandlá. The area is 39,647 square miles; the population in 1872 was 3,289,043, residing in 16,054 villages or townships, and in 726,190 houses. Classified according to religion there are 2,054,874 Hindus, or 62·48 per cent.; 26,046 Muhammadans; 243 Buddhists and Jains; 451 Christians; and of aboriginal tribes and persons of unspecified religion, 1,207,429, or 36·72 per cent. Two great rivers, the Nerbudda and Son, take their rise at the side of the Amarkantak hill in the north-west corner of the division, the former flowing nearly due west to the Bombay coast, the latter ultimately falling into the Ganges in lower Bengal.

CHHINDWÁRÁ, a district of British India, in the Nerbudda division of the Central Provinces, situated between 21° 25′ and 22° 50′ N. lat., and between 78° 0′ and 79° 30′ E. long. It is bounded on the N. by the districts of Hoshangábad and Narsinhpur, on the E. by Seoní, on the S. by Nágpur, and on the W. by Betul, and contains an area of 3852 square miles. The district has two distinct natural subdivisions—the hill country above the slopes of the Sátpurá Mountains, called the Bálághát, and a tract of low land to the south called the Zerghát. The high tableland of the Bálághát lies for the most part upon the great basaltic formation which stretches across the Sátpurás as far east as Jabalpur. The country consists of a regular succession of hills and fertile valleys, formed by the small ranges which cross its surface east and west. The average height of the uplands is 2500 feet, but there are many points of greater elevation. The appearance of the Zerghát below the hills is generally open and undulating. The country is intersected by several streams, of which the Kanhán is the most considerable. Near the hills and along the streams are strips and patches of jungle; the villages are usually surrounded with picturesque groves of tamarind, mango, and other shade-giving trees. The total population of the district, as ascertained by the census of 1872, is 159,116 males and 156,979 females; total 316,095, classified as follows:—Hindus, 191,669; Muhammadans, 9747; Buddhists and Jains, 574; Christians, 105; "other denominations," consisting of aboriginal tribes, 114,000. The average density of the population is 80·72 per square mile. Three towns are returned as containing a population of upwards of 5000, viz.: Chhindwárá, the administrative head-quarters of the district, population, 8626; Lodhikerá, population 5219; and Pandhurna, population 5218. Important discoveries of coal have been made here of late years; it is estimated that the area under which coal lies is over 250 square miles, some of the seams being as much as 18 feet in thickness. The forests of Chhindwárá are very extensive, and lie principally on the southern slopes of the Sátpurás. The total revenue of the district in 1873–74 amounted to £31,513, of which £21,687, or 68·8 per cent., was derived from the land-tax. For the protection of person and property, and administration of justice, the district contains 6 magisterial and 5 civil and revenue courts, together with a regular police of 361 men of all ranks, maintained at a cost of £5037. The cost of the district officials and police amounted to £10,514. Two charitable dispensaries are maintained for the relief of the sick. In the hill country the climate is temperate and healthy. In the cold season ice is frequently seen in the small tanks at an elevation of about 2000 feet. Until May the hot wind is little felt, while during the rains the weather is cool and agreeable. The average annual rainfall amounts to 36 inches.

CHHINDWÁRÁ, the principal town and administrative head-quarters of the district of the same name, situated on the banks of the Bodrí *nálá*. The site of the town is 2200 feet above sea level, and is surrounded by ranges of low hills. The European station extends for nearly two miles in length, and is well wooded. It is considered very healthy, and forms a resort for European visitors from Nágpur and Kámthí during the hot weather. The conservancy arrangements are good, and the town is clean and cheerful. The population of the town in 1872 was returned as follows:—Hindus, 6189; Muhammadans, 1865; Buddhists and Jains, 152; Christians, 105; others, 315; total, 8626.

CHIABRERA, Gabriello (1552–1637), the Italian Pindar, as he is sometimes called, was of patrician descent, and was born at Savona, a little town in the domain of the Genoese republic, twenty-eight years after the birth of Ronsard, with whom he has far more in common than with the great Greek whose echo he sought to make himself. As he has told in the pleasant fragment of autobiography prefixed to his works, in which, like Cæsar, he speaks of himself in the third person, he was a posthumous child; he went to Rome at the age of nine years, under the care of his uncle Giovanni. There he read with a private tutor, suffered severely from two fevers in succession, and was sent at last, for the sake of society, to the Jesuits' College, where he remained till his twentieth year, studying philosophy, as he says, "più per trattenimento che per apprendere,"—rather for occupation than for learning's sake. Losing his uncle about this time, Chiabrera returned to Savona, "again to see his own and be seen by them." In a little while, however, he returned to Rome, and entered the household of a Cardinal Camerlingo, where he remained for several years, frequenting the society of Paulus Manutius and of Sperone Speroni, the dramatist and critic of Tasso, and attending the lectures and hearing the conversation of Mureto. His revenge of an insult offered him obliged him to betake himself once more to Savona, where, to amuse himself, he read poetry, and particularly Greek. The poets of his choice were Pindar and Anacreon, and these he studied till it grew to be his ambition to reproduce in his own tongue their rhythms and structures, and so to enrich his country with a new form of verse,—in his own words, "like his countryman, Columbus, to find a new world or drown." His reputation was made at once; but he seldom quitted Savona, though often invited to do so, saving for journeys of pleasure, in which he greatly delighted, and for occasional visits to the courts of princes, whither he was often summoned, for his verse's sake, and in his capacity as a dramatist. At the ripe age of fifty he took to himself a wife, one Lelia Pavese, by whom he had no children. After a simple and blameless life, during which he produced a vast quantity of verse—epic, tragic, pastoral, lyrical, and satirical—he died in 1637, at the patriarchal age of eighty-five. An epitaph was written for him in elegant Latin by Urban VIII.; but on his tombstone are graven two quaint Italian hexameters of his own, in which the gazer is warned from the poet's own example not to prefer Parnassus to Calvary.

A maker of odes in all their elaborate pomp of strophe and antistrophe, a master of new and complex rhythms, a coiner of ambitious words and composite epithets, an employer of audacious transpositions and inversions, and the inventor of a new system of poetic diction,—it is not surprising that Chiabrera should have been compared with Ronsard. Both were destined to suffer eclipse as great and sudden as had been their glory. Ronsard was succeeded by Malherbe and by French literature, properly so-called; Chiabrera was the last of the great Italians, and after him literature languished till the second renaissance under Manzoni. Chiabrera, however, was a man of merit, apart from that of the mere innovator. Setting aside his epics and dramas (one of the latter received the honors of translation at the hands of Nicolas Chrétien, a sort of scenic Du Bartas), much of his work remains yet readable and pleasant. His grand Pindarics are dull, it is true, but some of his *Canzonette*, like the anacreontics of Ronsard, are exceedingly elegant and graceful. His autobiographical sketch is also extremely interesting. The simple old poet, with his adoration of Greek (when a thing pleased him greatly he was wont to talk of it as "Greek Verse"), his delight in journeys and sight-seeing, his dislike for literary talk save with intimates and equals, his vanities and vengeances, his pride in the memory of favors bestowed on him by popes and princes, his "*infinita maraviglia*" over Virgil's versification and metaphor, his fondness for masculine rhymes and blank verse, his quiet Christianity, is a figure deserving perhaps of more study than is likely to be bestowed on that "new world" of art which it was his glory to fancy his own, by discovery and by conquest.

The best editions of Chiabrera are those of Rome, 1718, 3 vols. 8vo; of Venice, 1731, 4 vols. 8vo; of Leghorn, 1781, 5 vols. 12mo; and of Milan, 1807, 3 vols. 8vo. These only contain his lyric work; all the rest he wrote has been long forgotten.

CHIARAMONTE, a town of Sicily, in the province of

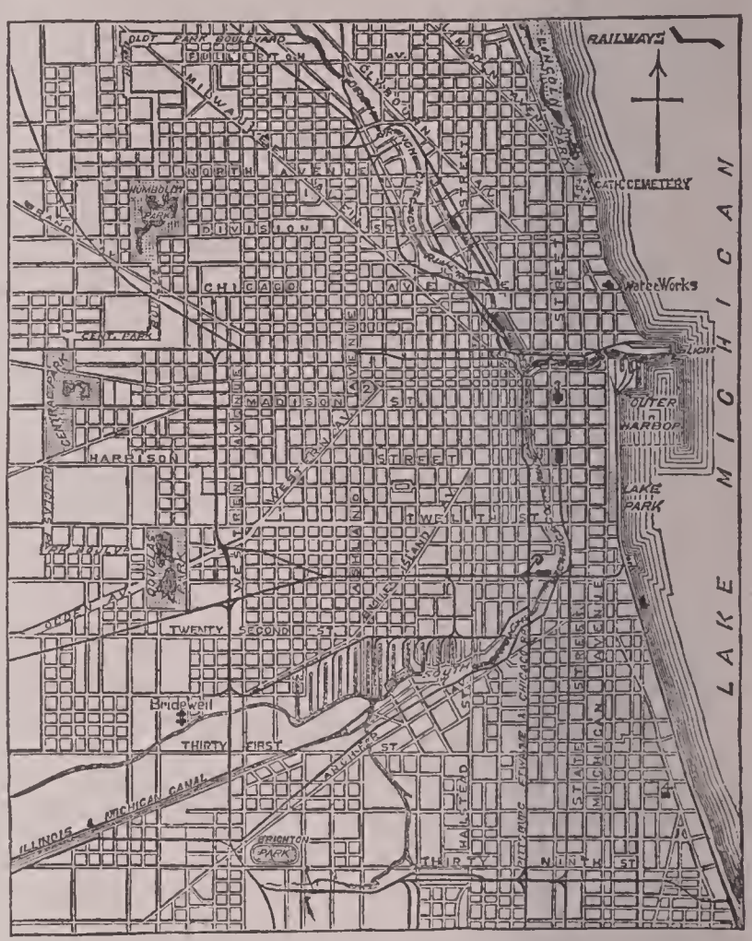
Syracuse, and 32 miles west from the city of that name. It is regularly built, with broad and straight streets. The view from the Capuchin convent is one of the finest in Sicily; and there is a well-preserved castle. The environs produce excellent wine. Population, 9300.

CHIARI, an ancient walled town of Italy, in the province of Brescia, and 12 miles west of the city of that name, near the left bank of the Oglio. It has several churches, a hospital, and a public library, and manufactures silk, cotton, and leather. In 1701 it was the scene of the victory of the Austrians under Prince Eugene over the Spaniards and French. Population, 9479.

CHIAVARI, a maritime town of North Italy, in the province of Genoa, and 21 miles E.S.E. of the town of that name, on the Gulf of Rapallo, at the mouth of the Sturla. It has a hospital, a railway station, and several fine churches, the principal of which is that of the Madonna del' Orto. The Genoa and Sarzano railway passes the town. The inhabitants, numbering about 11,500, are engaged in the manufacture of furniture, silk twist, lace, and linen, and in the anchovy fishery. The surrounding hills are well cultivated, and slate and marble are quarried in the neighborhood.

CHIAVENNA, or CLAFEN, a small town of Italy, in the province of Sondrio, in a deep valley on the right bank of the Maira, and about seven miles from its entrance into the Lake of Como. From its situation at the junction of the great roads over the Splügen and Septimer, between Germany and Italy, it is a place of considerable trade, especially in the wines of the Valtelline, and the pottery manufactured in the vicinity. Its principal manufacture is silk, and its beer is reckoned the best in Northern Italy. Its most remarkable church is San Lorenzo, with a carved font of the 12th century; and on a neighboring height are extensive ruins of an ancient castle. The town was known to the Romans as Clavenna, and probably was of some importance from its position. In the Middle Ages it was an independent imperial countship, till it was at last seized by the dukes of Milan, and bestowed on the Balbioni family. For a long time it was an object of contest between the bishops of Coire and the canton of the Grisons; and at last it fell to the latter in 1512. Incorporated with the Cisalpine republic in 1797, it passed in 1814 to Lombardy, and thus in 1859 to the kingdom of Italy. Population, 3900.

CHICAGO, in Cook county, State of Illinois, is probably the fourth city in size, and certainly the second in commercial importance, in the United States of America. It is situated on the west shore of Lake Michigan, 960 miles by rail from New York. Dearborn Observatory, $3\frac{1}{2}$ miles S. and $\frac{3}{4}$ mile E. from the court-house, is in 41° 50′ 1″ N. lat. and 87° 34′ 8″ W. long. The surrounding country is prairie land, with a loam soil, and a ridge running north and south two miles or more west from the lake. The city is at an elevation of nearly 600 feet above the sea level, but only 14 feet above the lake. When it was originally settled, the elevation above the lake was not more than 7 feet; the level was subsequently raised 7 feet, beginning about the year 1855; the streets were filled in, and the largest houses elevated by means of jack-screws, without being vacated for purposes either of business or of residence. The climate is healthful and invigorating, and the city is kept singularly clear of all forms of malaria by the prevailing winds. The average death-rate for several years was 23·1 per thousand inhabitants, as compared with 25·3 in Philadelphia, 32·6 in New York, and 30·8 in Boston. The area of the city comprises 23,000 acres, and extends over seven miles north and south along the lake shore, and 5 miles east and west; there were 226,000 building lots of 25 by 125 feet in 1875. The streets intersect each other at right angles. There is an inlet called the Chicago River which runs from the lake nearly a mile west, then separates into two branches, one running north-west, the other south-west, thus dividing the city into three divisions, connected by more than 35 bridges, and by two tunnels running under the bed of the river. This river ("Chacaqua," Indian for thunder, and so called after the Indian Thor, or thunder god) gave the city its name. Originally it emptied into the lake, but a remarkable piece of engineering caused it to change its course, and, so to speak, run "up-hill." The Illinois and Michigan canal, with which the main branch of the river is connected, was so deepened as to draw the water out from the lake; the canal empties into the Illinois River, and the Illinois River into the Mississippi River, so that the water of Lake Michigan flows into the Gulf of Mexico. The river has been so deepened that the largest vessels may be towed into any of its branches, which are supplied with docks and water-slips, affording a dockage capacity of nearly 40 miles, more than 20 of which are already in use. The population, including the residents of the suburban towns (of which there are more than 50, composed exclusively of families of men doing business in Chicago), exceeds 500,000; but the population of the city proper, as ascertained at different dates since its organization in the year 1837, is as follows:—

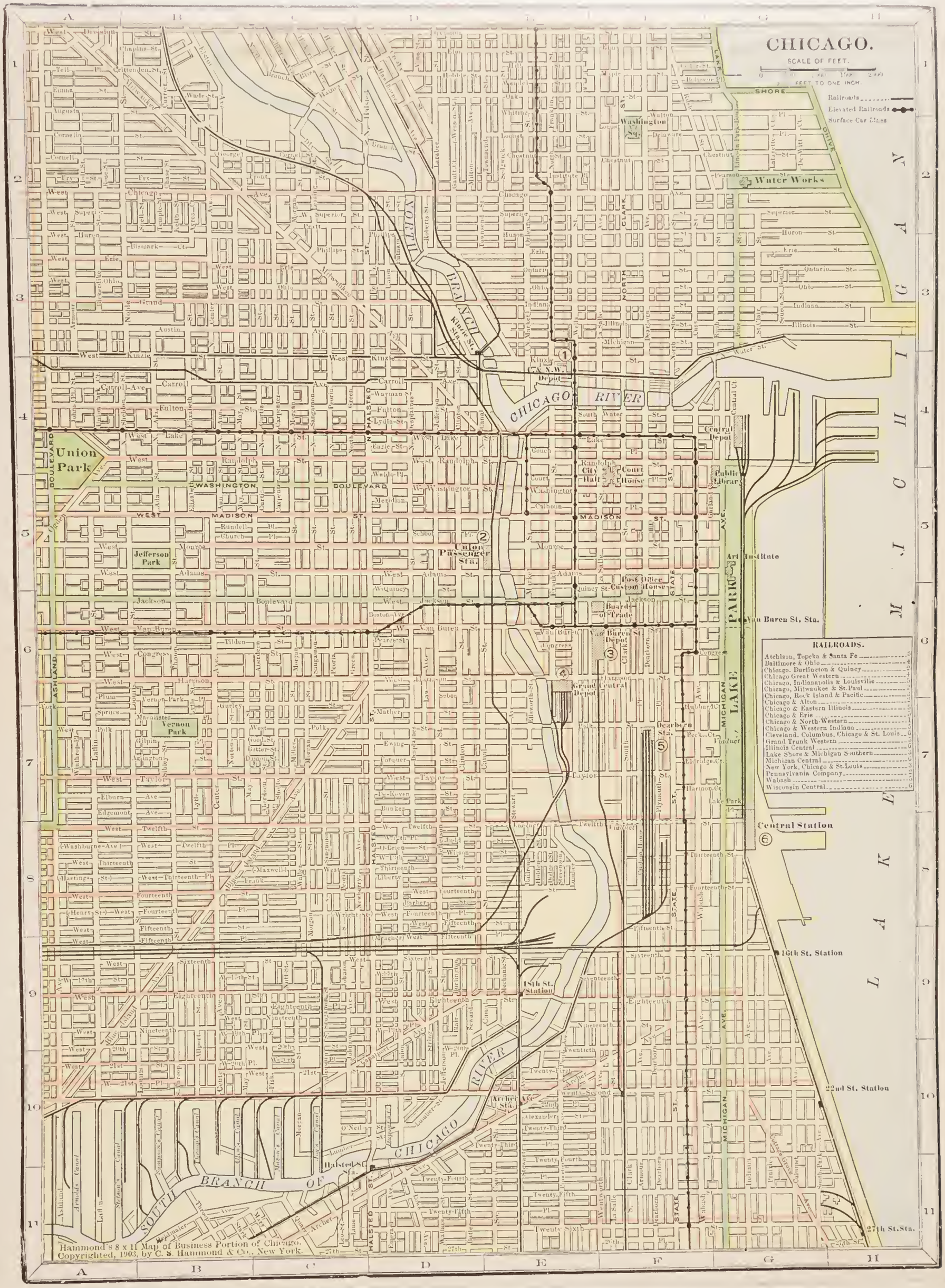


Plan of Chicago.

1. Wicker Park.
2. Union Park.
3. Court House.
4. University.

Date of Census.		Taken by.	Population.
July,	1837	City	4,170
July,	1840	U. S.	4,479
July,	1843	City	7,580
July,	1845	State	12,088
September,	1846	City	14,169
October,	1847	City	16,859
September,	1848	City	20,023
August,	1849	City	23,047
August,	1850	U. S.	29,963
December,	1853	City	59,130
June,	1855	State	80,000
August,	1856	City	84,113
August,	1860	U. S.	109,206
October,	1862	City	138,186
October,	1864	City	169,353
October,	1865	State	178,492
October,	1866	City	200,418
October,	1868	City	252,054
August,	1870	U. S.	306,605
October,	1872	City	367,396
October,	1874	City	395,408
May,	1876	Estimated	420,000

This growth, which is no less than 570 per cent. within 20 years, is regarded as without a parallel. The


CHICAGO.
SCALE OF FEET.
FEET TO ONE INCH.
Railroads
Elevated Railroads
Surface Car Lines
RAILROADS.
Atchison, Topeka & Santa Fe 5
Baltimore & Ohio 4
Chicago, Burlington & Quincy 2
Chicago Great Western 4
Chicago, Indianapolis & Louisville 5
Chicago, Milwaukee & St. Paul 2
Chicago, Rock Island & Pacific 3
Chicago & Alton 2
Chicago & Eastern Illinois 5
Chicago & Erie 5
Chicago & North-Western 1
Chicago & Western Indiana 5
Cleveland, Columbus, Chicago & St. Louis 6
Grand Trunk Western 5
Illinois Central 6
Lake Shore & Michigan Southern 3
Michigan Central 6
New York, Chicago & St. Louis 3
Pennsylvania Company 2
Wabash 5
Wisconsin Central 6
Union Park
Jefferson Park
Vernon Park
Union Passenger Sta.
Grand Central Depot
Dearborn Sta.
Central Station
16th St. Station
18th St. Station
22nd St. Station
27th St. Sta.
Van Buren St. Sta.
Central Depot
Public Library
Art Institute
Water Works
Washington Sq.
Post Office
Custom House
Board of Trade
City Hall
Court House
C. & N.W. Depot
Kinzie St. Sta.
Halsted St. Sta.
Archer Ave. Sta.
CHICAGO RIVER
NORTH BRANCH
SOUTH BRANCH OF CHICAGO RIVER
LAKE MICHIGAN
LAKE SHORE DRIVE
WASHINGTON BOULEVARD
WEST MADISON ST.
MADISON ST.
HALSTED ST.
STATE ST.
MICHIGAN AVE.
ASHLAND BOULEVARD
Hammond's 8 x 11 Map of Business Portion of Chicago.
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foreign population in 1870, numbering 144,557 in all, comprised 52,318 Germans, 39,988 Irish, 10,027 English, 4197 Scotch, 565 Welsh, 6374 Norwegians, 6154 Swedes, 1243 Danes, 1226 Swiss, 1418 French, and 9648 from the British provinces in America.

Government and Finances.—The City Government consists of a mayor and common council of 36 members, elected once every two years by a popular vote. There are 18 political districts called "wards," each of which elects two members to the council. The council is vested with plenary powers as to taxes, appropriations, contracts, &c.; but the bonded debt is limited, by a provision in the constitution of the State, to 5 per cent. on the taxable valuation of all the property. The valuation of all property, personal and real, for taxable purposes (rated at about one-half the actual value) in 1875 was $293,188,950; the tax-levy, $5,123,905; the bonded debt $13,456,000; the floating debt about $4,000,000, abundantly covered by uncollected taxes. Chicago is represeuted in the National Congress of the United States by three members.

Trade and Commerce.—The amount of trade for 1875 was estimated at close upon $657,000,000, made up as follows:—

Produce trade	$232,328,000
Wholesale business	293,900,000
Manufactures	177,000,000
Total	$703,228,000
Less manufactures included in the wholesale business	46,228,000
Total business	$657,000,000
Total in 1874	639,000,000

This business was a growth from $20,000,000 in 1852, since which time there has been a steady increase. The value of the shipments from Chicago of the products of the farm was stated as follows in the annual report for 1875 of the Board of Trade (an association meeting daily, with a membership of 1922):—

Flour and grain equal to 72,369,194 bushels, estimated value	$57,500,000
Live-stock	56,600,000
Produce of cattle and hogs	53,500,000
Produce of the dairy	5,700,000
Wool and hides	25,800,000
High wines and alcohol	11,300,000
Seeds and broom-corn	3,200,000
Sundry other commodities	1,700,000
Total	$215,300,000
Corresponding estimate for 1874	197,400,000
Corresponding estimate for 1873	180,000,000

The lumber trade showed the receipt of 1,147,193,432 feet and 635,708,120 shingles. The value of the cattle, hogs, sheep, and horses received at the Union Stock Yards during that year was $117,533,941. There is a growing direct trade with Europe. The value of the importations for 1875 was estimated at $10,000,000, meaning those alone which came to Chicago without being stopped for duty at any seaport city; and the direct exportations increased from 7213 tons in 1869 to 219,387 tons in 1875. The total volume of produce pouring through the city was estimated that year at 7,000,000 tons, or 700,000 car-loads, if it had all come by rail; or at the rate of 13½ tons for every minute in the year, including nights, Sundays, and holidays. There are 18 grain elevators, with an aggregate storage capacity of 14,650,000 bushels. These are vast store-houses where the grain is elevated from cars and ships, and disposed according to grades, then reloaded on cars and ships, all the work being done by machinery. The shipments of bread stuffs for 1835 were 2,262,030 barrels flour, 23,183,683 bushels wheat, 26,409,420 bushels corn, 10,230,208 bushels of oats, 1,834,117 bushels of barley, and 310,609 bushels of rye. There was a total city consumption of 67,825,311 bushels of grain. The shipments of provisions for that year were 56,040 barrels of beef, 311,170 barrels of pork, 182,068 tons of meat, 57,490 tons of lard, 3701 tons of tallow, 154,559 dressed hogs. The receipts of live stock during that year were 920,843 cattle, 3,912,110 hogs, 418,948 sheep, and 11,329 horses,—a total of 5,251,901, excluding horses. The aggregate of the wholesale trade of that year was estimated at $293,900,000, being an increase of 7½ per cent. over the previous year. The capital invested in wholesale houses (exclusive of that invested in other cities, but connected with Chicago) was $63,200,000. The statistics of manufactures at that date were as follows:—

Number of establishments	2,240
Number of employés	62,600
Wages paid	$28,676,000
Capital employed	69,550,000
Value of products	177,000,000

The principal industries are hog-packing (the number of hogs packed in 1875 being 2,069,200), beef-packing, brewing, and distilling, and the manufacture of iron and steel, wood, brick, leather, chemicals, boots and shoes, and cigars and tobacco. There is an annual industrial exhibition held in a building especially erected for that purpose, 200 feet wide and 800 feet long, which attracts exhibitors for one month from all parts of the north-west, and which was visited in October, 1875, by 276,000 persons. The shipping of Chicago for 1875 was as follows:—number of vessels arrived, 10,488, with a tonnage of 3,122,004; vessels cleared, 10,607, with a tonnage of 3,157,651. There are eighteen trunk lines of railroads running from Chicago, five to the east, and the others west and south, viz.:—The Baltimore and Ohio; Lake Shore and Michigan Southern; Pittsburg, Fort Wayne, and Chicago; Pittsburg, Cincinnati, and St. Louis; Michigan Central; Chicago and Michigan; Chicago and Alton; Chicago, Danville, and Vincennes; Chicago and Iowa; Chicago, Rock Island, and Pacific; Chicago and North-western (comprising three trunk lines); Chicago and Pacific; Chicago, Milwaukee, and St. Paul; Illinois Central; Western Union; Chicago, Burlington, and Quincy. The aggregate mileage of the railroads centring directly in Chicago is nearly 10,000 miles, and 750 trains arrive and depart daily; but it is estimated that Chicago has an uninterrupted connection with more than one-third of the entire railroad mileage of the continent, which is more than 70,000 miles. A notable peculiarity of the Chicago railway system is that it has been built almost entirely by capital outside of Chicago, and was centred in that city because of its superior advantages as the entrepôt of the north-west. The mails received in Chicago weigh 64,400 pounds daily. The banking capital of Chicago at the latest reports was as follows:—National banks (those organized under the provisions of the United States law), $13,381,000; State banks (organized under the State law), $7,165,000; private bankers, $3,885,000; total, $24,431,000. The annual bank clearings for three consecutive years were as follows:—1872, $993,060,503; 1873, $1,047,027,828; 1874, $1,101,347,918.

The Fire of 1871.—The most notable event in the history of Chicago was the destructive fire of 1871, the largest of modern times. The conflagration commenced by the overturning of a lamp, in a district built up almost exclusively of wood, about 9 o'clock in the evening of Sunday, October 8, 1871; it continued through that night and the greater part of the next day, lapping up great blocks of houses, and growing by what it fed on. It was finally checked by explosions of gunpowder in a line of houses on the south of the fire, and exhausted itself on the north by burning all there was to ignite. The area burned over in each division of the city was as follows:—West division (in which the fire originated), 194 acres; south division, 460 acres; north division, 1470 acres. The total area burned was 2124 acres, or nearly 3⅓ square miles, about 4 miles in length, and from 1 to 1½ miles in width. The season had been excessively dry; the rainfall in Chicago for the summer had been only 28½ per cent. of the average. There was a strong south-west wind, made a very sirocco by the heat, and taking irregular, fantastic, and uncontrollable offshoots and eddies, which spread the fire in all directions except west. The city fire department, though large and efficient, had been exhausted by an unusually extended fire the Saturday preceding, and the flames outran even their earliest efforts. Wooden buildings were scattered throughout the entire city, acting as brands to spread the conflagration. These were the main conditions of the fire. The total number of buildings destroyed was 17,450, and 98,860 people were rendered homeless; of the latter 250 perished in the flames or lost their lives from exposure. Thousands, flying before the flames, sought refuge in the lake, and remained standing in the water for hours as the only means of preservation against the intense heat and the shower of sparks and cinders. Among the buildings destroyed were the custom-houses, post-office, court-house, chamber of commerce, and nearly all the churches, railway stations, hotels.

banks, theatres, newspaper offices, and buildings of a quasi-public character. It is estimated that 73 miles frontage of streets was burned over, most of which had been improved with wood block pavements; these were partially destroyed. The total loss has been estimated at $196,000,000,—of which $53,000,000 represented the value of the buildings destroyed, $58,710,000 the personal effects, and the remainder business stocks, produce, and manufactures of every description. On the losses there was an insurance of $88,634,122, of which about one-half was recovered. A vast system of relief was organized, which received the most generous aid from all parts of the world. The money contributions from the various States and from abroad were $4,996,782; of this England contributed nearly $500,000. These funds, which were over and above the contributions of food, clothing, and supplies, were made to last, under the careful and honest administration of a society of citizens, till the close of the year 1876. Out of them temporary homes were provided for nearly 40,000 people; barracks and shelter-houses were erected, workmen were supplied with tools, and women with sewing-machines; the sick were cared for and the dead buried; and the poorer classes of Chicago were probably never so comfortable as within two or three years after this fire. The work of rebuilding the city was accomplished with marvellous rapidity. Immediately after the fire the most sanguine persons predicted that it would require at least ten years to restore the buildings that had been destroyed. But within three years the city was provided with buildings equal in capacity, and of twofold value. The work was begun before the cinders were cold, and the population seemed to gain new ambition and new energy from the disaster. The "fire limits" were extended so as to exclude the erection of other than stone, brick, or iron buildings within a large area, and subsequently this prohibition was applied to the entire city. The result has been to make New Chicago the most beautiful city in America in its business centres. Within the first year after the fire, buildings had been erected or started covering a frontage of 51,619 feet, and costing, when finished, $40,133,600. That the work was not spasmodic is shown from the fact that, in the year 1874, the frontage of new buildings was 33,065 feet, and the cost $5,785,441; and in 1875 the frontage was 55,470 feet (about 10½ miles) and the cost $9,778,080. The materials used were mostly brick, a pure white sandstone known as Athens (Illinois) marble, a grey sandstone from Ohio and Michigan, and a brown sandstone from Lake Superior. The business and population continued to increase in spite of the disaster,—indeed the ratio of growth became larger. The solidity and permanence of this prosperity were confirmed during the American panic of 1873, when the Chicago banks alone, among those of all large cities, were not compelled to issue certificates of deposit, but continued steadily to pay out current funds. There were few mercantile failures, and the business of the year following the panic still showed an increase. This superior resistance to the general contraction has been attributed to Chicago's position as the distributing point of the breadstuffs and provisions of the great North-West. The comparative value of Chicago real-estate is an interesting illustration of its rapid growth. An example case may be cited of one piece of ground in an outlying district which sold in 1868 for $50 an acre, and was resold in 1873 for $1500 an acre. Land obtained 40 years ago from the Government at 1\frac{25}{100}$ an acre, is now worth $10,000 an acre. Business property which was sold in 1865 for $250 a front foot (with a depth of 125 feet), was resold in 1871 for $1500 a front foot. Another piece of property which was valued at $3845 in 1866 was sold in 1872 for $100,000. These instances are not exceptional, but represent fairly the increase of values. The highest price ever paid for business property in Chicago was 52\frac{50}{100}$ per square foot, but the average value of first-class business property is $25 per square foot. The aggregate transfers of Chicago property in 1873 amounted to $78,427,391.

Education, Religion, Charities, &c.—The public school system in Chicago is regarded as one of the most thorough in the United States. In 1855 the first report of the Board of Education showed the enrollment of 3000 pupils; the report of 1875 gave the number as 49,121. There was then an annual expenditure of $827,502 to sustain the schools; there were 57 school buildings; 700 teachers were employed; and the annual cost of tuition per pupil was 15\frac{79}{100}$. Of the 102,555 persons in Chicago between the ages of six and twenty-one, besides the 49,121 in the public schools, there were 27,071 in private schools, and 15,947 at work. There were 33,547 neither at work nor in school, but only 186 of all were found who could neither read nor write. The graded system of study is used, and the schools are classified as follows:—1 high school, course of study four years; 3 division high schools (one for each division in the city), course of study two years; 1 normal school for the preparation especially of teachers; the others are grammar schools and primary schools, the former embracing the four highest grades, and the latter the four lowest grades. The school year consists of ten months, divided into three terms; the hours of attendance in the grammar and primary schools are 9 A.M. till noon, and 2 P.M. till 4 P.M. The principal studies in the grammar schools are theory of arithmetic, problems in arithmetic, geography, history of the United States, language, composition, reading, spelling, penmanship; drawing and music are also taught, and the study of German is optional. The course of studies in the high schools is that of the higher academies. Corporal punishment was abandoned altogether about the year 1865, and the reading of the Bible was discontinued in 1875, in deference to the dogmatic differences among the religious sects, the theory of the schools being free and secular. Of other educational institutions, besides 82 ordinary private schools, there are a large number of "Kindergarten" schools, in imitation of the favorite German system for elementary instruction. Among the higher institutions is the university of Chicago, connected with which is the Dearborn Observatory, which has a refracting telescope of 23 feet focal length and 18½ inches aperture. There are also the North-Western University (Methodist), the Baptist Union Theological Seminary, Chicago Theological Seminary, St. Ignatius College (Catholic), College of Law, Chicago Musical College, and 7 medical colleges. The principal charitable institutions are the Nursery and Half-Orphan Asylum, Protestant Orphan Asylum, Reform and Industrial School, Erring Women's Refuge, Foundlings' Home, Good Samaritan Industrial Home, Home for the Friendless, Old People's Home, Soldiers' Home, St. Joseph's Orphan Asylum (Catholic), Lutheran Orphan Asylum, Washingtonian Home (temperance reform), all liberally endowed, and 10 hospitals. There are 83 benevolent and other open societies, 49 masonic and other secret societies (exclusive of industrial unions), 14 theatres and opera houses, 84 newspapers (daily and weekly), 25 large hotels, and numerous smaller and private hotels. There are 8 libraries open to the public, of which the Chicago Public Library (established in 1872, and supported by taxation) is the largest; in 1875, three years after it was opened, there were more than 40,000 volumes, and the aggregate circulation of books during that year was 399,156 volumes, the whole number of visitors 236,021, and the total issue of periodicals 135,355. There are 238 houses of public worship in Chicago, including the mission churches. The churches are divided among the different denominations as follows:—Roman Catholic, 28; Baptist, 25; Presbyterian, 24; Methodist, 22; Episcopal, 18; Lutheran, 18; Congregational, 15; Jewish, 8; Free Baptist, 2; Christian, 4; Dutch Reformed, 2; Reformed Episcopal, 3; Evangelical, 11; Colored Methodist, 2; German Methodist, 2; Scandinavian Methodist, 4; Swedenborgian, 5; Unitarian, 4; Universalist, 4; miscellaneous and mission, 37. The value of church property in Chicago (exempt from taxation under the law) is estimated at $12,000,000, of which $5,000,000 is owned by the Roman Catholic Church.

Public Works, Parks, Streets, &c.—Of the public buildings destroyed by the fire, the custom-house and the city hall were still in course of erection in 1876. The National Government appropriated $4,000,000 for the former, and the cost of the latter was estimated at $2,500,000. Among the other public buildings are the county jail, bridewell, the water-works, and a large number of engine-houses and police-stations. The total cost of maintaining and enlarging the public works in 1875 was $9,368,649, the water system being self-sustaining. The water supply of the city is drawn from two miles out in the lake. A large structure of iron and heavy timber, loaded with stone, and called a "crib," 98 feet in diameter, was located at that distance from the shore. In the centre compartment an iron cylinder is sunk 64 feet, of which 31 feet are below the bottom of the lake, the water being 33 feet deep. Connected with it are two distinct tunnels leading to two separate sets

of pumping works. The tunnels are 66 feet below the level of the shore, one with a diameter of 5, and the other of 10 feet. The latter extends also three miles under the city, so that the two pumping works are removed that distance, and along its line are located 17 large subterranean wells or cisterns for use in case of fires. The cost of these tunnels was $1,500,000. Their capacity is 150,000,000 gallons; the capacity of the pumping engines is 80,000,000 gallons in 24 hours. Telegraphic communication is kept up constantly by cables between the "crib" and pumping works. The water is always pure, cold, and wholesome, and it may be raised to a height of 155 feet for distribution. The consumption for 1875 was 1,449,825,000 gallons. There are over 3860 miles of water pipe, varying from 4 to 24 inches in diameter, 2607 public hydrants, and 2132 stop-cocks. There are over 240 miles of sewers, which cost $4,236,769, and 609 miles of streets, of which 112 miles are paved; of the latter 87 miles are of the wooden block pavement. The side-walks of the city measure 725 miles; and there are nearly 60 miles of horse-railways or tramways for intramural transit. The park system of Chicago is one of the most extensive in the world. Two parks are in the south division, one containing 372 acres, and the other 593 acres. The latter has a frontage on Lake Michigan of 1½ miles, and the two embrace 14 miles of interior drives, and 30 miles of walks. The larger of the two is to have a series of interior lakes connected with Lake Michigan, and protected by a pier several hundred feet long, so that they may be reached by boats from the lake. The approaches to these two parks are two roadways, each 200 feet wide, known as Grand and Drexel Boulevards. The former may be compared to the Rotten Row in Hyde Park, London; the latter is modelled after the Avenue l'Impératrice, Paris, with a continuous stretch of floral ornamentation in the centre. The west division parks, inside the city limits, comprise Humboldt Park, 225 acres; Central Park, 185 acres; and Douglas Park, 180 acres. The ornamentation is varied and elaborate. Lincoln Park, within the northern limits of the city, contains 230 acres, and has a lake shore drive of several miles. All these parks are connected by wide roadways, varying from 150 to 300 feet in width, and giving a continuous drive of 35 miles. The parks are supplied with water from a number of Artesian wells. Besides these principal parks, there are the following public places in the different divisions of the city:—Lake Park, 42 acres; Union Park, 11 acres; Jefferson Park, 6 acres; Washington Square, 2 acres; Union Square, 1 acre; Dearborn Park, 1 acre; Ellis Park, 3 acres; Vernon Park, 3 acres; Wicker Park, 3 acres. There are thus 1856 acres set aside by Chicago for public grounds. (J. B. R.)

CHICHELY, or CHICHELE, HENRY (1362–1443), an English primate, was born at Higham Ferrers, in Northamptonshire, in 1362. After studying at Oxford, he was sent on various embassies to the Papal and French courts; in 1409, he was representative of England in the Council of Pisa, which deposed Gregory and Benedict, and elevated Alexander V. to the papacy; and, in 1414, he became archbishop of Canterbury. He was distinguished for his zeal in the cause of the English Church, which he defended against the pretension of the Pope to dispose of ecclesiastical preferments. He was also, on the other hand, a determined opponent of Wycliffe. He spent much of his wealth in the establishment of All Soul's College, Oxford, and in adorning Canterbury Cathedral and Lambeth Palace.

CHICHESTER, a municipal and parliamentary borough, episcopal city, and market-town of England, in Sussex, situated at the foot of a small spur of the South Down Hills, on the widest part of the plain to which it gives name. It is distant about 60 miles S.W. from London, and 14 N.E. from Portsmouth. Chichester still retains its ancient walls, which have a circuit of about a mile and a half, and probably follow the line of the Roman fortifications. The town is well-built, and consists of four principal streets, which meet at right angles at a central octagonal cross, fifty feet high, erected by Bishop Story, and reputed to be one of the finest structures of the kind in Great Britain. Of the public buildings the most remarkable are the cathedral, which is 407 feet in length and 150 in breadth, and is noteworthy as having double side-aisles, the church of St. Paul—a modern Gothic edifice, the guild-hall, the corn-exchange, the market-house, the infirmary, and the museum of the Chichester Literary Society and Mechanics' Institute. There is also a large cattle-market at the east of the city capable of accommodating several thousand head of cattle. It is one of the principal cattle-markets in the south of England, and was erected in 1871 by the corporation of the city at a cost of £15,000. In the cathedral are a number of ancient and curious monuments, besides nine by Flaxman, one of which is in memory of the poet Collins, who was a native of the city, and is buried in the church of St. Andrew's. The diocese of Chichester includes the whole county of Sussex except a few parishes which are peculiars, and comprises nearly 300 benefices. The palace of the bishop is in the city of Chichester. There is a grammar-school, founded by Bishop Story in 1497, and the blue-coat school boards and educates about 30 boys. Chichester communicates with the sea by means of a short canal. The borough, which returns one member to parliament, had a population of 9054 in 1871.

Arms of Bishopric.

Chichester, as already mentioned, is undoubtedly built on an ancient Roman site, near a line of road now known as the Stane Street; and it is usually, though hardly with absolute certainty, identified with *Regnum*, a town of the Belgæ mentioned in the Itinerary of Antonine. A slab of grey Sussex marble, now preserved at Goodwood, was discovered in 1713 on the site of the present council chamber, bearing an inscription which has given rise to an ingenious hypothesis, which represents Chichester as the seat of the native king Cogidubnus, mentioned by Tacitus as possessing independent authority, and this king as the father of the Claudia to whom reference is made in the Second Epistle to Timothy. The inscription proves at least that the town was the abode of a considerable body of craftsmen, and that they erected a temple to Neptune and Minerva under the patronage of a certain Pudens. With the conjectural restoration of a few letters it reads as follows:—"*N*eptuni et Minervæ templum *p*ro salute d*omus* divinæ *ex* auctoritate *Tib.* Claud. *Co*gidubni r. leg. aug. in Brit. *Colle*gium fabror. et qui in eo *a sacris* sunt d. s. d. donante aream *Pud*ente Pudentini fil." In the early Saxon period the town seems to have been destroyed by Ælla, and soon afterwards restored by Cissa, whose memory is preserved in the modern name, equivalent to Cissa's Caster, or Castrum. In 967 it was chosen by King Edgar as the seat of a mint, and specimens of the pennies are still extant. At the time of the Conquest it had only 283 houses and a church; but in 1083 the bishopric was removed thither from Selsey, and a cathedral was consecrated in 1108. This building having been destroyed by fire, a new one was erected in the end of the 12th century by Bishops Ralph and Seffrid, and this may be regarded as the basis of the present edifice. In 1213 the city was formally incorporated. During the civil war it was captured from the Royalists by Sir William Waller, whose soldiers did great damage to the cathedral. In spite of all attempts to preserve it, the tower and spire came to the ground in 1861; but a restoration has since been effected under the direction of Sir G. Gilbert Scott. Besides the poet Collins, Chichester numbers among its worthies Bishop Juxon, Hayley the friend of Cowper, and three artists of the 18th century, generally known as the "Three Smiths of Chichester." See Lower's *Sussex*, s.v.; *Quarterly Review*, vol. xcvii.

Arms of Chichester.

CHICKASAWS, a tribe of North American Indians, now settled in a reservation of 6840 square miles in the Indian Territory on the left bank of the Red River. According to their own tradition and the evidence of philology, they are closely connected with the Creeks and Choctaws; and they believe that they emigrated along with these tribes from the West, crossed the Mississippi, and settled in the district that now forms the north-east part of the state

of that name. Here they were visited by De Soto in 1540. From the first they showed a hostile spirit against the French colonists, and frequently engaged with them in actual conflict. With the English, on the other hand, their relations were more satisfactory. In 1786 they made a treaty with the United States; and in 1793 they assisted the whites in their operations against the Creeks. In the early years of the present century part of their territory was ceded for certain annuities, and a portion of the tribe migrated to Arkansas; and in 1832–34, the remainder, amounting to about 3600, surrendered to the United States the 6,442,400 acres of which they were still possessed, and entered into a treaty with the Choctaws for incorporation with that tribe. In 1855, however, they effected a separation of this union, with which they had soon grown dissatisfied; and by payment to the Choctaws of $150,000 obtained a complete right to their present territory. In the civil war of 1861 they joined the Confederates and suffered in consequence; but their rights were restored by the treaty of 1865. In 1866 they surrendered 7,000,000 acres; and in 1873 they adopted their former slaves. They possess a governor, a senate, and a house of representatives, and maintain 14 schools with about 500 pupils. In 1873 they numbered about 6000, and had private property to the value of $2,000,000.

CHICLANA, a town of Spain in the province of Cadiz, 13 miles south-east from that city, divided by the River Tiro into the Banda and Lugor quarters. It contains the residences of many of the Cadiz merchants, possesses baths of great celebrity, and is a favorite resort of the lower classes. In the neighborhood is Medina Sidonia, supposed by some to be the Phœnician *Asidon;* and about 5 miles south is the field of Barossa, where the Anglo-Spanish army under Sir Thomas Graham (Lord Lynedoch) defeated the French under Marshal Victor, March 5, 1811. Population about 8600.

CHICOPEE, a town of the United States, in Hampden county, Massachusetts, at the confluence of the Chicopee river with the Connecticut, 95 miles by rail W.S.W. of Boston. It comprises the villages of Cabotville and Chicopee Falls, and forms a flourishing manufacturing centre. Among its principal establishments are seven cotton mills with upwards of 114,000 spindles, the works of the Ames Company (which are the chief source of side arms in the United States), a woollen mill, two manufactories of agricultural implements, and several foundries. The town dates from 1640, and till 1848 formed part of Springfield. Population in 1870, 9607.

CHICORY. The Chicory or Succory plant, *Cichorium Intybus* (natural order *Compositæ*), in its wild state is a native of Great Britain, occurring most frequently in dry chalky soils, and by road-sides. It has a long fleshy tap-root, a rigid branching hairy stem rising to a height of 2 to 3 feet,—the leaves around the base being lobed and toothed, not unlike those of the dandelion. The flower heads are of a bright blue color, few in number, and measure nearly an inch and a half across. Chicory is cultivated much more extensively on the Continent—in Holland, Belgium, France, and Germany,—than in Great Britain; and as a cultivated plant it has three distinct applications. Its roots roasted and ground are used as a substitute for, adulterant of, or addition to coffee; both roots and leaves are employed as salads; and the plant is grown as a fodder or herbage crop which is greedily consumed by cattle. In Great Britain it is chiefly in its first capacity, in connection with coffee, that chicory is employed. A large proportion of the chicory root used for this purpose is obtained from Belgium and other neighboring Continental countries; but a considerable quantity is now cultivated in England, chiefly in Yorkshire. For the preparation of chicory the older stout white roots are selected, and after washing they are sliced up into small pieces and kiln-dried. In this condition the material is sold to the chicory roaster, by whom it is roasted till it assumes a deep brown color; afterwards when ground it is in external characteristics very like coffee, but is destitute of its pleasing aromatic odor. Neither does the roasted chicory possess any trace of the alkaloid caffeine which gives their peculiar virtues to coffee, tea, and other diet drinks. The fact, however, that for a hundred years it has been successfully used as a substitute for or recognized addition to coffee, while in the meantime innumerable other substances have been tried for the same purpose and abandoned, indicates that it is agreeable or beneficial to some constitutions. It gives the coffee additional color, bitterness, and body, and may perhaps, as a sedative, tonic, and diuretic, modify its stimulant and irritating effects. It is at least in very extensive and general use; and in Belgium especially its infusion is largely drunk as an independent beverage. The leaves blanched form a favorite salad on the Continent, known in Paris as *Barbe du Capucin.* In Belgium the fresh roots are boiled and eaten with butter, and throughout the Continent the roots are stored for use as salads during winter.

The Endive (*Cichorium Endivia*) is a closely allied plant, cultivated on account of its leaves alone, which, when blanched, constitute a valued salad, and are also sometimes cooked fresh. It was cultivated and esteemed by the ancient Egyptians, Greeks, and Romans.

CHIERI, a town of Italy, in the province of Turin, and eight miles south-east of the city of that name, with which it is connected by a good carriage road. It stands on the declivity of a hill, and is divided into two parts by a branch of the Tepice. Among its numerous churches and convents, mention may be made of Santa Maria della Scala, which is one of the largest Gothic structures in Piedmont, and occupies, it is said, the site of an ancient temple of Minerva. The town also possesses a large number of benevolent and educational institutions and a theatre. It ranks as one of the oldest manufacturing centres in Europe, and still prosecutes the fabrication of silk, cotton, and woollen goods. The population is about 12,000. According to some investigators, Chieri is to be identified with the Roman city of *Carrea Potentia;* but, be this as it may, it appears in history at an early period. In the 9th and 10th centuries it was subject to the bishop of Turin; in the 11th it became an independent republic; and in 1155 it was compelled by Barbarossa to recognize again the episcopal authority. In the following centuries it went through numerous vicissitudes of war and politics, but at the same time developed its industrial activity About the middle, indeed, of the 15th century, no fewer than 100,000 pieces of cotton goods were annually manufactured. In 1551 the town was laid waste by the French. By Victor Emmanuel it was raised to the rank of a princedom; and Cibrario,[1] the historian of North Italy, thought it worth his while to devote two volumes to the preservation of its annals, *Delle Storie di Chieri,* Turin, 1827.

CHIETI, or CIVITA DI CHIETI, a town of Italy, capital of the province of Abruzzo Citeriore, situated on a hill near the Pescara, about six miles from the Adriatic, and 40 east of Aquila, with which it will shortly have railway communication. It is the seat of an archbishop and a prefect, and has a fine cathedral, a gymnasium, a hospital, several monastic buildings, and a handsome theatre. There are numerous remains of the ancient *Teate,* of which the most important are seven halls, probably belonging to a bathing establishment, a large theatre, a gateway, and several inscriptions referring to the Asinian family; while the churches of Sta. Maria del Tricaglio and S. Paolo are built respectively on the sites of the temples of Hercules and Diana Trivia. The principal industries are the manufacture of woollen and silk goods; and there is a trade in corn, wine, oil, and the other productions of the neighborhood. Teate was the chief city of the Marrucini, and under the Roman dominion continued to be a place of considerable prosperity. It seems to have been the native city of the Asinii and the Vettii. After the fall of the Roman empire it passed into the hands of the Goths and the Lombards, was destroyed by Pepin, and was restored by the Normans. In 1524 it gave its name to the order of the Theatines founded by its bishop Gaetano. Population, 23,000.

CHIHUAHUA, a city of Mexico, capital of the state of the same name, lies in a beautiful valley opening towards the north, and hemmed in on the other sides by arms of the Sierra Madre, 4640 feet above the level of the sea, in 28° 38′ N. lat. and 106° 30′ W. long. The town is regularly built, and the streets are wide and clean, with many handsome and convenient houses, plentifully supplied with water, which is brought to the town by an aqueduct three miles in length. The grand square, three sides of which are occupied by public edifices and stores, and the fourth by the cathedral, an imposing building of the 18th century, has its spacious area adorned with foun-

[1] [Giann' Antonio L., count (1802-70), of Turin; a cabinet officer under Cavour; historian of Savoy House; wrote *Pol. Economy of Middle Ages.*—AM. ED.]

tains, walks, and benches, and with pillars of white porphyry. The principal buildings, besides the cathedral, are the mint, the prison, which was formerly a Jesuit convent, the house of correction, two hospitals, and the military school. In the square in front of the Jesuit chapel of San Felipe, is a simple monument in memory of the three martyrs of Mexican independence, Hidalgo, Allende, and Ilmenez, who were shot on the spot by the Spaniards. The town was founded in 1691, and in the 18th century was the seat of the captain-general of the Inner Provinces. At the time of its greatest prosperity it had about 70,000 inhabitants; but its present population does not exceed 14,000.

CHILDERS, Robert Cæsar (1838–1876), an eminent Oriental scholar, was the son of the Rev. Charles Childers, English chaplain at Nice. In 1860 he received an appointment in the civil service of Ceylon, which he retained until 1864, when he was compelled to return to England owing to ill-health. He had acquired some knowledge of Pāli during his residence in Ceylon, but it was not until the autumn of 1868 that, under the advice of Dr. Rost, he gave himself to the scientific study of the language. Entering at once on the task of preparing a Pāli dictionary, he labored at it with such extraordinary assiduity that he was able to publish the first volume in 1872, and the second and concluding volume in 1875. The work is an enduring monument of learning and zeal, and has been gratefully acknowledged by a competent authority as "the most valuable contribution that has yet been made to the knowledge of Pāli, and as the foundation of all future study of that language." Mr. Childers was a frequent contributor on subjects connected with Buddhism to scientific and literary periodicals. In 1872 he was appointed sub-librarian at the India Office, and in the following year he became the first professor of Pāli and Buddhist literature at University College, London. He died at London on the 25th July, 1876.

See Plate XI. of vol. i.

CHILI, or Chile, occupies a strip of land on the western side of South America, extending from 24° to 56° 28′ 50″ S. lat. from the Bay of Mejillones to Cape Horn, a distance of 2270 miles. On the E. it is bounded by the Andes, on the W. by the Pacific Ocean, and on the N. by Bolivia. Its breadth varies from 40 to 200 miles, and its area is computed at 218,925 square miles, with a population of 2,319,266. Between lat. 24° and 32° (comprehending the provinces of Atacama, Coquimbo, and the northern half of Aconcagua) the principal industry is mining; between lat. 32° and 38° (comprehending the southern half of Aconcagua and the provinces of Valparaiso, Santiago, Colchagua, Curicó, Talca, Maule, Nuble, Concepcion, and part of Arauco) the staples are agricultural produce and coal; while the remaining part produces timber, potatoes, and salted meat. The Andes extend in two parallel lines throughout nearly the entire length of the country. Between these two ranges or "Cordilleras" is a table-land, which attains its greatest breadth between lat. 33° and 40°, and which narrows both towards the northern and southern extremity, where the ramifications of both chains meet and form a continuous undulating plain. Chili further lays claim to the whole of Patagonia and Tierra del Fuego.

Mountains.

Mountains.—The Andes commence in the district called the Colony of Magellan, where their general elevation is lowest, the perpetual snow-line only 3000 feet, the highest peak, Mount Stokes, 6400 feet, and the coast excessively rough and broken and full of fiords of immense depth, fed by glaciers descending from the high lands. Northwards, towards lat. 41°, the coast becomes less indented, the range more continuous and elevated, and the peaks higher,—such as Minchinmadiva, 8000 feet, Corcobado Volcano, 9158 feet, and Yanteles, 8030 feet. From lat. 41°, or from the southern extremity of the province of Llanquihue, commence the table-land and the parallel granitic belt that skirts the Chilian coast, which together nowhere exceed 120 geographical miles in breadth from the sea to the Andes. At this lat. the snow-line rises to 8000 feet, at Valparaiso (33° S. lat.) to 12,780 feet, and at Coquimbo (29° S. lat.) to 15,200 feet. The centre table-land is in lat. 41° under 200 feet above the sea; at Talca it rises to 350, at Rancagua to 1560, at Santiago to 1800; and it continues to increase in elevation as it extends northward. The mean elevation of the Andes in Chili is 11,830 feet. The culminating peak is the volcano of Aconcagua, in the province of Aconcagua, which reaches the height of 22,427 feet. The principal summits to the north of this are Cima del Mercedario, 22,302 feet, in lat. 32°, and Cima del Cobre, 18,320 feet, in lat. 28° 30′ South of Aconcagua, in the province of Santiago, are Juncal (19,495 feet), and the volcanoes of Tupungato (20,269), San José (20,000 feet), and Maipu (17,664 feet). In Arauco is the volcano of Villarica, 15,996 feet; in Talca, the great truncate mountain called the Descabezado, 12,757 feet; in the province of Nuble, the volcano of Chillan, 9446 feet; and in Llanquihue, the volcano of Osorno, 7396 feet. In the Chilian range there are 23 volcanoes, of which only a few, such as the volcanoes of Osorno, Villarica, Antuco, and San José, are occasionally active. There are many passes over the Andes from Chili to the Argentine Republic; but the western slope of the mountains being steeper than the eastern, the ascent from Chili is more laborious than from the Argentine Republic, into which the mountains descend by a series of terraces, consisting of Secondary strata terminating in the vast expanse of flat country or "Pampas," occupied by the Tertiary formations. The passes may be said to be open during eight months of the year, but even at their best they can never be traversed by vehicles,—mules being the only means of conveyance. The highest of the passes, as well as the most frequented, are those of Doña Ana, 14,770 feet, and Colguën, 14,700 feet, in the province of Coquimbo; the Dehesa, 14,500 feet, east from Santiago and near the volcano of Tupungato; the Patos, 13,965 feet, and Uspallata, 13,125 feet, both in the province of Aconcagua; and the Planchon, 11,455 feet, in the province of Curicó. The part of the Andes bordering the province of Atacama may be crossed at numerous places at any period of the year, as the range there is generally free from snow.[1]

Earthquakes.

Earthquakes.—Chili is subject to frequent earthquake shocks (*temblores*), which, without causing damage, occasion much alarm lest they should be followed by the earthquake itself (*terremoto*). The occurrence of this terrible phenomenon is not indicated by any particular state of the weather, but it rarely happens during the night. It is the common belief that when *shocks* are frequent there is not much fear of their being followed by an *earthquake*, and certainly experience justifies that opinion. Though shocks are very common, earthquakes are rare,—the same province being the focus of one only about once in fifty years, though it is calculated one in every tenth year makes itself felt in some part of Chili.

Earthquakes manifest themselves by a quick horizontal and sometimes rotatory vibration, and when the focus is near the sea it also is agitated. The ground undulates, but very rarely bursts open; and even the most violent are over in a few seconds, though for some time afterwards (at gradually lengthening intervals from twelve hours) there is a succession of gradually lessening shocks. By the earthquake of February, 1835, the Isle of Santa Maria was uplifted, the southern end 8, the central part 9, and the northern end 10 feet; but both it and Concepcion subsided a few weeks afterwards, and even lost part of their previous elevation. During this earthquake two great waves rolled over the town of Talcahuano; the deep sea, close in shore, was dry for a few moments, and smoke burst from the surface of the water. During a very smart earthquake at Coquimbo, in November, 1849, the sea retired about 150 yards, and then rolled back about 12 feet high. An English ship, anchored in 7 fathoms water, in the neighboring bay of Herradura, nearly touched the bottom from the receding of the sea, which afterwards rolled in like a bore, and the water continued to ebb and flow for an hour and a half after the shock.

Lakes.

Lakes.—In the southern part of Chili there are several inland lakes abounding with fish, and frequented by numerous varieties of aquatic birds. The largest of these lakes is that of Llanquihue, situated in 41° 10′ S. lat., 197 feet above the sea, at the base of the volcano of Osorno, which rises 7199 feet above its surface. Its shape is triangular, its greatest length from north to south being 30 miles and greatest breadth 22 miles. The little river Maullin is its sole outlet, and conveys its surplus water to the Pacific, in lat. 41° 35′. In the neighborhood are the lakes Todos los Santos or Esmeralda, 18 miles long by 6 broad, and Rupanco, 24 miles long by 4 broad. Twelve miles northward is Lake Ranco, 32 miles long by 18 broad. In lat. 39° is Lake Villarica or Llauquen, mea-

[1] For the general description of the Andes, see vol. i. p. 589-591. and the article Andes, vol. ii. pp. 15–18.

suring 100 square miles. In the province of Concepcion is Lake Guilletué, measuring 50 square miles. Near Santiago, is Lake Aculeo, occupying about 8500 acres. In all these the water is fresh and pleasant to the taste; but in the small lakes situated near the coast, such as Bacalemu, Cahuil, Vichuquen, and Bolleruca, the water is brackish.

Rivers. *Rivers.*—The rivers, like the lakes, are much larger and more numerous in the south than in the north of Chili. They are almost entirely fed by the melting of the snow on the Andes, but are also liable to swelling from the winter rains. A few are navigable for a short distance; but nearly all yield immense service to agriculture by irrigation, carrying, like the Nile, both substance and moisture to the otherwise barren plains. The largest river is the Biobio, which, rising near the volcano of Antuco, in lat. 38° 15′, enters the Pacific after a course of 220 miles, where it is 2 miles broad. It is navigable for barges and small steamers as far as Nacimiento, 100 miles from the mouth.

The following is a list of the principal rivers, with the provinces through which they flow, and the lengths of their courses:—

Rivers.	Provinces.	Leagues.	Falling into
Biobio	Concepcion	74	Pacific Ocean.
Aconcagua	Aconcagua	60	"
Cauten, or Imperial...	Valdivia	50	"
Maule	Maule	50	"
Cachapoal	Santiago	48	Topocalma.
Itata	Concepcion	46	Pacific Ocean.
Mataquito	Talca	46	"
Topocalma, or Rapel..	Colchagua	40	"
Bueno	Valdivia	37	"
Valdivia, or Callacalla	"	34	"
Coquimbo	Coquimbo	31	"
Cruces	Valdivia	31	Valdivia.
Maipu	Santiago	30	Pacific.
Copiapo	Atacama	30	"
Huasco	"	30	"
Ligua	Aconcagua	29	"
Tolten	Valdivia	29	"
Laja	Concepcion	28	Biobio.
Loncotoma	Aconcagua	28	Pacific.
Limari	Coquimbo	27	"
Mapocho	Santiago	26	Maipu.
Vergara	Arauco	26	Biobio.
Juncal	Atacama	24	Pacific.
Taboledo	Arauco	22	Biobio.

Mineral waters. *Mineral Waters* are numerous in Chili; they are principally saline and sulphureous, containing carbonate of lime, bicarbonate of soda, and chloride of sodium. In temperature the waters range from 50° to that of boiling water. They are situated at various heights, from 1150 feet above the sea, as the baths of Panimavida, 18 miles from Talca, to 10,690 feet, as the baths of Toro, near Elqui in Coquimbo. The most remarkable as well as the most important of the bathing establishments is that of Chillan in the province of Chillan, on the western flank of the Cerro Nevado, 2050 feet above the sea, containing in close proximity icy cold and boiling springs,—sulphureous, ferruginous, alkaline, and saline. The season is from the first of December to the first of April, when they are visited by multitudes for the cure of gout, rheumatism, dyspepsia, and cutaneous diseases. Among the others most frequented are the baths of Apoquindo and Colina, near Santiago; Cauquenes, near Rancagua; Tinguiririca, near Colchagua; Mondaca, near Talca; Trapa-Trapa, near Los Anjeles; and Nahuelhuapi in Llanquihue.

Islands. *Islands.*—The most important Chilian islands are those of the province of Chiloé, covered with great forests of the magnificent cedar *Fitzroya patagonica*, and the tall and elegant cypress *Libocedrus tetragona*. The interesting island of Juan Fernandez may be included with those of Chili, although it is 360 miles from the coast, in lat. 33° 42′ S. It is a mountainous and well-wooded island, 52 miles in circumference, and exhibits generally those features familiar to the readers of *Robinson Crusoe* as the abode of Alexander Selkirk. It is stocked with herds of goats, while the beach is a haunt of seals. Forty-two miles further out to sea is the smaller island of Mas Afuera.

Climate. *Climate.*—As Chili extends from hot parched deserts in the Tropic of Capricorn to a boisterous cold and wet country within 12° of the Antarctic Circle, and as, while one-fourth of the territory is not much above the level of the sea, another fourth lies slightly below the snow-line, the only general qualification that can be assigned to this union of extremes is that both in the high and the low, the wet and the dry, the hot and the cold regions the climate is healthy throughout. Omitting the inhospitable regions of Cape Horn and Tierra del Fuego, and commencing with the most southern portion colonized by Chili, the Territory of Magellan, between lat. 54° and 51° 50′, we find that although the moisture and rainfall are too great for the ripening of wheat, yet potatoes, cabbage, celery, and carrots are readily grown. The principal town, Punta Arenas, is situated in the peninsula of New Brunswick, on the Straits of Magellan, in 53° 10′ 30″ S. lat. and 70° 50′ W. long. The next zone, between lat. 51° 50′ and 37°, comprehends the provinces of Chiloé, Llanquihue, Valdivia, and Arauco, of which the climate is very like that of Great Britain,—the most southern parts having more rain but less cold than the Highlands of Scotland, while the more northern have a more genial climate than the most favored parts of the south of England. In Valdivia the mean temperature throughout the year is 52° Fahr. Timber is the great article of export; but potatoes, wheat, barley, rye, and flax are grown in quantities sufficient for exportation. The next zone extends from 37° to 28° lat., embracing the provinces from Concepcion to Aconcagua, where irrigation is more or less necessary, and where flax, corn, grapes, figs, olives, peaches, and melons grow freely, but oranges and lemons only in the northern portion. Rain falls in June, July, and August with more or less frequency according to the latitude. During these months a mild northerly wind prevails, interrupted occasionally by a dry wind from the east. During all the rest of the year a wind blows from the south, which falls towards the evening. In Santiago the mean annual temperature is 55° Fahr., and in Valparaiso 58° Fahr. From lat. 28° to 24°, including the provinces of Coquimbo and Atacama, there is a gradually decreasing amount of moisture,—from four or five showers of from five to ten hours, as in Coquimbo, to nothing but an occasional mist, as in Atacama. Spring commences in September, summer in December, autumn in March, and winter in June.

Population. *Population.*—The following table gives the population of Chili according to a census taken in 1875, with the average number of births, deaths, marriages, and other kindred statistics:—

Provinces.[1]	Population.	Deaths.	Proportion of Deaths to Population.	Marriages.	Proportion of Marriages to Population.	Births.		
						Legitimate.	Illegitimate.	Total.
Colonia de Magallanes	1,144	62	1 in 18	20	1 in 57	47	14	61
Chiloé	64,536	1,134	1 " 57	496	1 " 130	2,162	418	2,580
Llanquihue	48,492	916	1 " 53	415	1 " 117	1,577	367	1,944
Valdivia	37,481	618	1 " 61	239	1 " 157	1,134	482	1,616
Arauco	140,896	3,099	1 " 45	916	1 " 154	4,131	2,133	6,264
Concepcion	151,365	3,981	1 " 38	1,564	1 " 96	5,288	2,704	7,992
Nuble	136,880	3,868	1 " 35	1,172	1 " 107	4,306	1,572	5,878
Maule	237,314	6,257	1 " 38	1,622	1 " 145	7,480	3,000	10,480
Talca	110,359	3,588	1 " 31	1,016	1 " 109	4,543	993	5,536
Curicó	92,110	2,312	1 " 40	753	1 " 125	3,281	585	3,866
Colchagua	146,889	3,944	1 " 37	1,343	1 " 109	6,034	1,054	7,088
Santiago	362,712	11,188	1 " 32	1,603	1 " 101	14,087	2,661	16,748
Valparaiso	176,682	6,504	1 " 27	1,428	1 " 124	6,286	1,668	7,954
Aconcagua	132,799	3,322	1 " 40	766	1 " 173	3,379	1,272	4,651
Coquimbo	157,463	3,662	1 " 43	979	1 " 161	3,588	1,768	5,356
Atacama	71,302	4,442	1 " 16	338	1 " 211	1,293	1,064	2,357
Total	2,068,424	55,897	1 in 37	16,670	1 in 124	68,616	21,755	90,371

It will be seen that the net amount of the population obtained by the census was 2,068,424; but 10 per cent. may be allowed for omissions, and 44,000 for wandering Araucanian and Patagonian tribes, which brings up the total number to about 2,320,000. One-third of the population is urban, and two-thirds rural. Of the deaths no less than 59 per cent. are under seven years, 4·8 from seven to fifteen, 7·3 from fifteen to twenty-five, 15·3 from twenty-five to fifty, and 11·4 from fifty to eighty. Out of every million children born only 543,900 live to the age of five years. One female child is born for every 1·05 male children; but the death rate is in precisely the opposite proportion. The annual increase of the population is one in every fifty-seven.

Health. *Sanitary Condition.*—The deaths, amounting to 55,897, are distributed among the different months of the year as follows:—January, 5333; February, 4398; March, 4228; April, 3937; May, 4423; June, 4213;

[1] [By treaty of 1883, the province of Antofagasta, 61,000 sq. m., was ceded by Bolivia; that of Tarapaca, 19,000 sq. m., by Peru; and that of Tacna, 8700 sq. m., was sequestered for ten years by Chili. By laws of 1887-88, the provinces were rearranged to add Cautin (3126 sq. m.), Malleco (2856), Biobio (4158), Linares (3488), and O'Higgins (2524) — Am. Ed.]

PRETTY GIRLS OF CHILE

July, 4613; August, 4773; September, 4767; October, 4940; November, 4749; December, 5523. The rate is greatest (9·9 per cent.) in December, and least (7·1 per cent.) in April.

It will be seen that the three provinces, Chiloé, Llanquihue, and Valdivia, which are the wettest, are also the most salubrious. The healthiest period is just before the rains set in, the least healthy during the heats of December and January, when dysentery prevails, owing perhaps to a too free consumption of the water-melon. The mortality of children under 7 years ranges from 47 per cent. in some years to 60 per cent. in others of the whole number of deaths; and four-fifths of the children who die under 7 years of age belong to the poorest classes. The most fatal diseases are gastric, typhoid, and typhus fevers; and the next, pulmonary complaints, dysentery, and syphilis. The system of sewerage in Chili is generally bad, consisting of partially open channels passing through the houses, sometimes with running water and at other times nearly dry. Even Valparaiso is not well provided with drainage. Intermittent fevers are unknown, and Asiatic cholera has not yet passed the Andes.

History. *History.*—The name Chili (or, in its Spanish form, Chile) is supposed to be derived from Tchile, a word belonging to the ancient language of Peru, signifying "snow." The country first became known to Europeans in the 16th century. It was then to a considerable extent under the dominion of the Incas, but had been previously inhabited by certain tribes of Indians, of whom the most important and only warlike race were the Araucanians.

In the time of the Inca Yupanqui (1433), grandfather of the monarch who occupied the throne of Peru on the arrival of the Spaniards, and the tenth in succession from Manco Capac, the reputed founder of the Peruvian empire, the first attempt was made by the Incas to extend their dominion over the territory of Chili. Yupanqui, leading his army across the desert of Atacama, and penetrating into the southern regions of the country, made himself master of a considerable portion of it. The permanent boundary of the dominions of this prince is said by some writers to have been determined by the River Maule, 35° 30′ S. lat., although it is more probable the River Rapel, 34° 10′ S. lat., constituted the extreme limits of the Peruvian empire towards the south. The latter opinion is to some extent supported by the fact, that the remains of an ancient Peruvian fortress, apparently marking the frontier, are still found upon the banks of the Rapel, while no such remains are known to exist in any part of the country farther south.

The Peruvian dominion in Chili ceased with the Inca Atahualpa in 1533. The first Spanish invasion was led by Diego de Almagro (1535 or 1536), who, however, met with such determined resistance from the Araucanians that he was compelled to retrace his steps.[1] Undaunted by this failure, Pizarro despatched another expedition, composed of Spanish troops and Peruvian auxiliaries, under Don Pedro de Valdivia, and was preparing to follow it in person with a larger force, when he was assassinated in 1541. Meanwhile Valdivia entered Chili, and fighting his way onwards, encamped on the banks of the Mapocho, where he founded the city of Santiago, the present capital of the republic, and about eleven years afterwards the town of Valdivia. At last, after twelve years' stay in Chili, his life and conquests were brought to an end in a desperate engagement with the Araucanians, who for 180 years afterwards continued to wage a sanguinary war with the Spaniards, till 1722, when they consented to a treaty which fixed the River Biobio as the boundary between them. Spanish Chili, extending from the Biobio northward to Atacama, was divided into thirteen provinces, under the rule of a governor appointed by the viceroy of Peru. The last of these governors was Mateo de Toro, 1810.

During the entire period of this connection between Spain and Chili, the viceroys, governors, and all the other Spanish officials of every grade regarded the inhabitants only as a means of furthering their own aggrandizement, which at length so exasperated the better educated classes that they determined to throw off the hateful yoke on the first favorable occasion. In 1810 this desired opportunity at last presented itself, when Spain, overrun by the armies of France, was no longer able to vindicate her own claims to a national existence. In July of that year the Chilians took the first step towards asserting their independence by deposing the Spanish president, and putting in his place (September 18, 1810) a committee of seven men, nominated by themselves, to whom were entrusted all the executive powers. In April, 1811, the first blood was spilt in the cause of Chilian independence. A battalion of royal troops, which had been drawn up in the great square of Santiago, was attacked by a detachment of patriot grenadiers, and routed with considerable loss on both sides. In the same year (December 20) the government was vested in a triumvirate, and Juan Jose Carrera was appointed general-in-chief of the army about to be formed.

In 1813 a powerful army, under the command of General Paroja, invaded Chili, but was twice defeated by the republican troops under Carrera. The royalists, however, speedily received large reinforcements; and after a severe contest, Chili was once more obliged to own the sovereignty of Spain. For three years more the people submitted (under the Spanish governors Osorio and Pont) to the old system of tyranny and misgovernment, till at length the patriot refugees, having levied an army in La Plata, and received the support of the Buenos Ayreans, marched against the Spaniards, and completely defeated them at Chacabuco in 1817.

The patriots next proceeded to organize an elective government, of which San Martin, the general of the army, was nominated the supreme director. Their arrangements, however, were not completed when they were attacked once more by the royalists, and routed at the battle of Cancharayada with great loss. Betrayed into a fatal security by this success, the royalist troops neglected the most ordinary military precautions, and being suddenly attacked by the patriots in the plains of Maipu, were defeated with great slaughter. This victory secured the independence of Chili.

The new Republic had no sooner vindicated for itself a place among the nations of South America, than it resolved to assist the neighboring state of Peru in achieving a similar independence, which object was at last effected after a bloody war of six years' duration. No small share of this success was due to the daring courage and consummate ability with which Lord Cochrane, under the most trying circumstances, conducted the naval affairs. In acknowledgment of these important services a well-executed statue of him has been erected in Valparaiso. With 1817 commenced again the national government, under the directorship of General O'Higgins, who held it till 1823, when he was compelled to resign in consequence of a popular tumult. For a few weeks a provisional triumvirate discharged the duties of an executive government. General Freire was next chosen director. During the period of three years in which he held the reins of government, the country was harassed by constant dissensions; and for the four years subsequent to his resignation it continued in a state of disorder bordering upon anarchy. From 1826 to 1830 the government was administered by six different directors, in addition to a second provisional triumvirate. In 1828, under the administration of General Pinto, a constitution was promulgated, which had the effect of temporarily reconciling political differences and calming party spirit. In 1831, however, when General Prieto was raised to the chief magistracy, a convention was called for the purpose of revising this constitution. The result of its deliberations was the present constitution of Chili, which was promulgated on the 25th of May, 1833. From that time Chili has enjoyed remarkable prosperity, and its government has been administered with such firmness and regularity, that it occupies a high rank among nations, and its funds stand well in the Stock Exchange.

After holding office for ten years, Prieto retired, and was succeeded by General Bulnes, a distinguished officer of the war of independence. Like his predecessor he was fortunate in finding in Manuel Montt an able and intelligent prime minister, who was to him what Portales had been to Prieto. In 1851 an insurrectionary movement broke out, headed by General Urriola, who, during the disturbances in Santiago in the Semana Santa, was accidentally killed. The same party then brought forward as their candidate for the presidency General José Maria de la Cruz in opposition to D. Manuel Montt, but the latter was elected, and continued in office for two periods (1851–1861). To him succeeded José Joaquin Perez (1861–1871), who in 1871 was followed by Federico Errazuriz, and he in his turn

[1] [For a correct version of the conquest see Vol. XVIII., p. 690, Am. Ed.]

by Aníbal Pinto in 1876. The administration of recent presidents has been conducted with firmness, wisdom, and prudence. They have been ready to use their influence for the reform of abuses and for the advancement of civil and religious liberty, and for the promotion of everything which could tend to increase the prosperity of the country.[1]

Races. *Races.*—The greater part of Chili, when Almagro invaded it, was inhabited by the *Araucanians*, who were, with other Indians, partly exterminated, but more generally absorbed into the Chilian nationality as at present existing. A remnant of independent Araucanians still occupy a province south of the Biobio; but they scarcely number 24,000, and are on the decrease. These Araucanians are divided into tribes, whose chief, called a cacique, has from two to six wives, or even more, according to his means of supporting them and their progeny. They cultivate maize, rear herds of horses, sheep, and cattle, weave coarse woollens, build comfortable cottages, binding the beams together by the rope creeper *Lardizabala biternata*, and from the reed *Chusquea Coleou* make shafts for their lances. They acknowledge a creator god called Pillan, and some inferior divinities, such as Eponeman, the god of war, Moilen, the god of good, and Guëcubu, the god of evil. They have neither temples nor priests, their worship consisting of the sacrificing of some animal under a tree belonging to the Magnolia order, the *Drymis chilensis*, which is considered sacred by them. This tree was first described by Dr. Winter, who accompanied Drake in his expedition round Cape Horn in 1577. The Araucanians believe also in sorcerers and enchantments, and that every natural death, other than by old age, is caused by the evil influence of some one, whose life the friends of the deceased endeavor to take in expiation and revenge. The Patagonians who inhabit the territory of Magellan and Tierra del Fuego, and who may number about 20,000, are not given to polygamy. They worship one god called Coche, and believe in the immortality of the soul. The average height of fifty Patagonians taken at random lately was found to be 6 feet $4\frac{3}{5}$ inches. The tallest was 6 feet $8\frac{1}{2}$ inches, and the least 6 feet and $\frac{1}{8}$ inch. The *Chilians* themselves hold the same position to Spain as the inhabitants of the United States do towards England. Their instincts and language are Spanish, modified by admixture and intercourse with other nations. The conventionalities of social life are much the same in Chili as in France, Belgium, and Catholic Germany; and this remark applies to dress, living, amusements, and propensities. Sunday is spent as a holiday, and enlivened by festivals, balls, theatricals, and concerts. Cricket and athletic sports are unknown, but good horsemanship is common. The great extent of seaboard not only induces large numbers of the inhabitants to visit foreign lands (calculated to average 78,000), but promotes the diffusion of the civilization of the most highly cultivated nations over the whole of Chili. The beautiful provinces of Valdivia and Llanquihue are colonized by Germans and North Americans, who prepare timber, meat, cheese, butter, beer, cider, and leather. The university and the learned professions have ever numbered among their distinguished members Polish, French, German, and English men of science. The North American colonists have been chiefly instrumental in the construction of flour-mills, telegraphs, and railways. At the commercial centres, such as Valparaiso, Concepcion, Copiapo, Coquimbo, and Huasco, many of the leading Chilian citizens are of English, French, and German descent. There are in the country about 35,000 Europeans, chiefly Germans, French, and English.

Constitution. *Constitution.*—By the constitution adopted on the 25th of May, 1833, the sovereignty is declared to reside in the people; but the exercise of its functions is delegated to three distinct powers—the legislative, the executive, and the judicial. The legislative power is committed to the National Congress, which consists of the Chambers of Deputies and Senators. The Chamber of Deputies comprises over 100 members, elected for a term of three years, on the principle of equal electoral districts with cumulative voting, and by a suffrage enjoyed by all citizens who are twenty-one years of age if married, or twenty-five if unmarried, and who are able to read and write, and pay yearly taxes to a certain amount.

Legislative department.

Senate. The senate is composed of fewer members, chosen by indirect election in each province for a term of nine years. One-third of the house is renewed every three years.

Chambers. The Chamber of Deputies and the Senate have concurrent as well as separate functions. The former body alone can impeach the higher officers of the state before the Senate. It originates all money bills, and measures relating to the military force of the country. The Senate alone has the right of pronouncing judgment on public functionaries impeached by the Chamber of Deputies; it confirms ecclesiastical nominations, and in certain cases gives or withholds its consent to the acts of the executive. In all other proceedings of the legislature the concurrent voice of the two houses is necessary. Laws may originate with either body, but require to be passed by both houses, sanctioned by the president (after consultation with the Council of State), and promulgated by the minister to whose department the matter relates. The period during which the Congress sits is limited to the three winter months; but the session may be prolonged by the president for fifty days. On the day before the regular session closes, the senators elect seven of their number to form the conservative committee, which replaces Congress during its prorogation in the duty of observing the conduct of the executive.

President. The executive power is committed to the president, with a salary of £3600, as supreme chief of the nation. He is chosen by indirect election, and holds office for a term of five years, after expiry of which he is not eligible for re-election until other five years have elapsed. The president concludes treaties, and declares peace or war; he appoints and removes ministers, councillors, and clerks of department, as well as diplomatic representatives, consuls, and the administrative officers of provinces. He also inducts the higher legal and judicial functionaries; but the nomination of these officers, as well as of ecclesiastical dignitaries, must proceed from the Council of State. He distributes the army and navy at will; and when, with the sanction of the Senate, he assumes the command of the national troops in person, he has the exclusive bestowal of naval and military commissions, though ordinarily appointments of this nature must be approved by the Senate.

The president is liable to impeachment for mal-administration for a year after the expiry of his authority. During that time he is not allowed to leave the country, except with the permission of congress. All the other officers of Government are subject to the same law; but in their case the time is more limited.

Council of State. The Council of State is composed of ministers in the exercise of their functions, a member of the courts of justice, an ecclesiastical dignitary, a general or admiral, a chief of the administration of finances, and one ex-minister or diplomatic agent,—all named by the president, together with six other councillors, named one-half by the Senate and one-half by the Chamber of Deputies. The duties of the Council of State are to advise and act as a check upon the president.

Executive department. The government is conducted by five cabinet ministers, each with a salary of £1200. The Ministro del Interior presides over the preparation of the national statistics, over roads and railroads, public buildings, and hospitals; the Ministro de Hacienda over the finance; the Ministro de Justicia, Culto, é Instruccion over the law and prisons, the church, and education; the Ministro de Guerra over the army and navy; and the Ministro del Esterior over foreign affairs and colonization. The president has no power of enforcing obedience to orders relating to any one of these departments until they have been confirmed by the minister in charge. The ministers are entitled to take part in all the debates of Congress; but, unless holding at the same time the office of senator or of deputy, they are not allowed to vote. Any of them may be impeached by the Chamber of Deputies for treason against the laws of the state, or for the mal-administration of the duties of his office. An action may be brought against them even by private individuals who have suffered by any of their acts if the Senate, to whom appeal must in the first place be made, decide that there is sufficient ground for complaint.

Local Government.—Upon the executive depend directly

[1] [For war of 1879–83, see Vol. XVIII. p. 692. In Jan., 1891, the Congressional faction revolted against President Balmaceda, seized most of the navy and the nitrate provinces, overthrew him in August, and restored the Republic.—Am. Ed.]

Local government.

the administrative officials throughout the country. For administrative purposes Chili is divided into eighteen provinces, each with subordinate departments, subdelegations, and districts, and one settlement, viz., the provinces of Atacama, Coquimbo, Valparaiso, Aconcagua, Santiago, Colchagua, Curicó, Talca, Maule, Nuble, Concepcion, Arauco, Valdivia, Llanquihue, and Chiloé, and the settlement of Magellan. The capital is Santiago, on the Mapocho. Each of the provinces is governed by an intendant, who is nominated by the president, and holds office for three years. The departments are under governors, who hold office for a similar term. The intendant generally acts as governor in that department in which the capital of the province is situated, and is, at the same time, mayor of the municipal corporation; but the authority of this body is very limited, as it cannot dispose even of its local funds without the permission of Government. The subdelegates are appointed by the governors for a period of two years, as are also the inspectors of districts. Both these offices are compulsory,—those who decline to serve being liable to fines.

The united revenue of the municipal corporations of Chili amounts to about £500,000, of which about £80,000 is contributed by the State, and the remainder derived from local sources.

Judicial department.

The procedure of the Chilian courts of justice is based on the same fundamental principles as those which hold among the Latin nations generally, and approximates therefore to that of equity. Evidence is mostly taken by depositions in writing. The suitor appears by a sworn procurator or attorney, who must be conversant with the technicalities of the law. In the higher courts, the aid of an advocate is further obligatory. The advocate, who combines the functions of the consulting lawyer with those of the barrister, is only admitted to practice after taking a university degree, and passing an examination by the Supreme Court. Trial by jury is unknown, except as applied in a modified form to libel cases connected with the press. The whole law of Chili is being gradually digested into codes,—the civil, penal, commercial, &c.

The supreme court, which sits at Santiago, takes cognizance of criminal and civil causes alike. Its decisions are final, and also bind the Government upon questions of law submitted for the consideration of the bench. There are three courts of intermediate appeal, sitting in Santiago, Serena, and Concepcion, which also have both criminal and civil jurisdiction, and whose decisions are final in certain cases.

In each department of every province there are one or more salaried judges of letters (or judges learned in the law), who divide among them the local jurisdiction,—the criminal and civil sides being, in places of importance, vested in different judges, each of whom, as a rule, sits alone. Below these, again, are the judges of subdelegations and of districts, of whom the latter can only decide civil cases when the value at issue is below £10, and in criminal causes can arrest the criminal and prepare evidence; while the former decides civil suits up to £40 value, hears appeals from the district judge, and takes cognizance of minor criminal offences.

In places where access to a judge of letters is difficult, an alcalde or local police magistrate retains a limited jurisdiction. With a view to reduce litigation, the law expressly encourages reference to arbitration in various forms; and the duties of public prosecutor and public advocate are performed by officials, who intervene before the higher courts and the judges of letters in all cases which involve public morality, or the interests of the State, of minors, of the incapable, of the absent, and of charitable trusts.

Military and ecclesiastical offences come under the cognizance of special tribunals, but neither ecclesiastical nor military persons are, as such, exempt from the jurisdiction of the ordinary tribunals in respect of offences against the law of the land. Certain special jurisdiction is reserved to the Council of State and to the revenue courts; and under a treaty with Great Britain, guaranteeing the mutual right of search in suspected slave vessels, a mixed tribunal decides, without appeal, as to the validity of capture.

The clerks and secretaries of the higher courts, and the secretaries of the judges of letters, must be qualified advocates, as also the notaries public, who are charged with drawing up and preserving legal instruments, some among their number being particularly entrusted with the registry of landed property, and of deeds of partnership, having then the title of notary conservator. The registers are open to public inspection.

Religion.

Religion.—The form of worship recognized by the constitution is the Roman Catholic, yet Government tolerates the public profession of others. For the purposes of ecclesiastical administration, Chili is divided into four dioceses—one archbishopric and 3 bishoprics—which are subdivided into 144 parishes. The salary of the archbishop is £1600, of the bishops of Concepcion and Serena £1200 each, and of Ancud £1000. The salaries of the curates range from £20 per annum to £200. The mission department is under the direction of Capuchin friars, and consists of a prefect and sub-prefect, and a staff of 30 missionaries and several chaplains, stationed in the provinces of Arauco, Valdivia, Llanquihue, and Magallanes. Their labors among the adult Indians produced little fruit, but in their schools they have been more successful. Worship, including salaries and repairs of churches, costs Government annually £63,425.

In Santiago there is one handsome Protestant church, in Valparaiso three, and a chapel in Talca. Roman Catholicism exists in a mild form among the educated classes, but with a good deal of superstition among the miners and peasantry (*huasos* and *inquilinos*). There is only one great place of pilgrimage in Chili, and that is to an image of the Virgin in the church of Andacollo, a small village near Serena. Upwards of 20,000 persons visit it annually, and the yearly festival is occasionally presided over by the bishop of the province, when the image is carried in procession round the square. The greatest devotees are the miners.

Education.

Education.—The first educational establishments in rank are the University and the National Institute of Santiago. The university, which grants degrees in law and medicine, has 37 professors, besides numerous assistants, and is attended by nearly 700 students. It is governed by a rector and a vice-rector, a secretary, and the five deacons of the faculties of humanity, mathematics, medicine, law, and theology, who are also charged with the inspection of education in all schools throughout the republic. Whoever has the necessary elementary knowledge may attend the classes without paying fees.

The preparatory section or "Institute," corresponding with our high schools, is under the management of a rector, a vice-rector, 48 masters, and several inspectors. It is attended by about 1000 pupils, of whom only those pay who lodge and board in the establishment, this costing £32 a year. The institute is endowed with 45 exhibitions or bursaries, 15 of which are divided equally among youths from Peru, Bolivia, and Ecuador.

These two establishments cost the Government annually £25,000. Lyceums, on the same plan as the National Institute, are established in every provincial capital, 16 altogether, and are supported by local taxation, government grants, and fees from pupils. In these institutions boarders pay an annual sum of £20, and day scholars £2, 8*s.*; but many receive instruction gratuitously. The directly practical branches of education receive the largest share of attention, but the learned languages are not neglected. The lyceums of Talca, Concepcion, and Serena possess the privilege of granting degrees in mathematics and chemistry.

Government expends annually on the lyceums in the province £35,000, and they are attended by 2200 pupils. Government supports besides 810 schools throughout the country, in which 62,220 children are taught the catechism, reading, writing, arithmetic, and geography. Those who choose may learn in addition the histories of Chili and America, sacred history, drawing, music, and sewing. There are also 480 private schools, with 24,000 pupils, which differ more in the rank of the children than in the subjects taught.

One in every 3·8 of the population in Santiago can read, and 1 in every 4·4 can both read and write—and the proportion is nearly the same in the provinces of Atacama, Coquimbo, Valparaiso, Concepcion, and Chiloé; while in the entire population of the republic one in 7 can read, and one in 8 can both read and write. Upon an average 1 child for every 24·71 inhabitants goes to school. In the public schools each child costs Government an average of 45 shillings.

Table showing the number of children educated at the public and private schools, and the proportion of pupils to inhabitants.

	Number of Inhabitants.	Pupils.	Number of Inhabitants to each Pupil.
Atacama	71,302	3,935	18·12
Coquimbo	157,463	6,134	25·67
Aconcagua	132,799	5,656	25·67
Valparaiso	176,682	9,900	17·84
Santiago	362,712	19,655	18·44
Colchagua	146,889	4,746	30·95
Curicó	92,110	3,145	29·28
Talca	110,359	4,082	27·03
Linárcs	237,334	1,707	48·13
Maule		3,223	
Nuble	136,880	4,976	27·51
Concepcion	151,365	6,023	25·13
Arauco	140,896	3,297	42·73
Valdivia	37,481	1,463	25·55
Llanquihue	48,492	2,730	17·76
Chiloé	65,680	4,780	13·74
Total	2,111,688	85,442	24·71

Educational Institutions for Especial Purposes.—For the education of priests there are seminaries in Serena, Valparaiso, Santiago, Talca, Concepcion, and Ancud, six in all, attended by about 535 young men, and costing Government £8000 annually. For the education of teachers, there are two schools for females and one for men. There are also in Santiago a school for the blind and another for the deaf and dumb.

In the military academy in Santiago there are 100 pupils, costing annually £7200; annexed to it is the naval academy, costing £2600, with 100 pupils. In Valparaiso is the practical naval school, costing £2600, with 100 pupils; a school for music, costing £750, with 100 pupils; an academy of painting, costing £1000, with 70 pupils; one of sculpture, costing £600, with 30 pupils; an agricultural and polytechnic school, with 90 pupils, costing £7200. There are also a national library and museum and observatory, costing annually about £4000. Masters are also employed to teach in prisons and in barracks. Altogether there are upwards of 1300 educational establishments, to which the State contributes £166,000, and these establishments are attended by about 93,000 pupils. Further to aid in the diffusion of knowledge Government distributes among the poorer schools text books, cheap editions of standard authors, —chiefly French translated into Spanish.

Charities. *Benevolent Institutions.*—In Chili there are 42 hospitals, with an average number of 41,930 patients; 18 lazar houses (*lazaretos*) with 2230 patients; 31 dispensaries, providing medicines during the year to 293,100 sick people; 1 asylum for the insane, with 575 patients; 4 foundling hospitals, with 845 children; 6 hospices, with 765 poor; 5 refuges for fallen women, with 610 inmates; and 5 establishments for orphans, with 590. For the support of these charities Government contributes annually on an average £54,500.

Prisons. There are several prisons, one house of correction, and a large penitentiary, the whole costing Government annually about £23,000.

Legations. *Legations.*—The Chilian legation for France and England is in Paris. The minister's salary is £1800; with other salaries and sundries, it costs £3000. In Washington the expense of the legation is £1400; in Lima, £2800, in Bolivia £1300; in Buenos Ayres, which serves also for Brazil, £2600.

Press. *The Press.*—The Press of Chili is improving. There are one or more daily newspapers in every town of importance, and about 50 papers and magazines published weekly or monthly. The official organ of the Government is the *Araucano;* of the Law Courts, the *Gaceta de los Tribunales;* of the university, the *Anales de la Universidad,* and of the Church, *La Revista Catolica.* There are also German and English newspapers. The national literature of Chili belongs chiefly to the belles lettres class, tinged with French ideas. The scientific writers are mostly foreigners or the descendants of foreigners. On an average, three times more books are imported from France than from England; ten times more than from Spain, or the United States, or Germany; and twenty-two times more than from Belgium.

Post-office. *Post-office.*—The number of letters that passed through the post-office in 1874 was 5 millions; of newspapers, periodicals, and circulars, 7½ millions; and of samples, 12,000, besides 336,000 official despatches.

Army. *Army and Navy.*—The army of Chili, which in time of war has exceeded 4500 men, was reduced in 1875 to 3500, consisting of 700 cavalry, 2000 infantry, and 800 artillery. This force is distributed on sentry duties and upon the frontiers, but the real military strength of the country is the National Guard.

The National Guard, also divided into cavalry, infantry, and artillery, averaged 55,000 men from 1867 to 1871, but in 1875 had become reduced to 22,000, the country being at peace.

Navy. The navy consists of two powerful ironclads, the "Almirante Cochrane" and the "Valparaiso," constructed in England, each of 1000 horse-power, and of about 2000 metric tons measurement, besides three corvettes, a sloop, and several transport vessels on active service, and two corvettes allocated to the naval schools. All are steamers. The marine force amounted in 1875 to 1600 men, including sailors, engineers, officers, and 200 marines and artillery-men.

Minerals. *Mineral Productions.*—Chili is rich in minerals. Among its metals are gold, silver, copper, lead, antimony, cobalt, zinc, nickel, bismuth, iron, molybdenum, and quicksilver, found in mines in the northern division, while rich beds of coal occupy the southern division, but only copper, silver, and coal are profitable to any extent. The various ores are found in all the series of rocks between granite and trachyte, the latter being sterile in Chili. The veins generally run from N. and N.W. to S. and S.E.; in some places, however, their course is irregular, or they extend E. and W.

Gold. The auriferous veins run nearly parallel to the imperfect cleavage of the surrounding granite rocks. Copper ores, containing a small quantity of gold, are generally associated with micaceous specular iron. Some mines are remarkable for the variety of minerals mixed with the gold, such as galena, blende, copper and iron pyrites, and peroxide of iron. These substances are found disseminated in quartz veins running nearly N. and S. Near Illapel are some very poor gold mines, in the beds of the gypseous formation, in altered felspathic clay-slate, which alternate with purple porphyritic conglomerate.

Silver. The richest silver mines are found in Jurassic rocks of the Oolitic formation in the province of Atacama. The richest districts are Chañarcillo, Tres Puntas, Florida, and Caracoles. In Chañarcillo the upper part of the mines produces immense quantities of embolite, while in those of Caracoles, on the frontier of Bolivia, the chloride of silver is found in still greater quantities. And in general these are the two kinds of silver ore met with most frequently in the upper region of the veins; while as the mines become deeper, the prevailing ores are various kinds of pyrargyrite or red silver, polybasite, and argentite or the sulphuret of silver. Native silver, in smaller or larger masses, is generally found in the upper region, although at Chañarcillo, from the vein San Juan, at 325 feet below the surface, 800,000 ounces of metallic silver were extracted in a few months. Gold is also found in Magellan.

Copper. Copper is more equally distributed than silver over the northern provinces, and is mostly found in the lower granitic and metamorphic schistose series, where it is met with most abundantly as pyrites, although other ores are also common, such as bornite or variegated copper, the black oxide, malachite, and atacamite. Domeykite, or arsenical copper, is found in the Calabozo mine, near Coquimbo; the hydrosilicate and olivenite in the mine San Antonio, near Copiapo; the vanadiate of copper in cavities in an arsenio-phosphate of lead, along with amorphous carbonate of lead and copper, in Mina Grande or La Marquesa, near Arqueros. That rare ore, the oxychloride of copper, or atacamite, occurs at Remolinos and Santa Rosa in veins in granite. The principal copper mines are in the provinces of Atacama, Coquimbo, and Aconcagua, and the most important are those of San Juan and Carrizal, near Copiapo, La Higuera, near Coquimbo, and Tamaya, about 40 miles from the coast, and 70 from Coquimbo. This last is a mountain district about 3500 feet above the sea, which produces about 150,000 cwts. a year of various kinds of sulphurets, of a produce from 9 to 64 per cent. Tambillos, 10 leagues from Coquimbo, produces principally poor sulphurets; Runeral, near the river, entirely poor carbonates; Andacollo, carbonates, oxides, oxysulphurets, and native copper; La Higuera, black sulphurets and pyrites; Herradura and Huasco, carbonates and sulphurets of low produce. In the Cordilleras, above Huasco, are some mines containing ores of copper, silver, and lead combined together. Silver and copper mines are sold by the "barra," or twenty-fourth part of the share of the mine.

Cobalt. The most common ores of cobalt are the arsenate and the sulpharsenate, containing from 19 to 22 per cent. of cobalt. The most important mine is the Veta Blanca of San Juan. At Tambillos and Huasco there are mines containing glance cobalt, and arsenate or erythrine; the former sort is frequently combined with nickel, which has been found

in considerable quantities in a mine in the Cordilleras above Copiapo.

The sulphuret of zinc is found in various parts, as well as antimony, lead, manganese, bismuth, mercury, and molybdena. Iron ores of every description are very abundant; amongst the most peculiar are coquimbite, or white copperas, and copiapite, or yellow copperas, much used by the inhabitants for dyeing and tanning, in the manufacture of ink, and for other purposes.

Gypsum is found in immense beds, particularly in the province of Santiago. The fine massive variety called alabaster is found at the Salto de Agua, near to Santiago, of a quality nearly equal to that of Italy. Lapis lazuli is found in the Cordilleras above the province of Coquimbo, but it is impossible to convey large slabs to the coast, and the principal use of the small pieces is to make ultramarine; but as the artificial equals the native in brilliancy of color and permanency, it is not of much value. In the province of Atacama, where it borders on Bolivia, are extensive deposits of the nitrate of soda and the borato of lime and soda.

Coal. Of great and increasing importance are the coal mines in southern Chili, extending along the coast from the province of Concepcion in 36° 50′ S. lat. to the Straits of Magellan, including some of the islands of Chiloé. The richest and at the same time the oldest coal mines are immediately south from the Biobio at Coronel, Lota, and Lebu. These coal mines are worked on the same plan as those in England with all the modern improvements and accessories. Steamers coal at the pit's mouth, and a great deal of the ore that used to be carried to England to be smelted is now sent to Coronel and Lota. There are also extensive works for amalgamating silver and smelting ores in Copiapo, Chañarcillo, Carrizal, and Guayacan.

Of the entire metal exports copper is 70 per cent. and silver 25. The amount of coal produced annually is increasing so rapidly that it will probably soon average from 2 to 3 millions of tons. The average value of the minerals exported is above 46 per cent. of the value of the whole of the exports, while that of agricultural products is about 44 per cent.

Flora. *Vegetable Kingdom.*—The Chilian flora contains 128 genera. Twenty-two of the genera belonging to the continent of Europe are not indigenous to Chili, while, on the other hand, that country possesses thirty-six genera not belonging to Europe.

Agriculture. *Agriculture.*—Till Chili had to compete with California and Australia in the foreign markets, the agricultural appliances were of that rude description introduced by the Spaniards. The ploughs were jointed sticks; corn was trodden out by mares or oxen, winnowed by throwing it up against the wind, and ground in small primitive mills. All this is now changed. The largest and most approved agricultural implements manufactured in the United States and in England are now employed, while the flour mills in power and machinery rival the best in Great Britain. Care is also being taken to improve the breeds by the introduction of horses, cattle, and sheep from England. About 82 per cent. of the entire surface of Chili is desert, mountain pasture, and forests, and only about 18 per cent. arable land. There are in the country 30,000 estates of various sizes, from many square miles to a few acres. The most important agricultural product, both for home consumption and exportation, is *wheat*, of which the average yield over the whole country is 7 for 1, and the average annual quantity from 1,305,000 to 1,380,000 quarters, of which about two-thirds are exported in grain, flour, and biscuit. In the province of Santiago the yield may be estimated at 12 for 1. Of *barley* the average annual production is 200,000 quarters, and the yield in the provinces in which it is cultivated 16 for 1. The value of the annual export averages £200,000. The rest is used as malt and food for horses. *Maize* is grown in every part of Chili excepting in Chiloé and the territory of Magellan, and yields 20 to 30 for 1. In the green state it forms two of the principal national dishes, choclos and humitas, eaten by both rich and poor. But the most universal national dish is supplied by the *kidney bean* (*Phaseolus vulgaris*) both in the green and the dry state. The average annual produce is 106,000 quarters, and the yield 9 for 1. South from the Maule, *pease* are more cultivated than kidney beans. The average produce is 27,000 quarters. The *potato* is indigenous to Chili. The largest quantity and the best are grown in the rainy provinces of Chiloé and Valdivia, where the yield varies from 10 to 40 for 1. The average annual produce is 3,100,000 bushels in the whole of Chili. Of *walnuts* the average annual produce is 48,000 bushels. Although there are 14,560 bearing *olive trees* in the country, the extraction of the oil from the berries is only beginning to receive due attention. There are 890,000 *mulberry trees*, but the breeding of silkworms has as yet not succeeded. The *vines* number from eighteen to twenty millions; and really good imitations of port and claret are made, although the great bulk goes to make a coarse brandy, a catalan-like wine called mosto, and the great beverages of the poorer classes, called chica and chacoli. The most important plant for the fattening of cattle is a *lucerne*, *Medicago sativa*, which flourishes throughout all the warmer regions of Chili. It is sown in winter, 2½ bushels to the cuadra, under a sprinkling of earth, is cut from three to four times in the year, and irrigated from five to ten times, according to the nature of the soil, and yields of green food 49 tons the cuadra. Cattle brought from the mountains, and oxen that have been working in carts and in the plough, are speedily fattened on it, while cows fed on it yield rich milk and butter. The hills in the warm regions of Chili are sparingly covered with a short and wiry grass, which, after one winter of abundant rain, lasts for two seasons, even although the succeeding winter may have been dry.

Timber. The sterile plains and mountains produce the carob tree (*Ceratonia*) which, in defiance of a broiling sun, stretches out its spacious limbs, covered with foliage, forming an agreeable retreat to the weary traveller by day as well as by night; the espino (*Acacia Cavenia*) inferior to the carob tree in size, hardness, and durability of its timber; and the great torch thistle, whose long, smooth spines are used by the country people for knitting-needles, and whose interior woody substance, stripped of its fleshy bark, forms the beams and rafters of the cottages of the peasantry in the northern provinces. Timber is abundant in all the provinces S. of Santiago, but chiefly in Arauco, Valdivia, and Chiloé, which may be termed the forest region of Chili. There are altogether above a hundred different kinds of indigenous trees, of which not more than thirteen ever shed their leaves. Several have been found serviceable in ship-building, but for purposes of house-carpentry none afford an adequate substitute for pine. Ornamental woods are scarce, and too soft for the use of cabinet-makers. The principal timber trees are the roble or Chilian oak (*Fagus obliqua*) which attains a height of 100 feet, and as the timber retains its soundness in water, it makes excellent stakes; the lingue (*Persea Lingue*) 90 feet, which furnishes the best wood for furniture, while the bark is of great value in tanning; the peumo (*Cryptocarya Peumus*), the bark of which it used in Valdivia for tanning,—the Germans exporting large quantities of first class sole leather, of which the largest quantity goes to England; two species of cypress, both exceeding in height the loftiest trees in England,—the timber, of a reddish hue, is used for beams, doors, pillars, and ornamental flooring. The cypress (*Librocedrus chilensis*) grows on the Andes of the middle provinces, while the *Librocedrus tetragona* is found on the southern Andes. The quillay tree (*Quillaja Saponaria*) grows north from the Biobio. A decoction of the bark is used for clearing the colors in dyeing and cleansing articles of silk and woollen cloth, and as a wash for the hair. The laurel (*Lauretia aromatica*) is a tall handsome tree, but its wood warps so much that it is suitable only for the coarsest work. The lumo (*Myrtus Luma*) produces timber liker the English oak than the Chilian oak. The Araucanian pine (*Araucaria imbricata*) 150 feet, flourishes on the mountains S. from the Biobio. When seen from a distance the trees look like gigantic umbrellas. The cone, which takes two years to ripen, contains from 50 to 100 oblong nuts 2 inches long, which, when cooked, form more delicate eating than chestnuts. Under the governorship of O'Higgins their trunks were used for ship-masts; but at present the expense of bringing them to the coast prevents their being employed in this way. The Chilian cedar or alerce (*Fitzroya patagonica*) is the largest and most important tree in Chili. The wood is reddish, soft and durable, and not liable to warp. The trunk is divided into pieces of 8 feet long, and then split up into boards 6 or 7 inches broad, and about half an inch thick, which is, on account of the straightness of the fibre, very easily effected. An ordinary tree yields from 500 to 600 of these boards. The general height is from 150 to 180 feet. Yet some specimens have been met with 300 feet high and 60 in circumference, which yielded upwards of 5200 boards. The best grow in Llanquihue, Chiloé, and Valdivia. Indeed, the luxuriance of vegetation in these regions is as great as in the tropics. The forests are frequently quite impenetrable on account of the creepers and the "quila," a rudely branched reed, which, however, affords a good food for the cattle. A creeper (*Lardiuabala biternata*) is used by the Araucanians instead of ropes. In the same districts grows likewise the *coliguë* or *colen* (*Chusquea Coleou*), a bamboo-like reed, which attains a height of 30 feet, and furnishes the shafts of the lances of the Araucanians and Pchuenches.

Fruit is plentiful. Besides the kinds already mentioned, in Valdivia there are large apple orchards, and further north pears, cherries, and quinces. The strawberries of the south of Chili have long been famous, and are still unrivalled, especially those of Tomé.

Zoology. *Animals.*—The most formidable animal in Chili is the puma. On account of its ravages in the farm-yard, it is frequently hunted with dogs, or caught by the lasso. The guanaco roams about among the lower regions of the Chilian Alps in herds numbering from 20 to 100. The vicuña is more rare; it inhabits the Andes of the province of Atacama. The huemel is found in the territory of Magellan, and in other districts the otter, wild cat, fox, and chinchilla. The horses of Chili are inferior in strength and height to those of England,

but greatly superior in point of endurance. The mule is the beast of burden, and will carry on an average a load of 355 lb. a distance of 20 or even 30 miles a day. The beef is excellent; meat is mostly cured by drying, making it into charqui. In this manufacture several hundred head of cattle are killed at a time, the flesh rapidly stripped off the bones, cut into long thin shreds, and then dried in the sun.

Birds.—Among the birds of Chili the most remarkable is the condor, which is easily recognized by the white ruff encircling its neck. As its wings on an average extend 8 or 9 feet, its flight has a very majestic appearance. Humboldt mentions having seen one flying at the height of 22,000 feet above the level of the sea. They scent an exposed carcase for a great distance, but seldom carry off live prey. The turkey-buzzard is also common in the northern districts; white eagles, hawks, and owls are more numerous in the south. The only song-birds worthy of notice are,—the tenca, the thrush, the tordo (a kind of blackbird), and the lloica (a kind of redbreast); but none of these can rival the notes of our English birds. The tenca is said to emulate the mocking-bird in imitative power. The tapaculo (*Pteroptochus albicollis*), a bird about the same size as the thrush, rarely flies, but runs about with great agility, emitting an odd but cheerful note. The chingol, or sparrow, has gayer plumage than his European representative. Besides these, parroquets, flamingoes, partridges, and woodpeckers abound in several localities, likewise the black-headed swan, and several varieties of crane. Patagonia has an ostrich much hunted by the Indians. The pelican, the penguin, and the shag inhabit the sea and the salt-water lakes.

Fish.—Great varieties of fish are found off the coast of Chili, and of these the pichihuen, which is caught chiefly in the Bay of Coquimbo, is regarded as a choice delicacy. There are small sweet oysters off Chiloé; huge mussels, barnacles, and fissurellæ, off Concepcion; and large clams off Coquimbo; besides sea-urchins, cockles, and limpets, which are found along the whole coast.

Of the reptiles, which are all harmless, the most numerous are lizards; the snakes vary from 12 to 30 inches in length. Scorpions and large spiders are common, but not dangerous. Of beetles there are upwards of 4000 species not found in Europe. Chili is never infested by the clouds of locusts which from time to time devastate the neighboring plains of the Argentine Republic. Small ants enter houses and attack provisions.

Bees. In 1844, J. P. Larrain made an unsuccessful attempt to introduce bees; however, about two years afterwards he succeeded. Since then they have multiplied so fast that there are now upwards of 100,000 hives, producing on an average £50,000 worth of honey and wax annually, of which by far the greatest part is exported.

Manufactures. *Manufactures.*—The wealth of Chili consists in the development of its great and abundant resources, for which its scanty population is insufficient; hence manufactures which require many skilled hands and much cheap labor have as yet not prospered,—the cost of production being too great But such works as flour mills, smelting works, tanneries, breweries, roperies, and soap works have long proved successful. Wine-making is progressing rapidly. At Tomé there is a cloth mill, and at Valparaiso a large sugar refinery.

Numerous banks and insurance and other companies are conducted on the principle of limited liability. Both Santiago and Valparaiso are in this way furnished with street tramways, and the plan has of late been applied to mining.

Exports. *Commerce.*—The commerce of Chili has vastly increased since the time when the country lay torpid under the yoke of Spain. In 1855 the total value of the exports was under £4,000,000 sterling, now it averages £8,000,000. The imports were in 1855 a little above £3,500,000, now they average £7,000,500. The principal exports are copper in bars and ores, averaging £3,050,000; silver in bars and ores, averaging £560,000; wheat, flour, and biscuits, averaging £1,507,000, barley, £300,000; hay of Lucerne (*Medicago sativa*), £51,600; potatoes, £48,000; walnuts, £40,000; butter and cheese, £20,500; eggs, £22,000; hides, £22,000.

Imports. Of the imports 17 to 18 per cent. are for nutrition, such as sugar, rice, and cattle; 20 to 21 per cent. are necessaries of social life, as clothing, domestic utensils, crockery, drugs, machinery, tools, books, paper, &c.; and 13 to 14 per cent. are articles of luxury, such as rich carpets, satins, silks, and drapery, toys, cards, tobacco, perfumery, musical instruments, pictures, statues, jewelry, tea, coffee, and yerba maté. This yerba, the dried leaves of the *Ilex paraguayensis*, is infused in an urn-shaped cup from which it is sucked up through a small silver tube (bombilla).

The commercial intercourse of Chili is most extensive with Great Britain. The value of the Chilian exports to England averages annually £3,700,000, and the imports from England £3,900,000. The exports to France are about one-third of those to England, and the imports from France about one-fifth of those from England. Next follow Germany, Peru, the United States, Bolivia, Brazil, and the Argentine Republic.

Chili exports and imports both by sea and by the passes in the Cordillera. Mules do the land traffic, and formerly only sailing vessels the traffic by sea; but steamers are now taking their place. The value of the imports by land averages £198,000, and the exports £23,000; and the value of the imports by sea averages £9,802,000, and the exports, £9,700,000, which in both cases includes goods in transit. Of the land imports the most valuable article is cattle, which are imported in large herds into the provinces of Coquimbo and Atacama from the Argentine Republic. The number of vessels that leave the ports of Chili averages 5900, with about 4,019,000 tons; and 5950 enter the ports, with about 4,059,880 tons. Of the total amount three-eighths are English and about the same Chilian, then follow the United States, French, German, Peruvian, Belgian, Dutch, and Portuguese vessels. The merchant navy of Chili in 1875 consisted of 28 steamers with 9880 metric tons, and 59 sailing vessels with 12,554 metric tons. Many small vessels, however, owned in Chili, have remained under the foreign flags to which they were transferred for safety during the last war with Spain.

Revenue. *Revenue.*—The annual income of Chili may be estimated at £3,550,000, and the expenditure at sometimes a little less and sometimes a little more. The chief source of revenue is the custom-house, which yields about half of the whole amount. Next in importance are the railways, yielding about a quarter of the whole; and after these, the monopoly of tobacco and cards, the land tax, trade licenses, stamps, tolls, the mint, post-office, and telegraphs.

Expenditure.

The Ministry of the Interior . . .		£1,018,750
The Ministry of the Exterior—		
Section—Foreign Relations	£19,409	
Section—Colonization .	31,071	
		50,480
The Ministry of Justice, Worship, and Public Instruction—		
Section—Justice . .	£117,569	
Section—Worship . .	63,425	
Section—Public Instruction	236,156	
		417,150
The Ministry of War—		
Section—The Army . .	£326,908	
Section—The National Guard	83,861	
Section—The Navy . .	234,703	
		645,472
The Ministry of the Exchequer (Hacienda)		1,305,162
		£3,437,014

National Debt. *National Debt.*—The national debt amounts to about £10,000,000 sterling, of which about £2,000,000 is of internal and £8,000,000 of external debt. The whole of the latter has been contracted in England, and the bulk of it invested in existing railways and railways in construction, which yield both directly and indirectly a fair return. The wanton bombardment of Valparaiso by the Spanish fleet (March 31, 1866) having suggested to the Chilians the necessity of providing against such outrages, they have spent a great deal of money in the purchase of ironclads and in the construction of forts,—besides having had to rebuild the bonded warehouses destroyed at that time. A large sum has also been spent on the House of Congress, which is being built on an ambitious scale.

Communication.—Chili is connected with Europe by telegraph, and the wires ramify over the greater part of the country. Santiago and Valparaiso and all the most important towns southward as far as Talcahuano, are connected by rail. In the northern provinces are also railways, which facilitate the working of the mines.

On the 15th of October, 1840, the first steamers of the Pacific Steam Navigation Company arrived at Valparaiso, the "Peru" (Captain Peacock) and the "Chili" (Captain Glover), both 700 tons. At first they sailed merely between Valparaiso and Callao, calling at the intermediate ports. In June, 1846, the route was extended by Panama and the Isthmus to Europe. On the 13th of May, 1868, the Company commenced their line between Liverpool and Chili by the Straits of Magellan, the first of their steamers which made the voyage being the "Pacific," 1174 tons.

Weights, measures, and money. *Weights, Measures, and Money.*—The weights and measures were formerly Spanish, but since January, 1858, those of France are in force as the only legal ones.

In her monetary system Chili possesses the double standard, gold and silver, the coins being as follows:—Of gold, a ten-dollar piece, weighing 15·253 grammes, and pieces of five and two dollars in proportion; of silver, a dollar piece of 25 grammes, and pieces of fifty, twenty, ten, and five cents in proportion; and also two-cent pieces, and cent-pieces of a bronze containing zinc and nickel.

The gold and larger silver coins contain one-tenth of alloy;

the smaller silver ones, which are of limited legal tender, are rather less pure. The bronze tokens, the emission of which has been limited to a value of about £20,000, replace the former coinage of copper. There is no Government paper; but some of the banks issue, under due restrictions, notes payable in coin. (C. B. B.—F. W.)

CHILLAN, a town of Chili, the capital of the province of Nuble, in a depression in the fertile plain between the rivers Nuble and Chillan, about 120 miles north-east of Concepcion, in 35° 56′ S. lat. and 71° 37′ W. long. The houses, with but few exceptions, consist of only a ground floor built round a rectangular court, and are constructed of sun-dried or baked bricks. The streets are about 22 yards wide and have open drains in the middle. The importance of the town consists in its being the centre of a large agricultural district of the greatest productiveness, which has a valuable outlet for its grain and cattle by means of the railway to Tomé. Hand-made lace is produced on designs which have become traditional in certain families. The district is also celebrated for its mineral baths. Chillan was originally founded by Ruiz de Gamboa in 1594, but it has since been frequently destroyed and rebuilt. In 1601 it was laid waste by the Moluche Indians, in 1657 by the Puelche Indians and an earthquake, by another earthquake in 1751, and in 1797 by the overflow of the River Nuble. This last catastrophe led the inhabitants to remove their city to a place called La Horca, where it was again levelled by the earthquake of 1835. Next year they began to build on the present site the now prosperous town, which has a population of 20,000.

CHILLIANWALLA, a town of British India in the Punjab, situated on the left bank of the River Jhelum, about 85 miles north-west of Lahore, in 32° 40′ N. lat. and 73° 39′ E. long. It is memorable as the scene of a sanguinary battle fought there on the 13th January, 1849, between a British force commanded by Lord Gough and the Sikh army under Shere Singh. The loss of the British in killed and wounded amounted to 2269, of whom nearly 1000 were Europeans, while that of the Sikhs was estimated at 4000. An obelisk erected at Chillianwalla by the British Government preserves the names of the officers and men who fell in the action.

CHILLICOTHE, a city of the United States, capital of the county of Ross in Ohio, on the west bank of the River Scioto, 45 miles south of Columbus. It is beautifully situated in the midst of a rich agricultural district, and has extensive communication by means of the Ohio and Erie canal, and several railway lines. Its public buildings, many of which are an ornament to the town, comprise a large court-house, which cost over $100,000, fourteen churches, and thirty-six public schools; and among its industrial establishments are carriage-factories, flour and paper-mills, an iron foundry, and a manufactory of agricultural implements. Chillicothe was founded in 1796 by immigrants from Virginia and Kentucky, and from 1800 to 1810 it was the capital of the State. Population in 1870, 8920.

CHILLINGWORTH, William (1602–1644), a celebrated divine and controversialist of the Church of England, was born at Oxford in October, 1602. In June, 1618, he became a scholar of Trinity College, and after a course of logic and philosophy he was admitted to the degree of Master of Arts in 1623, and was made a fellow of Trinity College in June, 1628. In those days he industriously cultivated the art of disputation, as was the fashion among the young theologians of the university. He also excelled in mathematics, and gained some credit as a writer of verses. The controversy between the Church of England and that of Rome was the absorbing topic of the time, which had gained a deeper interest in consequence of the marriage of Charles with Henriette of France Missionaries of the Church of Rome were busy throughout the country. The Jesuits made the universities their special point of attack; and one, named Fisher, who had his sphere at Oxford, succeeded in making a convert of young Chillingworth. To secure his conquest, Fisher prevailed upon Chillingworth to go to the Jesuit college at Douay. While he was there, Laud, who was his godfather, and who then was bishop of London, pressed him with arguments against the doctrine and practice of the Church of Rome, which had the effect of determining him to make an impartial inquiry into the claims of the two churches. For this purpose he quitted Douay in 1631 after a brief stay there, returned to England, and at Oxford, of which Laud was chancellor, he devoted his energies to a free inquiry into religion. On grounds of Scripture and reason he at length declared for Protestantism, and wrote in 1634, but did not publish, a confutation of the motives which had led him over to Rome. This paper was lost; the other, on the same subject, was probably written on some other occasion at the request of his friends. His return to Protestantism was attended with some scruples, which he expressed in a letter to Dr. Sheldon, and which probably gave rise to the report that he had turned papist a second time, and then Protestant again. The extreme sensitiveness of his theological conscience was evinced by the grounds on which he refused a preferment offered to him in 1635 by Sir Thomas Coventry, Lord Keeper of the Great Seal. He was in difficulty about subscribing the Thirty-nine Articles. As he informed Dr. Sheldon in a letter, he was fully resolved on two points—that to say the Fourth Commandment is a law of God appertaining to Christians is false and unlawful, and that the damning clauses in St. Athanasius's Creed are most false and in a high degree presumptuous and schismatical. To subscribe, therefore, he felt would be to "subscribe his own damnation." At this time his principal work was far towards completion. It was undertaken in defence of Dr. Christopher Potter, provost of Queen's College in Oxford, who had for some time been carrying on a controversy with a Jesuit known as Edward Knott, but whose real name was Matthias Wilson.

Laud, now archbishop of Canterbury, was not a little solicitous about Chillingsworth's reply to Knott, and at his request, as "the young man had given cause why a more watchful eye should be held over him and his writings," it was examined by the vice-chancellor of Oxford, and two professors of divinity, and published with their approbation in 1637, with the title *The Religion of Protestants a Safe Way to Salvation.* The work was well received, two editions being published within less than five months; and it called forth a shower of pamphlets from the opposite side. In the preface Chillingworth expresses a totally different view about subscription to the articles. "For the Church of England," he there says, "I am persuaded that the constant doctrine of it is so pure and orthodox, that whosoever believes it, and lives according to it, undoubtedly he shall be saved, and that there is no error in it which may necessitate or warrant any man to disturb the peace or renounce the communion of it. This, in my opinion, is all intended by subscription." His scruples having thus been happily overcome, he was, in the following year (1638), promoted to the chancellorship of the church of Sarum, with the prebend of Brixworth in Northamptonshire annexed to it. He was in the king's army at the siege of Gloucester, and invented certain engines for assaulting the town. Shortly afterwards he accompanied Lord Hopton, general of the king's troops in the west, in his march; and being laid up with illness at Arundel Castle, he was there taken prisoner by the Parliamentary forces under Sir William Waller. As he was unable to go to London with the garrison, he was conveyed to Chichester, and died there in January, 1644. His last days were spent in controversy with a redoubtable preacher, Francis Cheynell, about the dispute between the king and the parliament.

Besides his principal work, Chillingworth wrote a number of minor pieces of a controversial kind, and some of his sermons have been preserved. In politics he was a zealous Royalist, asserting that even the unjust and tyrannous violence of princes may not be resisted, although it might be avoided in terms of our Saviour's direction, "when they persecute you in one city, flee into another." His writings long enjoyed a high popularity. The *Religion of Protestants* is characterized by much fairness and acuteness of argument, and was commended by Locke as a discipline of "perspicuity and the way of right reasoning." The charge of Socinianism was frequently brought against him, but, as Tillotson thought, "for no other cause but his worthy and successful attempts to make the Christian religion reasonable." His creed, and the whole gist of his argument, is expressed in a single sentence, which is not without significance even for the present time,—"I am fully assured that God does not, and therefore that men ought not to require any more of any man than this, to believe the Scripture to be God's word, to endeavor to find the true sense of it, and to live according to it."

CHILMAREE (in Hindustani, *Chalamari*), a town of British India, in the presidency of Bengal, about 35 miles south-east of Rungpur, on the right bank of the Brahmaputra. It is mainly remarkable as the seat of a great religious and commercial festival, which brings together no fewer than from 60,000 to 100,000 people.

CHILMEAD, EDMUND, an English musician and mathematician of the first half of the 17th century. Little appears to be known concerning his life, though a treatise *On the Music of Ancient Greece*, of which he was the author, gave him for a time some little distinction. He wrote also an essay *On Sounds*, which, however, does not seem to have been deemed worthy of a publisher, or, at least, never obtained one. His only other published work of which we have any record is a *Catalogue of the Greek MSS. in the Bodleian Library*. He died in 1654.

CHILOÉ, an island off the coast of Chili, separated from the mainland on the N. by the narrow strait of Chacao, and on the E. by the archipelago of the Gulf of Ancud and Corcovado Bay. It is situated between 41° 45′ and 43° 30′ S. lat., and extends in length about 120 miles from N. to S.; its greatest breadth is about 50 miles, and its total area is estimated at 5200 square miles. The western or seaward coast is for the most part steep, and in some places rises to a height of 3000 feet; the eastern contrasts with it not only in its smaller elevation but also in the extreme irregularity of its outline. There are several lakes in the southern portion of the island, of which the most extensive bears the name of Lago de Cucao. The interior is mountainous and but partially explored. The whole island is divided into the five departments of Ancud or San Carlos, Chacao, Dalcahue, Castro, and Chonchi. Ancud, the capital and the bishop's seat, is a regularly built town, with a population of 7000. The total population of the province amounted in 1875 to 64,536. In 1558 the island and the neighboring archipelago were discovered by Garcia de Mendoza, and not long afterwards were taken possession of by Spain. On the expulsion of the Spanish forces from the rest of Chili in 1818 they settled in Chiloé; but in 1826 the island likewise was abandoned, and since that period it has formed one of the Chilian provinces. The most valuable article of commerce is the timber of the Chilian cedar, the *Fitzroya patagonica*, which is exported in small planks. The next article in importance is the potato, which is indigenous, and which is produced in annually increasing quantities as land is cleared of forest. Signs of coal-beds of considerable size and value have been discovered in the island. See CHILI.

CHILON, one of the seven sages of Greece, was a Lacedæmonian by birth. His father's name was Damagetos, and he appears to have flourished about the beginning of the 6th century B.C. In 556 B.C. he acted as ephor eponymous, but little more is known of his life. He is said to have died of joy on hearing that his son had gained a prize at the Olympic games. Diogenes Laertius tells us that he composed elegies, but none of these are extant. Many of his apothegms have been handed down. They show much of the weight and brevity that might be expected in a Spartan, but are not so pointed and severe as those of Bias. According to Chilon the great virtue of man was prudence, or well grounded judgment as to future events. (Diog. Laer., i. §§ 68–73; Mullach, *Frag. Phil. Græc.* i.)

CHILTERN HILLS, a range of chalk hills in England, extending through part of Oxford, Buckingham, and Bedford, and attaining their highest elevation of 904 feet in the neighborhood of Wendover. At one time the Chilterns were thickly covered with a forest of beech, and the western district of Bernwood was only cleared by James I. The depredations of the bandits, who found shelter within their recesses, became at an early period so alarming that a special officer, known as the Steward of the Chiltern Hundreds, was appointed for the protection of the inhabitants of the neighboring districts. The necessity for such an appointment has disappeared long ago, but the three hundreds of Stoke, Burnham, and Desborough in Buckingham are still distinguished by the old name, and a steward is still nominated by the Chancellor of the Exchequer, with a salary of 20s. and the fees of the office. The sole importance of the sinecure consists in the fact that its acceptance enables a member of the House of Commons to resign his seat, on the plea that he holds a place of honor and profit under the Crown. This appropriation of the post only dates from the middle of the 18th century, and its intrinsic legality has been called in question; but the custom is now completely legitimated by a long line of precedents. An application for the Stewardship of the Chiltern Hundreds was once refused, in 1842.

CHIMÆRA, in Grecian fable, a monster resembling a lion in the fore part, a goat in the middle, and a dragon behind, and having three heads corresponding to the three parts of her body. Each mouth breathed forth fire, and she committed great ravages throughout Caria and Lycia, till she was overthrown by Bellerophon, mounted on the winged horse Pegasus. Some have supposed that the myth owed its origin to the volcanic mountain Chimæra, in Lycia, where works have been found containing representations of the lion. In modern art the Chimæra is usually represented as a lion, out of the back of which grow the neck and head of a goat. As a general term chimæra signifies any fiction of the imagination made up of incongruous elements, or, generally, any fantastic idea or impracticable scheme of action.

CHIMAY, a town of Belgium, in the province of Hainault, on the Eaublanche, or White Water, about 28 miles south of Charleroi. It contains 3000 inhabitants, and has ironworks, marble quarries, breweries, and potteries. In 1470 it was raised to the rank of a countship by Charles the Bold, and in 1486 was erected into a principality in favor of Charles of Croy. Since that date it has passed in 1686 to the counts of Bossu, and in 1804 to the French family of Riquet de Caraman. In 1805 Prince Francis Joseph Philippe married the daughter of the Spanish minister Cabarrus, a woman of great wit and beauty, who had been previously the wife of M. de Fontenay and of Tallien, and had taken an active part in the overthrow of Robespierre. Their son Joseph, born in 1808, is the present possessor of the title, and has held the office of Belgian plenipotentiary.

CHIMPANZEE. See APE, vol. ii. p. 131.

CHINA. The account of this great empire of Eastern Asia may fitly commence with a brief notice, 1*st*, of *China*, as known to the ancients (the land of *Sinæ* or *Seres*), and 2*d*, of China as known to mediæval Europe (*Cathay*).

China as known to the Ancients.

The spacious seat of ancient civilization which we call China has loomed always so large to Western eyes, and has, in spite of the distance, subtended so large an angle of vision, that, at eras far apart, we find it to have been distinguished by different appellations, according as it was reached by the southern sea-route, or by the northern land-route traversing the longitude of Asia.

In the former aspect the name has nearly always been some form of the name *Sin*, *Chin*, *Sinæ*, *China*. In the latter point of view the region in question was known to the ancients as the land of the *Seres*, to the Middle Ages as the empire of *Cathay*.

The name of *Chin* has been supposed (doubtfully) to be derived from the dynasty of *Thsin*, which a little more than two centuries before our era enjoyed a brief but very vigorous existence, uniting all the Chinese provinces under its authority, and extending its conquests far beyond those limits to the south and the west.

The mention of the *Chinas* in ancient Sanskrit literature, both in the laws of Manu and in the Mahâbhârat, has often been supposed to prove the application of the name long before the predominance of the Thsin dynasty. But the coupling of that name with the *Daradas*, still surviving as the people of Dardistan, on the Indus, suggests it as more probable that those *Chinas* were a kindred race of mountaineers, whose name as *Shinas* in fact likewise remains applied to a branch of the Dard races. Whether the *Sinim* of the prophet Isaiah should be interpreted of the Chinese is probably not at present susceptible of any decision; by the context it appears certainly to indicate a people of the extreme east or south.

The name probably came to Europe through the Arabs, who made the *China* of the further east into *Sin*, and perhaps sometimes into *Thin*. Hence the *Thin* of the author of the *Periplus of the Erythræan Sea*, who appears to be the first extant writer to employ the name in this form (*i.e.*, assuming Müller's view that he belongs to the 1st century), hence also the *Sinæ* and *Thinæ* of Claudius Ptolemy.

It has often indeed been denied that the Sinæ of Ptolemy really represented the Chinese. But if we com

pare the statement of Marcianus of Heraclea (a mere condenser of Ptolemy), when he tells us that the "nations of the Sinæ lie at the extremity of the habitable world, and adjoin the eastern Terra Incognita," with that of Cosmas, who says, in speaking of *Tzinista*, a name of which no one can question the application to China, that "beyond this there is neither habitation nor navigation,"—we cannot doubt the same region to be meant by both. The fundamental error of Ptolemy's conception of the Indian Sea as a closed basin rendered it *impossible* but that he should misplace the Chinese coast. But considering that the name of *Sin* has come down among the Arabs from time immemorial as applied to the Chinese, considering that in the work of Ptolemy this name certainly represented the furthest known East, and considering how inaccurate are Ptolemy's configurations and longitudes much nearer home, it seems almost as reasonable to deny the identity of his India with ours as to deny that his Sinæ were Chinese.

If we now turn to the *Seres* we find this name mentioned by classic authors much more frequently and at an earlier date; for the passages of Eratosthenes (in Strabo), formerly supposed to speak of a parallel passing through *Thinæ*—διὰ Θινῶν, are now known to read correctly δι' Ἀθηνῶν. The name *Seres* indeed is familiar to the Latin poets of the Augustan age, but always in a vague way, and usually with a general reference to Central Asia and the further East. We find, however, that the first endeavors to assign more accurately the position of this people, which are those of Mela and Pliny, gravitate distinctly towards China in its northern aspect as the true idea involved. Thus Mela describes the remotest east of Asia as occupied by the three races (proceeding from south to north), Indians, Seres, and Scyths; just as in a general way we might say still that Eastern Asia is occupied by the Indies, China, and Tartary.

Ptolemy first uses the names of *Sera* and *Serice*, the former for the chief city, the latter for the country of the Seres, and as usual defines their position with a precision far beyond what his knowledge justified,—the necessary result of his system. Yet even his definition of Serice is most consistent with the view that this name indicated the Chinese empire in its northern aspect, for he carries it eastward to the 180th degree of longitude, which is also, according to his calculation, in a lower latitude the eastern boundary of the Sinæ.

Ammianus Marcellinus devotes some paragraphs to a description of the Seres and their country, one passage of which is startling at first sight in its seeming allusion to the Great Wall, and in this sense it has been rashly interpreted by Lassen and by Reinaud. But Ammianus is merely converting Ptolemy's dry tables into fine writing, and speaks only of an encircling rampart of mountains within which the spacious and happy valley of the Seres lies. It is true that Ptolemy makes his Serice extend westward to Imaus, *i.e.*, to Pamir. But the Chinese empire *did* so extend at that epoch, as it did twenty years ago, and we find Lieut. John Wood in 1838 speaking of "*China*" as lying immediately beyond Pamir, just as the Arabs of the 8th century spoke of the country beyond the Jaxartes as "*Sin*," and as Ptolemy spoke of "*Serice*" as immediately beyond Imaus.

If we fuse into one the ancient notices of the Seres and their country, omitting anomalous statements and manifest fables, the result will be something like the following:—"The region of the Seres is a vast and populous country, touching on the east the Ocean and the limits of the habitable world, and extending west to Imaus and the confines of Bactria. The people are civilized, mild, just, and frugal, eschewing collisions with their neighbors, and even shy of close intercourse, but not averse to dispose of their own products, of which raw silk is the staple, but which include also silk-stuffs, fine furs, and iron of remarkable quality." That is manifestly a definition of the Chinese.

That Greek and Roman knowledge of the true position of so remote a nation should at best have been somewhat hazy is nothing wonderful. And it is worthy of note that the view entertained by the ancient Chinese of the Roman empire and its inhabitants, under the name of *Ta-thsin*, had some striking points of analogy to those views of the Chinese which are indicated in the classical descriptions of the Seres. There can be no mistaking the fact that in this case also the great object was within the ' orizon of vision, yet the details ascribed to it are often far from being true characteristics, being only the accidents of its outer borders.

China as known to Mediæval Europe.

CATHAY is the name by which the Chinese empire was known to mediæval Europe, and is in its original form (*Kitai*) that by which China is still known in Russia, and to most of the nations of Central Asia. West of Russia the name has long ceased to be a geographical expression, but it is associated with a remarkable phase in the history of geography and commerce, of which we purpose under this head to give some account.

The name first became known to Europe in the 13th century, when the vast conquests of Jenghiz and his house drew a new and vivid attention to Asia. For some three centuries previously the northern provinces of China had been detached from indigenous rule, and subject to northern conquerors. The first of these foreign dynasties was of a race called *Khitan*, issuing from the basin of the Sungari River, and supposed (but doubtfully) to have been of the blood of the modern Tunguses. The rule of this race endured for two centuries, and originated the application of the name *Khitâi* or *Khitâï* to Northern China. The dynasty itself, known in Chinese history as *Liao*, or "Iron," disappeared from China in 1123, but the name remained attached to the territory which they had ruled.

The Khitân were displaced by the *Nyûchê* or *Chûrchê* race, akin to the modern Manchus who now rule China. These reigned, under the title of *Kin*, or "Golden," till Jenghiz and his Mongols invaded them in turn. In 1234 the conquest of the Kin empire was completed, and the dynasty extinguished under Okkodai, the son and successor of Jenghiz Khán. Forty years later, in the reign of Kublaï, grandson and ablest successor of Jenghiz, the Mongol rule was extended over Southern China (1276), which till then had remained under a native dynasty, the Sung, holding its royal residence in a vast and splendid city, now known as Hang-chow, but then as Ling-ngan, or more commonly as *King-sze*, *i.e.*, the Court. The southern empire was usually called by the conquerors *Mantzi* (or as some of the old travellers write, *Mangi*), a name which Western Asiatics seem to have identified with *Mâchîn* (from the Sanskrit *Mahâchîn*), one of the names by which China was known to the traders from Persian and Arabian ports.

The conquests of Jenghiz and his successors had spread not only over China and the adjoining East, but westward also over all Northern Asia, Persia, Armenia, part of Asia Minor, and Russia, threatening to deluge Christendom. Though the Mongol wave retired, as it seemed almost by an immediate act of Providence, when Europe lay at its feet, it had levelled or covered all political barriers from the frontier of Poland to the Yellow Sea, and when Western Europe recovered from its alarm, Asia lay open, as never before or since, to the inspection of Christendom. Princes, envoys, priests,—half-missionary half-envoy—visited the court of the great Khán ir Mongolia; and besides these, the accidents of war, commerce, or opportunity carried a variety of persons from various classes of human life into the depths of Asia. "'Tis worthy of the grateful remembrance of all Christian people," says an able missionary friar of the next age (Ricold of Monte Croce), "that just at the time when God sent forth into the Eastern parts of the world the Tartars to slay and to be slain, He also sent into the West his faithful and blessed servants, Dominic and Francis, to enlighten, instruct, and build up in the faith." Whatever on the whole may be thought of the world's debt to Dominic, it is to the two mendicant orders, but especially to the Franciscans, that we owe a vast amount of information about mediæval Asia, and, among other things, the first mention of *Cathay*. Among the many strangers who reached Mongolia were (1245–47) John de Plano Carpini (see CARPINI) and (1253) William of Rubruk (Rubruquis) in French Flanders, both Franciscan friars of high intelligence, who happily have left behind them reports of their observations.

Carpini, after mentioning the wars of Jenghiz against the *Kitai*, goes on to speak of that people as follows:—"Now these *Kitai* are heathen men, and have a written character of their own. . . . They seem, indeed, to be kindly and polished folks enough. They have no beard, and in character of countenance have a considerable resem-

blance to the Mongols" [are *Mongoloid*, as our ethnologists would say], "but are not so broad in the face. They have a peculiar language. Their betters as craftsmen in every art practised by man are not to be found in the whole world. Their country is very rich in corn, in wine, in gold and silver, in silk, and in every kind of produce tending to the support of mankind." The notice of Rubruk, shrewder and more graphic, runs thus:—"Further on is great Cathay, which I take to be the country which was anciently called the Land of the Seres. For the best silk stuffs are still got from them. . . . The sea lies between it and India. Those Cathayans are little fellows, speaking much through the nose, and, as is general with all those Eastern people, their eyes are very narrow. They are first-rate artists in every kind, and their physicians have a thorough knowledge of the virtues of herbs, and an admirable skill in diagnosis by the pulse. . . . The common money of Cathay consists of pieces of cotton-paper, about a palm in length and breadth, upon which certain lines are printed, resembling the seal of Mangu Khán. They do their writing with a pencil, such as painters paint with, and a single character of theirs comprehends several letters, so as to form a whole word." Here we have not only what is probably the first European notice of paper-money but a *partial* recognition of the peculiarity of Chinese writing, and a perception that puts to shame the perverse boggling of later critics over the identity of these Cathayans with the Seres of classic fame.

But though these travellers saw Cathayans in the bazaars of the Great Khan's camps, the first actual visitors of Cathay itself were the Polo family (see POLO, MARCO), and it is to the book of Marco's recollections mainly that Cathay owed the growing familiarity of its name in Europe during the 14th and 15th centuries. It is, however, a great mistake to suppose, as has often been assumed, that the residence of the Polos in that country remained an isolated fact. They were but the pioneers of a very considerable intercourse, which endured till the decay of the Mongol dynasty in Cathay, *i.e.*, for about half a century.

We have no evidence that either in the 13th or 14th century Cathayans, *i.e.*, Chinese, ever reached Europe, but it is possible that some did, at least, in the former century. For, during the campaigns of Hulaku in Persia (1256–1265), and the reigns of his successors, Chinese engineers were employed on the banks of the Tigris, and Chinese astrologers and physicians could be consulted at Tabriz. Many diplomatic communications passed between the Hulakuid Ilkhans and the princes of Christendom. The former, as the great Khan's liegemen, still received from him their seals of state; and two of their letters which survive in the archives of France exhibit the vermilion impressions of those seals in Chinese characters,—perhaps affording the earliest specimen of that character which reached Western Europe.

Just as the Polos were reaching their native city (1295), after an absence of quarter of a century, the forerunner of a new series of travellers was entering Southern China by way of the Indian seas. This was John of Monte Corvino, another Franciscan who, already some fifty years of age, was plunging single-handed into that great ocean of Paganism to preach the gospel according to his lights. After years of uphill and solitary toil converts began to multiply; coadjutors joined him. The Papal See became cognizant of the harvest that was being reaped in the far East. It made Friar John Archbishop in Cambaluc (or Peking), with patriarchal authority, and sent him batches of suffragan bishops and preachers of his own order. The Roman Church spread; churches and Minorite houses were established at Cambaluc, at Zaton or Tswan-chow in Fuh-keen, at Yang-chow, and elsewhere; and the missions flourished under the smile of the great Khan, as the Jesuit missions did for a time under the Manchu emperors three centuries and a half later. Archbishop John was followed to the grave, about 1328, by mourning multitudes of Pagans and Christians alike. Several of the bishops and friars who served under him have left letters or other memoranda of their experience, *e.g.*, Andrew, bishop of Zayton, John of Cora, afterwards archbishop of Sultania in Persia, and Odoric of Pordenone, whose fame as a pious traveller won from the *vox populi* at his funeral a beatification which the church was fain to seal. The only ecclesiastical narrative regarding Cathay, of which we are aware, subsequent to the time of Archbishop John, is that which has been gathered from the recollections of John de' Marignolli, a Florentine Franciscan, who was sent by Pope Benedict XII. with a mission to the Great Khan, in return for one from that potentate which arrived at Avignon from Cathay in 1338, and who spent four years (1342–46) at the court of Cambaluc as legate of the Holy See. These recollections are found in a singular position, dispersed incoherently over a chronicle of Bohemia which the traveller wrote by order of the emperor Charles IV., whose chaplain he was after his return.

But intercourse during the period in question was not confined to ecclesiastical channels. Commerce also grew up, and flourished for a time even along the vast line that stretches from Genoa and Florence to the marts of Chĕ-Keang and Fuh-keen. The record is very fragmentary and imperfect, but many circumstances and incidental notices show how frequently the remote East was reached by European traders in the first half of the 14th century,—a state of things which it is very difficult to realize when we see how all those regions, when reopened to knowledge two centuries later, seemed to be discoveries as new as the empires which, about the same time, Cortes and Pizarro were conquering in the West.

This commercial intercourse probably commenced about 1310–1320. Monte Corvino, writing in 1305, says it was twelve years since he had heard any news from Europe the only Western stranger who had arrived in all tha time being a certain Lombard chirurgeon (probably one of the *Patarini* who got hard measure at home in those days), who had spread the most incredible blasphemies about the Roman Curia and the order of St. Francis. Yet even on his first entrance to Cathay Friar John had been accompanied by one Master Peter of Lucolongo, whom he describes as a faithful Christian man and a great merchant, and who seems to have remained many years at Peking. The letter of Andrew, bishop of Zayton (1326), quotes the opinion of Genoese merchants at that port regarding a question of exchanges. Odoric, who was in Cathay about 1323–1327, refers for confirmation of the wonders which he related of the great city of Cansay (*i.e.*, King-sze, *hod.* Hang-chow), to the many persons whom he had met at Venice since his return, who had themselves been witnesses of those marvels. And John Marignolli, some twenty years later, found attached to one of the convents at Zayton, in Fuh-keen, a *fondaco* or factory for the accommodation of the Christian merchants.

But by far the most distinct and notable evidence of the importance and frequency of European trade with Cathay, of which silk and silk goods formed the staple, is to be found in the commercial hand-book (*circa* 1340) of Francesco Balducci Pegolotti, a clerk and factor of the great Florentine house of the Bardi, which was brought to the ground about that time by its dealings with Edward III. of England. This book, called by its author *Libro di divisamenti di Paesi*, is a sort of trade-guide, devoting successive chapters to the various ports and markets of his time, detailing the nature of imports and exports at each, the duties and exactions, the local customs of business, weights, measures, and money. The first two chapters of this work contain instructions for the merchant proceeding to Cathay; and it is evident, from the terms used, that the road thither was not unfrequently travelled by European merchants, from whom Pegolotti had derived his information. The route which he describes lay by Azoff, Astrakhan, Khiva, Otrar (on the Jaxartes), Almálik (Gulja in Ili), Kan-chow (in Kansuh), and so to Hang-chow and Peking. Particulars are given as to the silver ingots which formed the currency of Tartary, and the paper-money of Cathay. That the ventures on this trade were not insignificant is plain from the example taken by the author to illustrate the question of expenses on the journey, which is that of a merchant investing in goods there to the amount of some £12,000 (*i.e.*, in actual gold value, not as calculated by any fanciful and fallacious equation of values).

Of the same remarkable phase of history that we are here considering we have also a number of notices by Mahometan writers. The establishment of the Mongol dynasty in Persia, by which the Great Khan was acknowledged as lord paramount, led (as we have already noticed in part) to a good deal of intercourse. And some of the Persian historians, writing at Tabriz, under the patronage of the Mongol princes, have told us much about Cathay.

especially Rashiduddin, the great minister and historian of the dynasty (died 1318). We have also in the book of the Moorish traveller Ibn Batuta, who visited China about 1347–48, many very curious and in great part true notices, though it is not possible to give credence to the whole of this episode in his extensive travels.

About the time of the traveller first named the throne of the degenerate descendants of Jenghiz began to totter to its fall, and we have no knowledge of any Frank visitor to Cathay in that age later than Marignolli; missions and merchants alike disappear from the field. We hear, indeed, once and again of ecclesiastics despatched from Avignon, but they go forth into the darkness, and are heard of no more. Islam, with all its jealousy and exclusiveness, had recovered its grasp over Central Asia; the Nestorian Christianity which once had prevailed so widely was vanishing, and the new rulers of China reverted to the old national policy, and held the foreigner at arm's length. Night descended upon the further East, covering Cathay with those cities of which the old travellers had told such marvels, Cambaluc and Cansay, Zayton and Chinkalan. And when the veil rose before the Portuguese and Spanish explorers of the 16th century, those names are heard no more. In their stead we have China, *Peking*, *Hangchow*, *Chincheo*, *Canton*. Not only were the old names forgotten, but the fact that those places had ever been known before was forgotten also. Gradually new missionaries went forth from Rome—Jesuits and Dominicans now; new converts were made, and new vicariats constituted; but the old Franciscan churches, and the Nestorianism with which they had battled, had alike been swallowed up in the ocean of Pagan indifference. In time a wreck or two floated to the surface,—a MS. Latin Bible or a piece of Catholic sculpture; and when the intelligent missionaries called Marco Polo to mind, and studied his story, one and another became convinced that Cathay and China were one.

But for a long time all but a sagacious few continued to regard Cathay as a region distinct from any of the new-found Indies; whilst mapmakers, well on into the 17th century, continued to represent it as a great country lying entirely to the north of China, and stretching to the Arctic Sea.

It was Cathay, with its outlying island of Zipangu (Japan), that Columbus sought to reach by sailing westward, penetrated as he was by his intense conviction of the smallness of the earth, and of the vast extension of Asia eastward; and to the day of his death he was full of the imagination of the proximity of the domain of the Great Khan to the islands and coasts which he had discovered. And such imaginations are curiously embodied in some of the maps of the early 16th century, which intermingle on the same coast-line the new discoveries from Labrador to Brazil with the provinces and rivers of Marco Polo's Cathay.

Cathay had been the aim of the first voyage of the Cabots in 1496, and it continued to be the object of many adventurous voyages by English and Hollanders to the N.W. and N.E. till far on in the 16th century. At least one memorable land-journey also was made by Englishmen, of which the exploration of a trade-route to Cathay was a chief object,—that in which Anthony Jenkinson and the two Johnsons reached Bokhara by way of Russia in 1558–1559. The country of which they collected notices at that city was still known to them only as *Cathay*, and its great capital only as *Cambaluc*.

Cathay as a supposed separate entity may be considered to come to an end with the journey of Benedict Goës, the lay-Jesuit. This admirable person was, in 1603, despatched through Central Asia by his superiors in India with the specific object of determining whether the Cathay of old European writers, and of modern Mahometans, was or was not a distinct region from that China of which parallel marvels had now for some time been recounted. Benedict, as one of his brethren pronounced his epitaph, "seeking Cathay found Heaven." He died at Suhchow, the frontier city of China, but not before he had ascertained that China and Cathay were the same. After the publication of the narrative of his journey (in the *Expeditio Christiana apud Sinas* of Trigault, 1615) inexcusable ignorance alone could continue to distinguish between them, and though such ignorance lingered many years longer, the result of his exploration fitly brings this prefatory notice to a close. (H. Y.)

General Description of China Proper.

China, as the name is at present used, embraces within its boundaries the dependencies of Manchuria, Mongolia, and Tibet, in addition to China Proper. This vast empire extends from 18° 30′ to 53° 25′ N. lat. and from 80° to 130° E. long. It is bounded on the N. by Asiatic Russia along a frontier extending nearly 3000 miles; on the E. by those portions of the Pacific Ocean which are known in the north as the Sea of Japan, in the central portion as the Yellow Sea, and in the south as the China Sea; on the S. and S.W. by the China Sea, Cochin China, and Burmah; and on the W. by Kashmir and Eastern Turkestan, which province has within the last few years been wrested from China by the Ataligh Ghazee.

The area of China Proper is not more than half that of the whole empire; it extends as far north only as 41° lat., and as far west as 98° long. It is about 1474 miles in length, and its breadth is about 1355 miles. Its coast line measures about 2500 miles; its land frontier is described as being 4400 miles in length, and its area is said to contain 1,348,870 square miles.

Great delta plain.

Surface.—One of the most noticeable features in the surface of China is the immense delta plain in the north-eastern portion of the empire, which, curving round the mountainous districts of *Shan-tung*, extends for about 700 miles in a southerly direction from the neighborhood of *Peking*, and varies from 150 to 500 miles in breadth. Commencing in the prefecture of *Yung-ping Foo*, in the province of *Chih-li*, its outer limit passes in a westerly direction as far as *Chang-ping Chow*, north-west of *Peking*. Thence running a south-south-westerly course it passes westward of *Ching-ting Foo* and *Kwang-ping Foo* till it reaches the upper waters of the *Wei River* in *Ho-nan*. From this point it turns westward and crosses the *Hwang-ho*, or Yellow River, in the prefecture of *Hwai-king*. Leaving this river it takes a course a little to the east of south, and passing west of *Joo-ning Foo*, in the province of *Ho-nan*, it turns in a more easterly direction as far as *Leuchow Foo*. From this prefecture an arm of the plain, in which lies the *Tsaou Lake*, stretches southward from the *Hwai River* to the *Yang-tsze Keang*, and trending eastward occupies the region between the river and *Hang-Chow Bay*. To the north of this arm rises a hilly district, in the centre of which stands *Nanking*.

The boundary of the plain round the mountainous region of *Shan-tung* begins at *Lai-chow Foo*, and describes a huge bow to the west and south, reaching westward to the prefecture of *Tse-nan*, and southward to the frontier of the province of *Keang-soo*, which boundary it follows to the sea. The greater part of this vast plain descends very gently towards the sea, and is generally below the level of the Yellow River,—hence the disastrous inundations which so often accompany the rise of the *Hwang-ho*. It is the delta of the Yellow River, and also to some extent of the *Yang-tsze Keang*, and it is chiefly remarkable for its semi-annular shape, within which it encloses the mountain districts of the province of *Shan-tung*. Owing to the great quantity of soil which is brought down by the waters of the Yellow River, and to the absence of oceanic currents, this delta is rapidly increasing and the adjoining seas are as rapidly becoming shallower. As an instance, it is said that the town of *Pootai* was 1 le west of the sea-shore, in the year 220 B.C., and in 1730 it was 140 le inland, thus giving a yearly encroachment on the sea of about 100 feet. Again, *Seen-shwuy Kow* on the *Peiho* was on the sea-shore in 500 A.D., and is now about 18 miles inland.

Mountain ranges.

The rest of the empire may be described as being either mountainous or hilly. Several ranges of high mountains, in connection with the mountain system of Central Asia, enter the western provinces of the empire, and after traversing the western and southern provinces in various directions dwindle down to low hills as they approach the sea-coast. In the eastern portion of Tibet the *Kwan-lun* range throws off a number of branches, which spread first of all in a south-easterly direction, and eventually take a north and south course, partly in the provinces of *Sze-chuen* and *Yun-nan*, where they divide the beds of the rivers which flow into Siam and Cochin-China, as well as the principal northern tributaries of the *Yang-tsze Keang*. Another range, known as the *Tung-nan*, or *Foo-new Shan*, which appears to be the eastern termination of the great *Kwan-lun* range of Central Asia, and which is said to have several snow-clad peaks,

enters China in the southern portion of the province of *Kan-suh*, and stretches in an easterly direction across the province of *Shen-se* into that of *Ho-nan*, where it finally disappears. This range separates the waters which enter the *Hwang-ho*, or Yellow River, through the *Wei* and the *Lo* from those which flow into the *Yang-tzse Keang*, through the *Kia-ling* and the *Han*. Forming the northern frontier of the province of *Sze-chuen* runs the *Kew-lung* or *Po-mung* range, which entering China in 102° long. takes a general course of east as far as 112° long., at about which point it is lost sight of in the province of *Hoo-pih*. In the south the *Nan-shan* ranges, some peaks of which are said to reach above the snow-level, take their rise in *Yun-nan*, and after spreading in a series of ranges over the south and east portions of *Kwang-se* trend in an easterly direction, covering the entire province of *Kwang-tung*. Then turning north-eastward, they occupy the whole area of the provinces of *Fuh-keen*, *Keang-se*, *Chĕ-keang*, *Hoo-nan*, and southern *Gan-hwuy*, until they reach the *Yang-tsze Keang;* which river, from the *Tung-ting Lake* to *Chin-keang Foo*, forms their northern boundary. It is reckoned that this mountain region occupies an area of about 300,000 square miles. Besides these more important ranges there are the *Lung Mountains* in *Kan-suh*, the *Ta-hang Mountains* in *Shan-se*, the *Tae Mountains* in *Shan-tung*, and many others, among which may be mentioned the ranges which form the northern frontier of *Chih-li*. It will thus be seen that there is a general subsidence from the mountain districts in the western portions of the empire to the central and south-eastern provinces, where the mountains dwindle down to hills, and where the snowy peaks and rugged sides of the ranges in *Yun-nan* and *Sze-chuen* are exchanged for the wooded tops and carefully-cultivated terraces of the littoral provinces.

Rivers. *Rivers.*—The rivers of China are very numerous, and, with the canals, form some of the most frequented highways in the empire. The two largest are the *Yang-tsze Keang* and the *Hwang-ho*, or Yellow River, the latter of which is less known to fame for its value in a commercial sense, than by reason of the vast and destructive floods which have from time to time caused it to inundate the low-lying country on either side of its banks. According to Chinese geographers the *Hwang-ho* takes its rise in the "Sea of Stars," on the eastern side of the Bayen-kára Mountains, in the Mongolian province of Kokonor, where it has gained for itself the name of *Ah-urh-tan*, or Golden River, from the color of its waters. For some miles it runs in two streams, and when united takes at first a south-easterly course. Next trending in a north-easterly direction it traverses the province of *Kan-suh* and passes northwards through the Great Wall until it reaches the rising ground in the neighborhood of the *In-shan*. Thence curving to the south-east and south it re-enters China through the Great Wall and continues its southerly course, forming the boundary between the provinces of *Shen-se* and *Shan-se* as far as *Tung-kwan*. Here it makes a sharp bend and runs nearly due east to *Kai-fung Foo*. In the neighborhood of this city it enters on the great eastern plain of China, and the alterations which have taken place in its bed between this district and the sea have earned for it the well-deserved title of "the Sorrow of Han." According to the Chinese records this portion of the river has changed its course nine times during the last 2500 years, and has emptied itself into the sea at as many different mouths, the most northerly of which is represented as having been in about 39° lat., or in the neighborhood of the present mouth of the *Peiho*, and the most southerly being that which existed before the last change in 1851–53, in 34° lat. The breaches that were made in the northern bank of the river east of *Kai-fung Foo* during the floods of 1851, 1852, and 1853 caused its waters gradually to overflow the low-lying country to the northwards; and these, after spreading over a belt of country about 12 miles in width, struck the bed of the *Ta-tsing River*, and having forced their way into that narrow, clean-cut channel, followed it to the sea. The result of this change has been that the old course of the river is dry, and that the muddy dun-colored waters—hence the name *Hwang-ho* or Yellow River—after permanently flooding a large tract of country, are now leading up to another grand catastrophe by destroying the banks of the new channel which they have found for themselves. Already the increased volume of water has added another obstruction to those before existing to the navigation of the river by destroying a large stone bridge of seven arches at *Tse-hoheen*, a town situated 210 miles from the mouth, the ruins of which have seriously impeded the course of the stream. But the *Hwang-ho* is of little value for navigating purposes. At its mouth lies a bar having at its deepest part about from 7 to 9 feet of water only; further up, about 3 miles below *Tse-hoheen*, there is a shoal extending right across its bed, at the deepest point of which there is about 11 feet of water, while in the passage at the extremity of the sunken bridge at *Tse-hoheen* there is a depth of only about 5 feet.

A far more valuable river in every way is the *Yang-tsze Keang*, which takes its rise in the Min Mountains of Tibet, and after a course of 2900 miles empties itself into the Yellow Sea in about 31° lat. In common with most of the large rivers of China, the *Yang-tsze Keang* is known by various names in different parts of its course. From its source in Tibet to *Seu-chow Foo* in *Sze-chuen*, it bears the name of *Kin-sha Keang*, or River of the Golden Sands. From *Seu-chow Foo* to *Yang-chow Foo* in *Keang-soo*, its volume has gained for it the title of *Ta Keang*, or the Great River; and from the ancient name of the district through which it thence passes, it is known for the remainder of its course as the *Yang-tsze Keang*, or the *Yang-tsze River*. Chinese geographers state that it has two sources, the more northerly of which gives birth to the *Kang-chu ah-lin* at a point about 1600 le to the south-east of the source of the Yellow River; and to the more southerly one of the two the *Na-ko-to-moo-tsing ah-lin*, which rises on the south of the range, owes its existence. Both these streams twist and turn eastward for upwards of 200 le, when they unite and form one stream, which flows in an easterly and afterwards southerly course until it enters the Chinese province of *Yun-nan* at the *Hwang-shing Pass*, or Pass of Imperial Victory. It then turns northward into the province of *Sze-chuen*, and thence after receiving several important tributaries it takes an east-north-easterly course, until passing into *Hoo-pih* it dips southwards to the boundary of *Hoo-nan* in the neighborhood of the *Tung-ting Lake*, the waters of which contribute largely to swell its volume. From this point it makes a curve northwards as far as *Han-kow*, receiving on the way the waters of the *Han River*. From *Han-kow* it bends its course again southwards to the *Po-yang Lake*. Thence through the province of *Gan-hwuy* it proceeds in a north-easterly direction until it reaches *Nanking*, 200 miles from the sea. Here the influence of the tide begins to be felt, and beyond this point it gradually widens into the great estuary by which it is connected with the ocean. The basin area of the *Yang-tsze Keang* is reckoned to be about 548,000 square miles, and it is navigable for steamers as far as *I-chang*, upwards of 1200 miles from its mouth. Unlike the Yellow River, along the navigable portion of the *Yang-tsze Keang* are dotted many rich and populous cities, among which the chief are *Nanking*, *Gan-king*, *Kew-keang*, *Han-kow*, and *I-chang*. Beyond this last-named city the navigation becomes impossible for any but light native craft, by reason of the rapids which occur at frequent intervals in the deep mountain gorges through which the river runs between *Kwai-chow* and *I-chang*.

Grand Canal. Next in importance to the Yang-tsze Keang as a water highway is the *Yun-ho*, or, as it is generally known in Europe, the *Grand Canal*. This magnificent artificial river reaches from *Hang-chou Foo* in the province of *Chĕ-keang* to *Tien-tsin* in *Chih-li*, where it unites with the *Peiho*, and thus may be said to extend to *Tung-chow* in the neighborhood of *Peking*. After leaving *Hang-chow* it passes around the eastern border of *Tai-hoo*, or Great Lake, surrounding in its course the beautiful city of *Soo-chow*, and then trends in a generally north-westerly direction through the fertile districts of *Keang-soo* so far as *Chin-keang* on the *Yang-tsze Keang*. Mr. Ney Elias, who in 1868 travelled along the Grand Canal from *Chin-keang* to the new course of the Yellow River, thus describes the characteristics of this portion of its course:—

> The Grand Canal between *Chin-keang* and *Tsin-keang-pu*, or in other words, between the *Yang-tsze* and the old bed of the Yellow River, . . . is everywhere in good repair, and the adjacent country well irrigated, and apparently in a thriving state, both as regards cultivation and, to judge by the aspect of the towns on and near its banks, as regards trade also. After crossing the old Yellow River, however, a part of the canal somewhat less known is reached, and the flourishing condition

of the country is no longer noticeable; on the contrary, for a distance of about 150 miles, though the canal itself is in tolerably good working order, the country in its vicinity has an arid, sterile appearance, and is but thinly populated. There are few towns or villages, and some there are seem neither populous nor busy, though they are not in ruins, and bear but few traces of the rebellion. . . . The canal, which at one time was so deep that at many places the level of the water was above that of the adjacent country, is now everywhere considerably below it, rendering irrigation at even a short distance from its banks, without mechanical appliances, almost an impossibility; even the dry bed of the *Loma Lake* is scarcely cultivated on account of its elevation above the level of the canal, though it is only separated from it in some parts by a bank of a few yards in width. It is true that this lake appears never to have been more than a shallow flood lagoon, nevertheless it was some feet below the general level of the country, and was connected with the canal by means of water-courses and sluice-gates; and if this is difficult to irrigate how much more so must be the country above and beyond it! This 150 miles being passed over, the *Wai Shan* (sometimes called *Yii Shan*) Lake is reached at a small village, called *Han-chuang-cha*. This is the most southern of a chain of lakes or rather lagoons, which stretch from far to the south of *Han-chuang-cha* (I believe from near *Su-chan-fu* on the old Yellow River) to within a few miles of *Tse-ning-chow*, and which constitute the only important feeder of the Grand Canal to the southward. In the summer they merge one into the other, and form a continuous sheet of water, though very shallow in parts. In winter, when the water is low, these shallow parts are mere morasses, which divide the sheet into three or four separate lagoons. In former days the canal ran in some places by the side of these lagoons, and in others through portions of them, but being everywhere embanked on both sides, it was only dependent upon them for its supply of water, the canal itself forming an unobstructed means of communication through the year. Of late years, however, this section of the canal has been allowed to go to ruin, and those portions only are used which run through the morasses existing in the dry season, the lagoons themselves forming elsewhere the only channel for navigation. Near the northern limit of these lagoons stands the city of *Tse-ning-chow*, the first place of any importance on the canal north of *Tsin-kiang-pu*; it is said to be a place of considerable trade in ordinary times. . . . Still proceeding northward, a distance from *Tse-ning-chow* of about 25 miles, the summit level of the canal is reached near a small town called *Nan Wang*. It is here that the River *Wen* falls into the canal, a portion of its waters flowing to the south, and the rest to the north, precisely as described by Staunton and other writers. . . . About 30 miles beyond *Nan Wang* we come to the new Yellow River, the canal for that distance being extremely narrow and shallow—a mere ditch in fact, running between embankments large enough to confine a stream of infinitely greater volume. The banks along nearly the whole of the Grand Canal between the old and the new bed of the Yellow River, excepting those portions bordering on or traversing the lagoons, are surrounded by earthen walls crenellated after the fashion of city walls, behind which are stockades at intervals of every few miles. All this work has the appearance of being recently constructed, though in many places it is already being broken up by the country people to make room for cultivation, for they can ill afford to lose that strip of land immediately adjacent to and irrigated by the canal. The villages also make an attempt at fortifications, some of them being surrounded by earthen or mud walls or moats; and, indeed, many solitary farms have some species of defensive works round them, and in most cases a small, square brick tower within. These towers are rarely met with to the south of the province of *Shan-tung*—they are probably the "water castles" mentioned by the historian of the Dutch Embassy.

On the west side of the canal, at the point where the Yellow River now cuts across it, there is laid down in Chinese maps of the last century a dry channel which is described as being that of the old Yellow River. Leaving this point the canal passes through a well-wooded and hilly country west of *Tung-ping Chow*, through the city *Chang-kew Chin* and to the east of *Tung-chang Foo*. At *Lin-tsing-Chow* it is joined at right angles by the *Wei River* in the midst of the city, and from thence across the frontier into *Chih-li*, and passing to the west of *Tih Chow* and *Tsang Chow* joins the *Peiho* at *Tien-tsin* after having received the waters of the *Ke-to River* in the neighborhood of *Tsing Heen*. At *Tien-tsin* the canal ends, and the *Peiho* completes the communication to the vicinity of *Peking*.

Another of the large rivers of China is the *Han Keang*, which rises in the *Po-mung* or *Kew-lung* mountains to the north of the city of *Ning-keang Chow* in *Shen-se*. Taking a generally easterly course from its source as far as *Fan-ching*, it from that point takes a more southerly direction and empties itself into the *Yang-tsze Keang* at *Han-kow*, "the mouth of the Han." This river has some noticeable peculiarities. Not the least of these is that it is very narrow at its mouth (200 feet) and grows in width as the distance from its mouth increases. Another marked feature is that the summer high-water line is for a great part of its course, from *E-ching Heen* to *Han-kow*, above the level of its banks, the result being that were it not for artificial barriers the whole of the surrounding country would be under water for a great part of the year. In the neighborhood of *Seen-taou Chin* the elevation of the plain above low-water is no more than 1 foot, and in summer the river rises about 26 feet above its lowest level. To protect themselves against this inevitably recurring danger of inundations the natives have here, as elsewhere, thrown up high embankments on both sides of the river, but at a distance from the natural banks of about 50 to 100 feet. This intervening space is flooded every year, and by the action of the water new layers of sand and soil are deposited every summer, thus strengthening the embankments from season to season. In summer the river would be navigable for steamers of moderate size as far as *Laou-ho Kow*, which is situated 180 le above *Fan-ching*, but in winter it would be quite impossible to reach the latter place. The chief trading places on the *Han-keang* are *Sha-yang Chin*, *Yo-Kow*, *Sin-Kow*, *Seen-taou Chin*, *Fan-ching*, and *Laou-ho Kow*.

In the southern provinces the *Se Keang*, or Western River, is the most considerable. This river takes its rise in the prefecture of *Kwang-nan Foo* in *Yun-nan*, whence it reaches the frontier of *Kwang-se* at a distance of about 90 le from its source. Then trending in a north-easterly direction it forms the boundary between the two provinces for about 150 le. From this point it takes a generally south-easterly course, passing the cities of *Teen Chow*, *Fung-e Chow*, *Shang-lin Heen*, *Lung-gan Heen*, *Yung-kang Chow*, and *Nan-ning Foo* to *Yung-shun Heen*. Here it makes a bend to the north-east, and continues this general direction as far as *Sin-chow Foo*, a distance of 800 le, where it meets and joins the waters of the *Keen Keang* from the north. Its course is then easterly, and after passing *Woo-chow Foo* it crosses the frontier into *Kwang-tung*, and finally empties itself into the China Sea in the neighborhood of *Macao*. Like the *Yang-tsze Keang* this river is known by various names in different parts of its course. From its source to *Nan-ning Foo* in *Kwang-se* it is called the *Se-yang Keang*, or River of the Western Ocean; from *Nan-ning Foo* to *Sin-chow Foo* it is known as the *Yuh Keang*, or the Bending River; and over the remainder of its course it is recognized by the name of the *Se Keang* or Western River. The *Se Keang* is navigable as far as *Shoaou-king*, 130 miles, for vessels not drawing more than 15 feet of water, and steamers of a light draught might easily reach *Woo-chow Foo*, in *Kwang-se*, which is situated 75 miles further up. In winter the navigation for junks is difficult above *Woo-chow Foo*, and it is said that rapids are met with about 100 miles beyond that city.

The *Peiho* is a river of importance as being the high water-way to *Peking*. Taking its rise in the *Se-shan*, or Western Mountains, beyond *Peking*, it passes the city of *Tung-chow*, the port of *Peking*, and *Tien-tsin*, where it meets the waters of the *Yun-ho*, and empties itself into the Gulf of *Pih-chih-li* at the village of *Takoo*. The *Peiho* is navigable for small steamers as far as *Tien-tsin* during the greater part of the year, but throughout the winter months, that is to say, from the end of November to the beginning of March, it is frozen up.

Lakes. *Lakes.*—There are numerous lakes in the central provinces of China. The largest of these is the *Tung-ting Lake* in *Hoo-nan*, which, according to Chinese geographers, is upwards of 800 le, or 266 miles, in circumference. In native gazetteers its various portions are known under distinct names; thus it is said to include the *Tsing-tsaou*, or Green Grass Lake; the *Ung*, or Venerable Lake; the *Chih-sha*, or Red Sand Lake; the *Hwang-yih*, or Imperial Post-house Lake; the *Gan-nan*, or Peaceful Southern Lake; and the *Ta-tung*, or Great Deep Lake. In ancient times it went by the name of the *Kew-keang Hoo*, or Lake of the Nine Rivers, from the fact that nine rivers flowed into it. During the winter and spring the water is so low that the shallow portions become islands, separated by rivers such as the *Seang* and *Yuen*, and numberless streams; but in summer, owing to the rise in the waters of the *Yang-tsze Keang*, the whole basin of the lake is filled. The *Poyang Lake* is also subject to a wide difference between high and low water, but not quite to the same

extent as the *Tung-ting Lake*, and its landmarks are more distinctly defined. The *Tai Lake*, in the neighborhood of *Soo-chow Foo*, is also celebrated for its size and the beauty of its surroundings. It is about 150 miles in circumference, and is dotted over with islands, on which are built temples for the devotees of religion, and summer-houses for the votaries of pleasure from the rich and voluptuous cities of *Hang-chow* and *Soo-chow*. The boundary line between the provinces of *Chĕ-keang* and *Keang-soo* crosses its blue waters, and its shores are divided among thirteen prefectures. Besides these lakes there are, among others, two in *Yun-nan*, the *Teen-che* near *Yun-nan Foo*, which is 40 miles long and is connected with the *Yang-tze Keang* by the *Poo-to River*, and the *Urh-hai* to the east of the city of *Ta-le*.

Loess. *Loess.*—One of the most remarkable features in the physical geography of China is the existence of a vast region of loess in the northern portion of the empire. This peculiar formation covers the province of *Chih-li* (with the exception of the alluvial plain), *Shan-se*, northern *Shen-se*, *Kan-suh*, and northern *Ho-nan*, constituting altogether an area of about 250,000 square miles. Loess is a solid but friable earth of a brownish-yellow color. It spreads alike over high and low grounds, smoothing off the irregularities of the surface, and is often to be found covering the sub-soil to a depth of more than 1000 feet. It has a tendency to vertical cleavage, and wherever a river cuts into it, the loess encloses it between perpendicular cliffs, in many places 500 feet high. These when washed by the water are speedily undermined, and the loess breaks off in vertical sheets, which fall into the river and are carried down by the stream. In this way have been deposited the sediments which to a great extent constitute the great plain, and render the Gulf of *Pih-chih-li* and the Yellow Sea so shallow. From an economical point of view the loess is invaluable to the natives of the north of China. In its perpendicular cliffs which are removed from the action of running water are dug out innumerable caves, in which a large majority of the people inhabiting the loess region dwell, while its surface yields abundant crops, requiring no application of manure and but slight expenditure of labor in preparation. Wherever it is found, therefore, whether on the plain or at an elevation of 7000 or 8000 feet, it is available for agricultural purposes. The Chinese call it *Hwang-too*, or "Yellow Earth," and it has been suggested that the imperial title *Hwang-te*, "Yellow Emperor," or "Ruler of the Yellow," has had its origin in the fact that the emperor was lord of the loess or the "Yellow Earth."

Provinces. *Provinces.*—China Proper is divided into nineteen provinces,—*Chih-li*, *Shan-tung*, *Shan-se*, *Ho-nan*, *Keang-soo*, *Gan-hwuy*, *Keang-se*, *Chĕ-keang*, *Fuh-keen*, *Hoo-pih*, *Hoo-nan*, *Shen-se*, *Kan-suh*, *Sze-chuen*, *Kwang-tung*, *Kwang-se*, *Kwei-chow*, *Yun-nan*, and *Shing-king* in Manchuria.

Chih-li. The metropolitan province of *Chih-li*, in which is situated *Peking*, the capital of the empire (see PEKING), contains eleven prefectural cities, and occupies an area of 58,949 square miles. By the latest census reports the population was returned as 27,000,000. This province forms part of the great delta plain spoken of above, with the exception of the mountain ranges which define its northern and western frontier. It is bounded on the E. by the Gulf of *Pih-chih-li* and *Shan-tung*, and on the S. by *Shan-tung* and *Ho-nan*. The proportion of Mahometans among the population is very large. In *Peking* there are said to be as many as 20,000 Mahometan families, and in *Paou-ting Foo*, the capital of the province, there are about 1000 followers of the Prophet. The extremes of heat and cold in *Chih-li* are very marked, as a glance at the accompanying table of the temperature at *Tien-tsin* during the year 1861, as chronicled by Dr. Lamprey's self-registering thermometer, will show.

1861.	Thermometer (Fahr.)		1861.	Thermometer (Fahr.)	
	Maximum.	Minimum.		Maximum.	Minimum.
	°	°		°	°
January..	38	0·8	July	108	61
February.	46	1·5	August....	100	60·5
March.....	68	18	September	92	40
April.....	87	35	October ...	77	40
May.....	94	41	November	42	17·5
June.....	107	53	December	50	3

During the months of December, January, and February the rivers are frozen up, and even the Gulf of *Pih-chih-li* is fringed with a broad border of ice. There are four rivers of some importance in the province, namely, the *Peiho*, which has been described above; the *Wăn-ho*, which rises in the mountains in Mongolia, and flowing to the west of *Peking*, forms a junction with the *Peiho* at *Tien-tsin;* the *Shang-se-ho*, which rises in the mountains in the north of the province of *Shan-se*, and takes a south-easterly course as far as the neighborhood of *Ki Chow*, from which point it trends north-east, and eventually joins the *Wăn-ho* some 15 miles above *Tien-tsin;* the *Poo-to-ho*, which rises in *Shan-se*, and after running a parallel course to the *Shang se-ho* on the south, empties itself in the same way into the *Wăn-ho;* and the *Lan-ho*, which rises in Mongolia, enters the province in the north-east after passing to the west of *Jehol*, passes the city of *Yung-ping Foo* in its course (which is south-easterly) through *Chih-li*, and from thence winds its way to its mouth at the north-eastern boundary of the Gulf of *Pih-chih-li*. The province contains three lakes of considerable size. The largest is the *Ta-loo-tsze Hoo*, which lies in 37° 40′ lat. and 115° 20′ E. long.; the second in importance is one which is situated to the E. of *Paou-ting Foo;* and the third is the *Too-loo-tsze Hoo*, which lies E. by N. of *Shun-tĭh Foo*. Four high roads radiate from *Peking;* one leading to Urga by way of *Seuen-hwa Foo*, which passes through the Great Wall at *Chang-kea Kow;* another, which enters Mongolia through the *Koo-pei Kow* to the north-east, and after continuing that course as far as *Fung-ning*, turns in a north-westerly direction to *Dolanor;* a third striking due east by way of *Tung-chow* and *Yung-ping Foo* to *Shan-hai Kwan*, the point where the great wall terminates on the coast; and a fourth which trends in a south-westerly direction to *Paou-ting Foo* and on to *Tai-yuen Foo* in *Shan-se*. The mountain ranges to the north of the province abound with coal, notably at *Chai-tang*, *Tai-gan-shan*, *Miaou-gan-ling* and *Foo-taou* in the *Se-shan* or Western Hills. "At *Chai-tang*," Baron von Richthofen says, "I was surprised to walk over a regular succession of coal-bearing strata, the thickness of which, estimating it step by step as I proceeded gradually from the lowest to the highest strata, exceeds 7000 feet." The coal here is anthracite, as is also that at *Tai-gan-shan*, where are found beds of greater value than any in the neighborhood of *Peking*. In *Seuen-hwa Foo* coal is also found, but not in such quantities as in the places above named. Iron and silver also exist in small quantities in different parts of the province, and hot and warm springs are very common at the foot of the hills along the northern and western edges of the province. The principal agricultural products are wheat, kaou leang, oats, millet, maize, pulse, and potatoes. Fruits and vegetables are also grown in large quantities. Of the former the chief kinds are pears, apples, plums, apricots, peaches, persimmons, and melons. *Tien-tsin* is the Treaty Port of the province, and by the *Consular Trade Report* for 1874 we find that the total value of the merchandise exported from that city during the year amounted to 1,144,893 taels, and that of the goods imported to 17,682,684 taels. The articles which figure most conspicuously in the list of exports are dates, dried lily flowers, wool, tobacco, and rhubarb; and the most valuable of the imports are shirtings, drills, T-cloths, jeans and twills, opium, woollens, steel, lead, needles, Japanese seaweed, and sugar.

Shan-tung. The province of *Shan-tung*, or "East of the Mountain," is bounded on the N. by the province of *Chih-li* and the Gulf of *Pih-chih-li*, on the E. by the Yellow Sea, on the S. by *Keang-soo* and the Yellow Sea, and on the W. by *Chih-li*. It contains an area of 65,104 square miles, and the population is estimated to be 30,000,000. It is divided into ten prefectures, with as many prefectural cities, of which *Tse-nan Foo*, the provincial capital, is the chief. The physical features of the province are very plainly marked. The centre and eastern portions are occupied by a series of mountain ranges running north-east and south-west, between which lie fertile valleys, while the north-western, southern, and western portions form part of the great delta plain of the north of China. The most considerable range of mountains is that which lies to the north of the city of *Tai-gan Foo*, of which the highest peak is the *Tai-shan*, a mountain which has been famous in Chinese history for more than 4000 years, and to which at the present day hundreds of pilgrims an-

nually resort. Another important range is the *Laou-shan*, which fringes the south-eastern coast for about 18 miles. With the exception of the Yellow River, which in its new course traverses the province in a north-easterly direction to the sea, there are no large rivers in *Shan-tung*. The most considerable are the *Wei*, which flows into the Gulf of *Pih-chih-li;* the *Yth*, which empties itself into a lake lying to the east of the Grand Canal; and the *Ta-wan*, which rises at the southern foot of the *Yth Mountains* and terminates its course in the Grand Canal. There are several lakes in the province, notably the *He-shang Hoo* and the *Nan-shang Hoo*, both of which border on the Grand Canal in the south-west. Large quantities of foreign and southern goods are consumed in the populous districts surrounding these lakes, the waters of which afford means of export for the cotton, silk, coal, grain, &c., which are produced in the fertile tracts lying in their neighborhood. Speaking generally the province is not a fertile one. Not being a loess region, the mountains are unproductive, and yield only brushwood and grass, while the plain to the north is so impregnated with salt that it is almost valueless, especially near the sea, for agricultural purposes. The valleys between the mountains and the plain to the south-west are, however, extremely rich and fertile. The chief wealth of *Shan-tung* consists in its minerals, the principal of which is coal. There are four large coal-fields and several smaller ones now being worked in the province, the most considerable of which lies in the valley of the *Laou-foo River* in the centre of the province. The coal and coke from this district are conveyed by road to the city of *Le-tsing* on the Yellow River, a distance of about 75 miles, from whence they are exported in all directions. Another large field lies on the plain a little to the south of *Yth-chow Foo* in the south. A third field is in the district of *Wei Heen* to the north; and a fourth in the neighborhood of *Yth Heen* in the south-west. Iron ore, ironstone, gold, galena, lead, and copper are also found in considerable quantities in many parts of the province. The principal agricultural products are wheat, millet, Indian corn, pulse, rice, arrowroot, and many varieties of fruits and vegetables. The castor-oil plant is common, and the wax tree grows plentifully in the neighborhood of *Lai-yang* in the east, giving rise to a considerable trade in the wax produced by means of wax insects. Unlike those of their kind in *Sze-chuen*, the wax insects of *Shan-tung* breed and become productive in the same districts. They are placed upon the trees in the spring, and at the close of the summer they void a peculiar substance which when melted forms wax. In the autumn they are taken off the trees, and are preserved within doors until the following spring. *Shan-tung* abounds in good harbors, the most noteworthy of which are *Chefoo* and *Wei-hai-wei* on the north, and *Shih-aou*, *Kin-kea-kow*, and *Ching-taou* on the south of the promontory. As being the native province of both Confucius and Mencius, *Shan-tung* has acquired an undying fame in the Chinese world of literature. *Chefoo*, the Treaty Port of *Shan-tung*, is situated on the north-eastern coast of the province. The value of the foreign trade from this port amounted in 1874 to £2,597,060, £1,882,144 of which represented the imports, and £714,916 the exports.

Shan-se. The province of *Shan-se* is bounded on the N. by Mongolia, on the E. by *Chih-li*, on the S. by *Ho-nan*, and on the W. by *Shen-se*. It occupies an area of 53,268 square miles, and contains besides its capital, *Tae-yuen Foo*, eight prefectural cities. The population is returned as being 14,004,210. The configuration of *Shan-se* is noteworthy, forming, from its southern frontier to as far north as *Ning-woo Foo*—an area of about 30,000 square miles—a plateau elevated from 5000 to 6000 feet above the level of the sea, the whole of which is one vast coal-field. The northern and western limits of the plateau are bounded by high mountain ranges trending south-west and north-east. Down the central line of the province from north to south lies a curious series of deep depressions, all of which are ancient lake basins. But though forming a series it is plain that these lakes were not formerly connected with each other, some being separated from those next adjoining by high ridges, and being drained by different rivers and in different directions. *Shan-se* is one of the most remarkable coal and iron regions in the world, and Baron von Richthofen gives it as his opinion that the world, at the present rate of consumption of coal, could be supplied for thousands of years from *Shan-se* alone. The neighborhood of *Tse-chow Foo* in the south of the province abounds in both coal and iron, and has probably, partly by reason of its situation being within reach of the populous plain of *Hwai-king Foo*, of the Yellow River, of *Taou-kow Chin* and *Sew-woo Heen* (the shipping places for *Tien-tsin* and the Grand Canal), and of *Ho-nan Foo*, furnished more iron to the Chinese than any other region of a similar extent in the empire. The iron is of great purity and is easily fusible, while the necessary means for manufacturing it, such as all sorts of clay and sand for crucibles, moulds, &c., and a very superior anthracite coal, lie ready to hand. The coal is of two kinds, bituminous and anthracite, and the line of demarcation between the two is formed by the hills which are the continuation of the *Ho-shan* range, the fields of bituminous coal being on the west of these hills, and those of anthracite on the east. In the neighborhood of *Ping-ting Chow* the extent of the coal-field is incalculable; and speaking of the whole plateau, Baron von Richthofen says, "These extraordinary conditions, for which I know no parallel on the globe, will eventually give rise to some curious features in mining. It may be predicted that, if a railway should ever be built from the plain to this region—and there is no other means of ever bringing to their due account its mineral resources—branches of it will be constructed within the body of one or other of those beds of anthracite, which are among the thickest and most valuable known anywhere, and continue for miles underneath the hills west of the present coal-belt of *Ping-ting Chow*. Such a tunnel would allow of putting the produce of the various coal-beds immediately on railroad carts destined for distant places." Salt is produced in the prefecture of *Ping-yang* in the south of the province, both from a salt lake and from the alluvial soil in the neighborhood of the *Fun River*. In agricultural products the province is poor, and as the means of transport at present existing are rude and insufficient, all kinds of food command unusually high prices. Meat is a rare luxury, and salt fish, the usual substitute for meat, is consumed only by the wealthier classes. As a rule the people are poor, and in the mountainous districts are subject to famine and starvation. The only wagon road leading into and through *Shan-se* is the great highway from *Peking* to *Segan Foo*, which enters *Shan-se* west of *Ching-ting Foo*, and leaves the province at the *Tung-kwan* at the great bend of the Yellow River.

Ho-nan. The province of *Ho-nan* is bounded on the N. partly by the Yellow River (which it crosses to the west of *Ho-nan Foo*, forming an arm northwards between the provinces of *Shan-se* and *Chih-li*), on the W. by *Shen-se*, on the S. by *Hoo-pih*, and on the E. by *Gan-hwuy*. It occupies an area of 65,404 square miles, and contains nine prefectural cities. Its capital is *Ho-nan Foo*. The prefecture of *Hwae-king*, north of the Yellow River, consists of a fertile plain, "rendered park-like by numerous plantations of trees and shrubs, among which thick bosquets of bamboo contrast with the gloomy groves of cypress." All kinds of cereals grow luxuriantly, and the general productiveness of the district is indicated by the extreme denseness of the population. The most noticeable feature in that portion of the province which is properly called *Ho-nan*, or "south of the River," is the *Foo-new Shan* range, which runs east and west across this part of the province. As the *Kwan-lun* range, it forms an almost impassable barrier between Kokonor and Tibet, and in China it separates completely the northern from the central provinces. Coal is found on the south of the Yellow River in the districts of *Ho-nan Foo*, *Lushan*, and *Joo Chow*. The chief products of the province are, however, agricultural, especially in the valley of the *Tang-ho* and *Pe-ho*, which is an extensive and densely populated plain running north and south from the *Foo-new Shan*. Cotton is also grown extensively and forms the principal article of export, and a considerable quantity of wild silk is produced from the *Foo-new Shan*. Three roads from the east and south unite at *Ho-nan Foo*, and one from the west. The southern road leads to *Joo Chow*, where it forks, one branch going to *She-ke-chin*, connecting the trade from *Fan-ching*, *Han-kow*, and the *Han River* generally, and the other to *Chow-kea-kow* near the city of *Chin-chow Foo*, at the confluence of the three rivers which unite to form the *Sha-ho;* the second road runs parallel with the Yellow River to *Kai-fung Foo;* the third crosses the Yellow River at *Mang-tsin Heen*, and passes thence in a north easterly direction to *Hwae-king Foo*, *Sew-woo Heen*, and

Wei-hwuy Foo, at which place it joins the high road from *Peking* to *Fan-ching;* and the western road follows the southern bank of the Yellow River for 700 le to its great bend at the fortified pass known as the *Tung-kwan*, where it unites with the great wagon road leading through *Shan-se* from *Peking* to *Se-ngan Foo*.

Keang-soo. The province of *Keang-soo* is bounded on the N. by *Shan-tung*, on the S. by *Chĕ-keang*, on the W. by *Gan-hwuy*, and on the E. by the sea. It occupies an area of 45,000 square miles, and the population, which is larger than that of any other province of China, is estimated at 37,843,501. *Keang-soo* forms part of the great plain of Northern China. There are no mountains within its limits, and but few hills. It is watered as no other province in China is watered. The Grand Canal runs through it from south to north; the *Yang-tsze Keang* crosses its southern portion from west to east; it possesses several lakes, of which the *Tai-hoo* is the most noteworthy, and numberless streams connect the canal with the sea. Its coast is studded with low islands and sand-banks, the results of the deposits brought down by the Yellow River during the different periods in which in the course of its history it has flowed into the Yellow Sea. *Keang-soo* is rich in places of interest. *Nanking*, "the Southern Capital," was the seat of the Chinese court until the commencement of the 15th century, and in modern times it has been famous as having been the headquarters of the Tai-ping rebels from the year 1853, when they took the city by assault, to 1864, when its garrison yielded to Col. Gordon's[1] "ever victorious army" (see NANKING), and *Hang-chow Foo* and *Soo-chow Foo* on the *Tai-hoo*, are reckoned to be the most beautiful cities in China. "Above there is Paradise, below are *Soo* and *Hang*," says the Chinese proverb. Of late years also *Shang-hai* has earned for itself a place among the notabilities of the province. Tea and silk are the principal articles of commerce produced in *Keang-soo*, and next in importance are cotton, sugar, and medicines. The silk manufactured in the looms of *Soo-chow* is famous all over the empire, as a proof of which it may be mentioned that on the occasion of the marriage of the late emperor Tung-che, large orders were received by the manufacturers in that city for silken goods to be bestowed as imperial presents and to be converted into wedding garments. In the mountains near *Nanking*, coal, plumbago, iron ore, and marble are found. *Shang-hai* on the *Woo-sung River*, and *Chin-keang* on the *Yang-tsze Keang*, are the two Treaty Ports in the province. According to the trade reports for 1874, the value of the goods exported from Shanghai in that year amounted to 27,541,834 taels, and that of those imported to 89,636,343 taels. From *Chin-keang* during the same period, £317,277 worth of merchandise was exported, while the value of the imports amounted to £3,527,066. In explanation of this latter figure the British vice-consul writes, "with the exception of opium, the sale of which has steadily advanced since the opening of the port (in 1861), all the principal articles of import exhibit a decline."

Gan-hwuy. The province of *Gan-hwuy*, "Peace and Plenty," is bounded on the N. by *Ho-nan*, on the E. by *Keang-soo* and *Chĕ-keang*, on the S. by *Keang-se*, and on the W. by *Hoo-pih* and *Ho-nan*. It covers an area of 48,461 square miles, and contains a population of 34,108,059 souls. Its principal city is *Gwan-king* on the *Yang-tsze Keang*, besides which it numbers seven prefectural cities. The southern half of the province, that portion south of the *Yang-tsze Keang*, forms part of the *Nan-shan*, or hilly belt of the south-eastern provinces, and produces, besides cotton and iron ore, large quantities of green tea. *Gan-hwuy* is one of the most productive provinces of China. Over the whole of its southern portion tea is largely grown, notably in the districts of *Hwuy-chow Foo*, *Tung-lew*, *Ta-tung*, and *Woo-hoo*. Speaking of this part Baron von Richthofen says, "The exuberant fertility of the soil in the lower portions of the province is not excelled by anything I have seen in temperate climates. No expense has, therefore, been spared in protecting the lowlands by embankments, and introducing a perfect system of irrigation. Both deserve the highest admiration. On the *King River* I have walked for miles through fields of hemp the stalks of which were from 11 to 13 feet high. Cotton, too, is raised in large quantities." The *Shun-gan Keang* is the principal river of the province, and is of great importance for foreign commerce, supplying as it does direct water communication between some of the principal tea-growing districts and the neighborhood of *Hang-chow*.

Keang-se. The province of *Keang-se* is bounded on the N. by *Hoo-pih* and *Gan-hwuy*, on the S. by *Kwang-tung*, on the E. by *Fuh-keen*, and on the W. by *Hoo-nan*. It extends over an area of 72,176 square miles, and its population by the last census was returned as being 19,000,000. It is divided into fourteen prefectures, and the provincial capital is *Nan-chang Foo*, a city situated on the *Kea Keang*, about 35 miles from the *Po-yang Lake*, into which the river empties itself. The whole province is mountainous, being traversed in a south-westerly and north-easterly direction by the *Nan-shan ranges*. The largest river is the *Kea Keang*, which rises in the mountains in the south of the province and flows westward into the *Po-yang Lake* as mentioned above. During the summer time it has water of sufficient depth for steamers of light draught as far as *Nan-chang*, and it is navigable by native craft for a considerable distance beyond that city. Another river of note is the *Chang Keang*, which has its source in the province of *Gan-hwuy*, and flows into the *Po-yang Lake*, connecting in its course the *Woo-yuen* district, from whence come the celebrated "Moyune" green teas, and the city of *King-tĭh-chin*, celebrated for its pottery, with *Jaou-chow Foo* on the lake. The black "Kaisow" teas are brought from the *Ho-kow* district, where they are grown, down the River *Kin* to *Juy-hung* on the lake, and the *Sew-ho* connects by a navigable stream *E-ning Chow*, in the neighborhood of which city the best black teas of this part of China are produced, with *Woo-ching*, the principal mart of trade on the lake. The principal productions of the province are tea (of which 32,733,053 lb were exported in 1874), China ware, grass cloth, hemp, paper, tobacco, and tallow. *Kew-kcang*, the Treaty Port of the province, is situated on the *Yang-tsze Keang*, a short distance above the junction of the *Po-yang Lake* with that river. According to the foreign trade returns for this port for the year 1874, it appears that the value of the imports was £1,179,895, 5s., and that of the exports, £2,976,503, 14s.

Chĕ-keang. The province of *Chĕ-keang* is bounded on the N. by the province of *Keang-soo*, on the E. by the sea, on the S. by the province of *Fuh-keen*, and on the W. by the provinces of *Keang-se* and *Gan-hwuy*. It occupies an area of about 36,000 square miles, and contains a population of 21,000,000. With the exception of a small portion of the great delta plain, which extends across the frontier from the province of *Keang-soo*, and in which are situated the famous cities of *Hoo Chow*, *Kea-hing*, *Hang-chow Shaou-hing*, and *Ning-po*, the province forms a portion of the *Nan-shan* of south-eastern China, and is hilly throughout. The *Nan-shan* ranges run through the centre of the province from S.W. to N.E., and divide it into a northern portion, the greater part of which is drained by the *Tseen-tang Keang*, and a southern portion which is chiefly occupied by the *Ta-che* basin. The valleys enclosed between the mountain ranges are numerous, fertile, and for the most part of exquisite beauty. The hilly portion of the province furnishes large supplies of tea, and in the plain which extends along the coast, north of Ningpo, a great quantity of silk is raised. In minerals the province is poor. Coal and iron are occasionally met with, and traces of copper ore are to be found in places, but none of these minerals exist in sufficiently large deposits to make mining remunerative. The principal cities are *Hang-chow* and the Treaty Port of *Ning-po*. In the foreign trade returns for *Ning-po* for 1874 the value of the imports during the year is described as having been £2,565,179, and that of the exports as £2,337,948. Among the latter articles we find tea, silk, cotton, dried cuttle-fish, paper fans, straw hats, and medicines occupying the most prominent positions. The principal import was opium, the value of which alone amounted to £1,129,668. Cotton piece goods, annexed to which stands the next largest figure, were imported to the value of £430,692. Opposite *Ning-po*, at a distance of about 50 miles, lies the *Island of Chusan*, the largest of a group bearing that general name. This island is 21 miles long, and is about 50 miles in circumference. It is very mountainous, and is surrounded by numerous islands and islets. On its south side stands the walled town of *Tinghai*, in front of which is the principal harbor. The population is returned as being 50,000.

The province of *Fuh-keen*, or, as it used to be called,

[1] [Chas. Geo. Gordon (1833–85) was killed at Khartoum in the Soudan, whither he had gone to complete the Egyptian evacuation. He was governor of Equatorial Africa from 1877–80.—AM. ED.]

CHINA, JAPAN AND KOREA.

SCALE OF MILES

0 100 200 300 400 500

Capital of Country ..... Treaty Ports ..... Amoy

Capital of Province ..... Railroads

Proposed Railroads

Submarine Cables

Hammond's 8 x 11 Map of China, Japan and Korea

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A 85 B 90 C 95 D 100 E 105 F 110 G 115 H 120 I 125 J 130 K 135 L 140 M 145 N 150

1 45 2 40 3 35 4 30 5 25 6 20

H Longitude 120 East from I Greenwich 125 J 130 K 135 L

C 95 D 100 E 105

Fuh-keen. *Min*, is bounded on the N. by the province of *Chĕ-keang*, on the S. by that of *Kwang-tung*, on the W. by that of *Keang-se*, and on the E. by the sea. It occupies an area of 53,480 square miles, and its population is estimated at 14,777,410. The provincial capital is *Fuh-chow Foo*, and it is divided into eleven prefectures, besides that ruled over by the prefect of the capital city. *Fuh-keen* is generally mountainous, being overspread by the *Nan-shan* ranges, which run a general course of N.E. and S.W. The principal river is the *Min*, which is formed by the junction, in the neighborhood of the city of *Yen-ping Foo*, of three rivers,—namely, the *Keen-ke*, which takes its rise in the mountains on the western frontier in the prefecture of *Keen-ning Foo*, the *Fuh-tun Ke*, the source of which is found in the district of *Kwang-tsih* in the north-west of the province, and the *Shaou Ke*, which rises in the mountains in the western district of *Ning-kwa*. From *Yen-ping Foo* the river takes a somewhat south-easterly course, and after passing along the south face of the city of *Fuh-chow Foo*, empties itself into the sea about 30 miles below that town. Its upper course is narrow and rocky and abounds in rapids, but as it approaches *Fuh-chow Foo* the channel widens, and the current becomes slow and even. Its depth is very irregular, and it is navigable only by native boats of a small class. Two other rivers flow into the sea near the island of *Amoy*, neither of which, however, is navigable for any distance from their mouths owing to the shallows and rapids with which they abound. The soil of the province is, as its name, "Happy Establishment," indicates, very productive, and the scenery is of a rich and varied character. Most of the hills are covered with verdure, and the less rugged are laid out in terraces. The principal products of the province are tea, of which the best kind is that known as Bohea, which takes its name, by a mispronunciation, from the *Woo-e Mountains*, in the prefecture of *Keen-ning Foo*, where it is grown; grains of various kinds, oranges, plantains, lichis, bamboo, ginger, gold, silver, lead, tin, iron, salt (both marine and rock), deers' horns, beeswax, sugar, fish, birds' nests, medicine, paper, cloth, timber, &c. *Fuh-keen* boasts of two Treaty Ports, *Fuh-chow Foo* and *Amoy*. The trade reports for 1874 show that the value of goods imported in foreign vessels to *Fuh-chow Foo* in that year amounted to £1,332,387, 11s. 8d., and that that of goods similarly exported amounted to £4,397,320, 19s. 4d. The chief articles of export from *Amoy* are tea, sugar, and sugar candy; of tea £1,129,090 worth was exported during the year 1874.

Island of Formosa. The Island of *Formosa*, or *Taiwan*, "the Great Bay," as the Chinese call it, forms part of the province of *Fuh-keen*. Situated at a distance of about 80 or 90 miles from the mainland, its highest mountains can be easily recognized from the coast near Amoy. And so when Chinese historians assert that its existence first became known to their ancestors in the year 1480, they probably mean that at that date emigrants from the mainland first gained a footing in the island. At all events, when the Japanese two centuries later attempted to establish a colony in the island, they found there a Chinese population sufficiently numerous to be formidable. The island stretches from lat. 21° 53′ 30″ to lat. 25° 33′. In shape it is long and narrow. Its greatest width is about 70 miles, and it tapers off to a fine point at its southern extremity. A backbone of mountains runs from north to south through almost its entire length, leaving a plain on the western and northern portions. These level districts are occupied by Chinese settlers, while the mountains and their eastern slopes to the sea are inhabited by native tribes. The fertility of the plains has gained for *Formosa* the name of the Granary of China. On every available piece of land fields of rice and sugar are carefully cultivated, and recompense the farmer by yielding him constant and abundant crops. These alone, in addition to such products as jute, grass cloth, fibre, rice paper, and ratan, would make the island a valuable possession; but far more precious are the sulphur and the camphor, which are obtained from the mines and from the mountains of the island, and which are claimed by the Government as Crown monopolies. When taken from the mine the sulphur is boiled in iron boilers until the slate-like mineral assumes a treacle-like consistency. This is constantly stirred until every impurity is separated from the sulphur, which is then ladled out into wooden tubs shaped like sugar-loaves. In these it is left to cool, and the conical cake is freed from the tub by the simple process of knocking out the bottom of the latter. As the gigantic laurels from which the camphor is obtained are found only in the mountains in the possession of the natives, the acquisition of a constant supply is somewhat difficult. In 1874, however, 14,380½ cwts. of this commodity were exported from the ports of *Tam-suy* and *Kelung*. Petroleum also adds to the riches of the island. The Treaty Ports in *Formosa* are *Tai-wan Foo* (including *Ta-kow*) on the south-west coast, and *Tam-suy* (including *Kelung*) on the north-west and north coast. The foreign trade returns for *Tai-wan Foo* for 1874 show that goods to the value of £1,678,858 were imported during the year, and that £1,840,016 was the value of the exports during the same period. The *Tam-suy* returns present much smaller totals; £304,243 represents the value of the imports, and £203,428 that of the exports in 1874.

Hoo-pih. The province of *Hoo-pih*, "North of the Lakes," is bounded on the N. by *Ho-nan*, on the E. by *Gan-hwuy*, on the S. by *Hoo-nan*, and on the W. by *Shen-se* and *Sze-chuen*. It occupies an area of 70,450 square miles, and contains a population of 27,370,098. The most important city within its borders is the Treaty Port of *Han-kow*, besides which it contains ten other prefectural cities. The greater part of the province forms a plain, and its most noticeable feature is the *Han River*, which runs in a south-easterly direction across the province from its north-westerly corner to its junction with the *Yang-tsze Keang* at *Han-kow*. The products of the *Han* valley are exclusively agricultural, consisting of cotton, wheat, rape seed, tobacco, and various kinds of beans. Vegetable tallow is also exported in large quantities from this part of *Hoo-pih*. Gold is found in the *Han*, but not in sufficient quantities to make working it more than barely remunerative. It is washed every winter from banks of coarse gravel, a little above *E-ching Heen*, on which it is deposited by the river. Every winter the supply is exhausted by the washers, and every summer it is renewed by the river. Baron von Richthofen reckoned that the digger earned from 50 to 150 cash a day. Only one wagon road leads northwards from *Hoo-pih*, and that is to *Nan-yang Foo* in *Ho-nan*, where it forks, one branch going to *Peking* by way of *Kai-fung Foo*, and the other into *Shan-se* by *Ho-nan Foo*. According to the *Consular Trade Reports* for 1874, the value of the foreign trade at *Han-kow* during that year amounted to £9,775,754, of which sum £4,388,113 represents the value of the imports, and £5,387,641 that of the exports.

Hoo-nan. The province of *Hoo-nan*, "South of the Lakes," is bounded on the N. by *Hoo-pih*, on the E. by *Keang-se*, on the S. by *Kwang-se* and *Kwang-tung*, and on the W. by *Kwei-chow* and *Sze-chuen*. It occupies an area of 84,000 square miles, and its population is estimated at 18,652,507. The provincial capital is *Chang-sha Foo*, in addition to which it counts eight prefectural cities within its boundaries. It is essentially a province of hills, the only plain of any extent being that around the *Tung-ting Lake*, but this extends little beyond the area which in summer forms part of the lake. To the north of *Hang-chow Foo* detached groups of higher mountains than are found in the southern portion of the province are met with. Among these is the *Hang-shan*, one of the *Woo-yo* or five sacred mountains of China, upon which the celebrated tablet of Yu was placed. The principal rivers of the province are—(1.) The *Seang Keang*, which takes its rise in the *Nan-shan*, and empties itself into the *Tung-ting Lake;* it is navigable for a great distance from its mouth, and the area of its basin is 39,000 square miles; (2.) The *Tsze Keang*, the basin of which covers an area of 10,000 square miles, and which is full of rapids, and navigable only for the smallest kinds of boats; and (3.) The *Yuen Keang*, a large river, which has some of its head-waters in the province of *Kwei-chow*, and which empties itself into the *Tung-ting Lake* in the neighborhood of *Chang-tĭh Foo;* —its basin has an area of 34,300 square miles, 22,500 of which are in the province of *Hoo-nan*, and 12,500 in that of *Kwei-chow;* its navigation is difficult and dangerous, and only small boats are able to pass beyond *Hang-kea*, a mart situated about 500 le above *Chang-tĭh Foo;* and (4.) The *Ling Keang*, which flows from the tea district of *Ho-fung Chow* to the *Tung-ting Lake*. Its basin covers an area of about 8000 square miles, and it is navigable only in its lowest portion. The principal places of commerce are—(1.) *Seang-tang*, on the *Seang Keang*, which is said to con-

tain 1,000,000 inhabitants, and to extend three miles long by five le deep; (2.) *Chang-sha Foo*, the provincial capital on the same river; and (3.) *Chang-tth Foo*, on the *Yuen Keang*. The products of the province are tea (the best quality of which is grown at *Gan-hwa*, and the greatest quantity at *Ping-keang*), hemp, cotton, rice, paper, tobacco, tea-oil, and coal. This last is by far the most important of the mineral products of *Hoo-nan*. The whole of the south-eastern portion of the province is one vast coal-field, extending over an area of 21,700 square miles. This area is divided into two nearly equal parts,—one, the *Luy River* coal-fields, yielding anthracite, and the other the *Seang River* coal-fields, yielding bituminous coal. The people are, as a rule more generally prosperous than are the inhabitants of the other provinces, and Baron von Richthofen, in the course of his journey through the province, noticed with surprise the number of fine country seats owned by rich men who had retired from business, which were scattered over the rural districts. Almost all the traffic is conveyed through *Hoo-nan* by water-ways, which lead northward to *Han-kow* on the *Yang-tsze Keang*, and *Fan-ching* on the *Han River*, eastward to *Fuh-keen*, southward to *Kwang-tung* and *Kwang-se*, and westward to *Sze-chuen*. One of the leading features of the province is the *Tung-ting Lake*, which has been already described.

Shen-se.

The province of *Shen-se* is bounded on the N. by the Great Wall, on the W. by the province of *Kan-suh*, on the S. by the province of *Sze-chuen*, and on the E. by *Shan-se*, from which it is separated by the Yellow River. It contains an area of 67,400 square miles, and its population was said to number upwards of 10,000,000 before the outbreak of the late Mahometan rebellion. *Se-gan Foo* is the provincial capital, and besides this there are seven prefectural cities in the province. *Shen-se* is divided into two parts by a barrier of mountains, consisting of the *Foo-new Shan* and the *Tsing-ling Shan*, which runs across the southern portion of the province from east to west. To the north of the mountains lie the basins of the *Wei River* and of several other tributaries to the *Hwang-ho*. The position of the *Wei* basin is peculiar. Cut off from the rest of China on the east by the Yellow River, and on the south by the mountains, it yet forms the great channel of communication with Central Asia. Its position, therefore, in a strategical point of view is at once apparent. Were it in the hands of an enemy the Chinese colonies in Central Asia would be completely severed from the mother country, and hence the eagerness which has been evinced by the Government throughout all history to retain possession of the region. For upwards of 2000 years, with the exception of intervals, from 1122 B.C. to 1127 A.D., the city of *Se-gan Foo*, which lies in the basin, was the capital of the empire. Its walls enclose a square space of six geographical miles each way, and, unlike most Chinese cities, its fortifications are kept in perfect repair. During the late Mahometan rebellion it was closely invested for two years by the rebels, who however failed to make themselves masters of it. From *Se-gan Foo* radiate a number of roads going east, south, and west. The east road is the great *Tung-kwan* road, which forms the principal means of communication between *Peking* and the north-eastern provinces of the empire, and *Sze-chuen*, *Yun-nan*, and Tibet. To the south one road crosses the mountains to *Shang Chow*, and on to the *Tan River*, an affluent of the *Han River*, and is thus connected with the trade of the *Yang-tsze Keang;* and another leads to *Han-chung Foo* and *Sze-chuen*. Leaving the west gate of the city two roads lead to *Lan-chow Foo*, from which town commences the great high road into central Asia by way of *Leang-chow Foo*, *Kan-chow Foo* and *Suh-chow* to *Hami*, where it forks into two branches, which follow respectively the northern and southern foot of the *Teen-shan* range, and are known as the *Teen-shan pih loo* and the *Teen-shan nan loo*. It was along these roads that the fame of China first reached Europe, and it was by the *Teen-shan nan loo* that Marco Polo entered the empire. To defend this line of communication the Great Wall was extended to beyond *Suh Chow*, and the *Kea-yu* gate, which is the door of the empire, was built. During the reign of Hea-woo Te of the Han dynasty Chinese colonies and high roads lined with fortified cities were established along this route, and though at times the Government has lost possession of the line beyond the Great Wall, it has always succeeded in re-establishing its supremacy over it, and the earlier emperors of the present dynasty established a firmer hold over the *Teen-shan pih loo* and Ili than any of their predecessors had been able to acquire. Occupying a position, then, at the confluence of the roads which connect north-eastern China with its western and south-western portions, *Se-gan Foo* is naturally a city of great commercial importance. Producing no manufactures of its own, its trade consists principally in the importation of silk from *Che-keang* and *Sze-chuen*, tea from *Hoo-pih* and *Hoo-nan*, and sugar from *Sze-chuen*, and in the exportation of these and other articles of commerce to *Kan-suh*, Russia, and Central Asia. *Shen-se* is purely an agricultural province, and produces nothing for the foreign markets. Its principal products are cotton, wheat, and opium, and these it exchanges with the neighboring provinces for coal, iron, salt, &c. But besides these, kaou-leang, pulse, millet, maize, groundnut, barley, beans, pease, lucerne, and rape seed are grown. The *Wei* basin is the greatest agricultural country in the north-west. Being a loess region it is unfit for rice, but for the same reason it produces fine crops of the kinds mentioned at a minimum expenditure of labor. The *Shen-se* opium is much valued by smokers, and ranks next to the *Shan-se* drug, which is second only to that produced in *Kan-suh*. Coal abounds in the northern part of the province, but owing to the difficulty of transit it is not worked to any great extent. The winters are cold, but short, and though fruit trees abound and are most productive, no evergreen trees or shrubs are to be met with within the province.

Kan-suh.

The province of *Kan-suh*, which derives its name from the first syllables of the names of the two cities *Kan-chow Foo* and *Suh-chow*, is bounded on the N.E. by the Ordo Mongol tribes and the Desert of Gobi, on the E. by *Shen-se*, on the S. by *Sze-chuen*, on the S.W. by Kokonor and the Desert of Gobi, and on the N.W. by Kobdo and Ili. The boundary on the N. remains undefined, but the province may be said to occupy the territory lying between lat. 32° 30′ and 40°, and long. 108° to 98° 20′, and to contain an area of about 86,688 square miles. The population is estimated at 15,193,125. *Kan-suh* is for the most part a howling wilderness of sand and snow, but to the east of the Yellow River the country is cultivated and to some extent productive. The principal river is the Yellow River, the course of which through the province has already been described, and in the mountains to the south of *Lan-chow Foo* rises the *Wei River*, which traverses *Shen-se*, and flows into the Yellow River at *Tung-kwan*. The chief products of *Kan-suh* are cloth, horse hides, a kind of curd like butter "which melts in the mouth," and is known by the Mongols under the name of Wuta, musk, plums, onions, dates, sweet melons, and medicines.

Sze-chuen.

Sze-chuen, "the Four Streams," is the largest province in China. It is bounded on the N. by Kokonor, *Kan-suh*, and *Shan-se*, on the E. by *Hoo-pin* and *Hoo-nan*, on the S. by *Kwei-chow* and *Yun-nan*, and on the W. by Tibet. Its population is estimated at 35,000,000; it occupies an area of 220,000 square miles, and contains fifteen prefectural cities, inclusive of *Ching-too Foo*, the provincial capital. The western portion of the province forms part of the mountain-lands of Central Asia, and the eastern portion, comprising about 100,000 square miles, is, with the exception of the plain on which the city of *Ching-too Foo* is situated, emphatically a hilly region. The boundaries of this hilly region may be described by lines drawn from *Lung-gan Foo* to *Kwei-chow Foo* on the N., from *Kwei-chow Foo* to *Yung-ning Heen* on the S.E., and from this latter place to *Lung-gan Foo* on the W. The ethnological and commercial boundaries are clearly and sharply drawn by these physical features. The mountain districts are poorly cultivated, and are inhabited by "Ejin," or Barbarians, who are distinguished under the tribal names of Se-fan, Lo-lo, and Man-tsze, and whose allegiance to the Chinese Government sits but lightly on them, while the eastern portion is exclusively Chinese, and is one of the most thriving and populous regions in the empire. Through the southern portion of it runs the *Yang-tsze Keang*, which is there navigable throughout the year, while it is traversed by three large rivers, the *Min Keang*, the *To Keang*, and the *Kea-ling Keang*, all of which take their rise in the mountains on its north-west border, and empty themselves into the *Yang-tsze Keang* at *Seu-chow Foo*, *Loo Chow*, and *Chung-king Foo* respectively. The whole

province is intersected by numerous but difficult roads. The *Ta-pih-loo*, or great north road, leads from *Ching-too Foo* to *Peking*. From the same centre there branches one to *Chung-king Foo*, one to *Paou-ning Foo*, and one to *Ya-chow Foo*, while another road connects *Chung-king Foo* with *Kwei-chow Foo* on the *Yang-tsze Keang* and beyond with *E-chang Foo* in *Hoo-pih*. From *Ya-chow Foo*, again, start two important roads, one leading into Tibet by way of *Yung-king Heen*, *Tsing-ke Heen*, *Ta-tseen-loo*, *Le-tang*, *Pa-tang*, and *Tsiamdo*, and the other to Western *Yun-nan* viâ *Tsing-ke Heen*, *Ning-yuen Foo*, and *Yen-yuen Heen* to *Ta-le Foo*. From *Ta-le Foo* this road continues through Momien to Bhamo in Burmah. Another road connects *Pa-tang* and *Le-keang Foo* with *Ta-le Foo*, and yet another crosses the southernmost corner of the province, connecting *Tung-chuen Foo* in *Yun-nan* with *Ta-le Foo* in the same province.

The products of *Sze-chuen* are varied and valuable, and, unlike those of the northern provinces of China, are eminently suitable for foreign export. First on the list stands silk, and of this article of commerce a larger quantity is produced in eastern *Sze-chuen* than in any other province of the empire. There are few districts in this region in which silk is not produced, and though it is somewhat inferior in quality to that produced in *Chĕ-keang* yet in strength and durability it is so far superior to it that it is able to compete successfully with the finer kind in the market. Large quantities are exported to *Shen-se*, *Shan-se*, *Kan-suh*, *Peking*, *Yun-nan*, Tibet, *Kwei-chow*, *Kwang-se*, *Hoo-nan*, and *Hoo-pih*, and lately it has begun to figure in the *Shanghai* returns as an article of foreign export. The cultivation of the poppy is largely carried on in the same portion of the province. The opium produced is, however, of an inferior quality, and the exportation therefore is limited to those provinces which from exceptional circumstances are unable to procure the better description of drug from elsewhere. White wax is another of the most valuable articles of the *Sze-chuen* trade. It is made exclusively in the department of *Kea-ting Foo*, the climate of which appears to favor the propagation of the disease among the insects which is said by the natives to be the cause of the plentiful secretion of wax. This belief is borne out by the fact, that in the districts where the insects breed only a small quantity of wax is produced, and experience has therefore taught the natives the advantage of breeding the insects in one district and producing the wax in another. The region of *Keen-chang* in the south of the province has been found most suitable for breeding purposes, and it is there, therefore, on the insect trees, which are evergreens with large and pointed ovate leaves, that the breeding processes are carried on. At the end of April the producers start each with a load of the eggs of the insects for the district of *Kea-ting Foo*, a journey which on foot occupies about a fortnight. The road between the two districts is very mountainous, and as exposure to the heat of the sun would hatch the eggs too rapidly, the travellers journey only during the night. At *Kea-ting Foo* they are eagerly bought up, and are at once put upon the wax tree. Baron von Richthofen thus describes the subsequent process:—"When the egg balls are procured they are folded up, six or seven together, in a bag of palm leaf. These bags are suspended on the twigs of the trees. This is all the human labor required. After a few days the insects commence coming out. They spread as a brownish film over the twigs, but do not touch the leaves. The Chinese describe them as having neither shape, nor head, nor eyes, nor feet. It is known that the insect is a species of coccus. Gradually, while the insect is growing, the surface of the twigs becomes encrustated with a white substance; this is the wax. No care whatever is required. The insect has no enemy, and it is not even touched by ants. In the latter half of August the twigs are cut off and boiled in water, when the wax rises to the surface. It is then melted and poured into deep pans. It cools down to a translucent and highly crystalline substance. Ten taels weight of eggs produce from two to three catties of wax." Tobacco is another article which occupies a prominent place among the productions of *Sze-chuen*. It is grown very generally throughout the province, and is exported in large quantities to *Se-fan*, Tibet, *Yun-nan*, *Hoo-nan;* and the export to *Han-kow* alone is estimated at 50,000 piculs annually. The best is grown in the district of *Pe Heen;* the next quality is said to come from *Kin-lang Heen*, and the third quality from *She-fang Heen*, all these districts being in the plain of *Ching-too Foo*. The habit, which is unknown in other provinces, of smoking the tobacco leaves rolled up in the shape of cigars obtains largely in *Sze-chuen*. Salt is also produced in *Sze-chuen* in large quantities from brine, which is raised from wells. *Tsze-liu-tsing*, in *Tsze Chow*, *Wootung-keaou*, near *Kea-ting Foo*, *Paou-ning Foo*, and *Tung-chuen Foo*, are the districts where the wells are most abundant. The brine is raised from the well with long bamboo tubes and bamboo ropes, and is then led to large pans for evaporation. In the district of *Tsze-liu-tsing* petroleum is struck at a depth of from 1800 to 2000 feet, and is used for evaporating the brine. Coal and iron are found in many parts of the province, but the only coal which is worked is of an inferior quality, and the iron is smelted with wood alone. Sugar, tung oil, wheat, barley, beans, rice, Indian corn, potatoes, &c., are among the other products of *Sze-chuen*. From the list of exports and re-exports from *Han-kow* in the Trade Returns for 1871, Baron von Richthofen has made a list of the proximate value of the exports of *Sze-chuen* in this direction.

	Piculs.	Value in Taels.
Sze-chuen Silk	4,075	894,019
Safflower	4,837	294,795
White Wax	10,765	647,029
Sze-chuen rhubarb	2,761	35,616
Musk	74	58,629
Spelter	1,913	7,435
Copper	515	21,658
Wood-oil	290,441	1,825,701
Total, Taels		3,784,882

Ning-yuen Foo is the principal district from which the copper is produced, as much as from 500 to 600 tons a year being exported from this one prefecture. The mines are owned by private companies, who are bound by the terms of their license to sell the metal at a fixed price (8 taels per picul) to certain holders of a Government concession, who on their part are bound to pay 2 taels per picul into the provincial treasury.

Kwang-tung.

The province of *Kwang-tung* is bounded on the N. by *Hoo-nan*, *Keang-se*, and *Fuh-keen*, on the S. and E. by the sea, and on the W. by *Kwang-se*. It contains an area of 79,456 square miles, and is divided into nine prefectures; and the population is estimated at about 19,174,030. Its name, which signifies "East of Kwang," is derived, according to Chinese writes, from the fact of its being to the east of the old province of *Hoo-kwang*, in the same way that *Kwang-se* derives its name from its position to the west of *Hoo-kwang*. *Kwang-tung* extends for more than 600 miles from E. to W., and for about 420 from N. to S. It may be described as a hilly region, forming part as it does of the *Nan Shan* ranges. These mountains, speaking generally, trend in a north-east and south-westerly direction, and are divided by valleys of great fertility. The principal rivers of the province are the *Se Keang*, which has been already described; the *Pĕh Keang*, or North River, which rises in the mountains to the north of the province, and after a southerly course joins the *Se Keang* at *Sanshwuy Heen;* the *Tung Keang*, or East River, which after flowing in a south-westerly direction from its source in the north-east of the province, empties itself into the estuary which separates the city of *Canton* from the sea; and the *Han River*, which runs a north and south course across the eastern portion of the province, taking its rise in the mountains on the western frontier of *Fuh-keen*, and emptying itself into the China Sea in the neighborhood of *Swatow*. *Kwang-tung* is one of the most productive provinces of the empire. Its mineral wealth is very considerable, and the soil of the valleys and plains is extremely fertile. The principal article of export is silk, which is produced in the district forming the river delta, extending from *Canton* to *Macao* and having its apex at *San-shwuy Heen*. The value of the silk and of silken manufactures, especially textures which are annually exported from *Canton* in foreign bottoms, is estimated at about 14,000,000 dollars. Tea is also grown in many districts, and is exported annually to the amount of about 3,000,000 dollars; cassia lignea, together with cassia buds and twigs (from the sub-prefecture of *Lo-ting*, 150 miles east of *Canton*), matting, fire-crackers, sugar, and palm leaf fans, which are annually exported to the number of 4,000,000 or 5,000,000 to New York alone, are among the other prominent articles

of merchandise. Sugar is grown on the banks of almost all the rivers, and 40 per cent. of the ground under cultivation in the districts of *Pwan-yu, Tung-kwan,* and *Tsang-ching,* is occupied by sugar plantations. Out of the total exports from *Swatow* during the year 1874, which amounted in value to £4,367,739, sugar was put down as representing £1,023,810. Three large coal-fields exist in the province, namely, the *Shaou-chow Foo* field in the north; the *Hwa Heen* field distant about 30 miles from *Canton;* and the west coast field, in the south-west. The last is by far the largest of the three, and extends over the districts of *Woo-chuen, Teen-pih, Yang-keang, Yang-chuen, Gang-ping, Kae-ping, Sin-hing, Ho-shan, Sin-kwang,* and *Sin-ning.* The coal from the two first named fields is of an inferior quality, but that in the west coast field is of a more valuable kind. Iron ore is found in about twenty different districts, notably in *Tsing-yuen, Tsung-fa, Lung-mun,* and *Luh-fung.* None, however, is exported in its raw state, as all which is produced is manufactured in the province, and principally at *Fat-shan,* which has been called the Birmingham of China. The *Kwang-tung* coast abounds with islands, the largest of which is *Hainan,* which forms part of the prefecture of *Keung-chow Foo.* This island extends for about 100 miles from north to south, and the same distance from east to west. The southern and eastern portions of *Hainan* are mountainous, but on the north there is a plain of some extent. Gold is found in the central part; and sugar, cocoa nuts, betel nuts, birds' nests, and agar agar, or sea vegetable, are among the other products of the island. By the terms of the treaty *Keung-chow Foo* on the north coast was to be a Treaty Port, and it is now about to be opened to trade. In the province of *Kwang-tung* there are two Treaty Ports, namely, *Canton* and *Swatow.* At *Canton* the value of the exports carried in foreign vessels during the year 1874 amounted to £4,672,128, and of imports to £1,985,701. The value of the imports to *Swatow* during the same period was £3,317,297, and of the exports £1,310,321.

Kwang-se. The province of *Kwang-se* is bounded on the N. by *Kwei-chow* and *Hoo-nan,* on the E. by *Kwang-tung,* on the S. by the Gulf of Tonquin and Cochin-China, and on the W. by *Yun-nan.* It covers an area of 78,250 square miles, and its population is estimated at 7,313,895. The provincial capital is *Kwei-ling Foo,* or City of the Forest of Cinnamon Trees, and there are besides ten prefectural cities. In the south and east parts of the province the surface is mountainous, but in the north the mountains are exchanged for hills and plains. The principal rivers are the *Se Keang,* the course of which has been described above, and the *Kwei Keang,* or Cinnamon River, which takes its rise in the district of *Hing-gan,* in the north of the province, and in the neighborhood of that of the *Seang River,* which flows northward through *Hoo-nan* to the *Tung-ting Lake.* The *Kwei Keang,* on the other hand, takes a southerly course, and passes the cities of *Kwei-lin, Yang-so Heen, Ping-lo Foo, Chaou-ping Heen,* and so finds its way to *Woo-chow Foo,* where it joins the waters of the *Se Keang.* Another considerable river is the *Lew Keang,* or Willow River, which rises in the mountains inhabited by the Meaou-tsze, in the district of *Yung-tsung,* in *Kwei-chow.* Leaving its source, it takes a south-easterly direction, and enters *Kwang-se,* in the district of *Hwae-yuen.* After encircling the city of that name, it flows south as far as *Lew-ching Heen,* where it forms a junction with the *Lung Keang,* or Dragon River. Adopting the trend of this last-named stream, which has its head-waters in *Yun-nan,* the mingled flow passes eastward, and further on in a south-easterly direction, by *Lew-chow Foo, Woo-seuen Heen,* and *Sin-chow Foo,* where it receives the waters of the *Se Keang,* and thenceforth changes it name for that of its affluent.

Kwei-chow. The province of *Kwei-chow* is bounded on the N. by *Sze-chuen,* on the E. by *Hoonan,* on the S. by *Kwang-se,* and on the W. by *Yun-nan.* It contains 64,554 square miles, and has a population of about 5,288,219. *Kwei-yang Foo* is the provincial capital, and besides this there are eleven prefectural cities in the province. With the exception of plains in the neighborhood of *Kwei-yang Foo, Ta-ling Foo,* and *Tsun-e Foo,* in the central and northern regions, the province may be described as mountainous. But the very disturbed state in which it has been for many years makes it difficult to gain much information about it. The mountain-ranges in the south are largely inhabited by Meaou-tsze, who are the original owners of the soil, and who have been goaded into a state of rebellion by the oppression to which they have been subjected by the Chinese officials. To this disturbing cause has been added also another by the spread of the Mahometan rebellion of *Yun-nan* into some of the south-western districts of the province. The devastating effects of these civil wars have been most disastrous to the trade and the prosperity of *Kwei-chow.* The climate is by nature unhealthy, the supply of running water being small, and that of stagnant water, from which arises a very fatal malaria, being considerable; but it is at the present time rendered still more dangerous by the number of corpses which are left to putrefy in the fields. The agricultural products of the province are very limited, and its chief wealth lies in its minerals. Copper, silver, lead, and zinc are found in considerable quantities, and as regards quicksilver, *Kwei-chow* is probably the richest country in the world. It has been from of old the chief product of the province, and the belt in which it occurs extends through the whole province from south-west to north-east. One of the principal mining districts is *Kae Chow,* in the prefecture of *Kwei-yang Foo,* and this district has the advantage of being situated near *Wang-ping Chow,* from which place it can be conveniently and cheaply shipped to *Hankow.* Cinnabar, realgar, orpiment, and coal form the rest of the mineral products of *Kwei-chow.* Wild silk is another valuable article of export. It is chiefly manufactured in the prefecture of *Tsun-e Foo,* where three kinds are produced. The first quality, the trade in which is estimated at about 500,000 taels a year, is chiefly exported to *Shen-se, Shan-se,* and *Peking,* while some finds its way to *Seang-tan* and so into *Kwang-se.* The inferior kinds are locally consumed.

Yun-nan. The province of *Yun-nan,* "South of the Clouds," is bounded on the N. by *Sze-chuen,* on the E. by *Kwei-chow* and *Kwang-se,* on the S. by Burmah and the Lao tribes, and on the W. by Burmah and Tibet. It occupies an area of 107,969 square miles, but though thus the second largest province of the empire, its population is estimated at only 5,561,320, and probably this number is at the present time, in consequence of the long continuance and violent extinction of the Panthay rebellion, excessive. The greater part of the province may be said to consist of an extensive plateau, containing numerous valley plains, which is divided in the northern portion by mountain ranges that enter at the north-west corner of the province and separate the waters of the *Kin-sha Keang,* the *Meikon,* and the *Salwein.* Besides *Yun-nan Foo,* the capital, the province contains twenty prefectural cities, several of which—*Tung-chuen Foo, Yun-nan Foo, Ta-le Foo, Yung-chang Foo, Tsoo-heung Foo,* and *Ling-gan Foo,* for example—are situated in the valley plains just spoken of. The principal rivers are the *Meikon,* which traverses the province from north to south on its way to the China Sea through Anam; the *Salwein,* which runs a parallel course through its western portion; the *Kin-sha Keang,* which runs first in a south-east and then in an easterly direction through the north of the province; and the head-waters of the *Songka,* which takes its rise in the south-eastern part of the province. This last-named river forms a navigable communication from *Yun-nan* to the Gulf of *Tong-king* where it empties itself into the sea. The navigation commences at *Man-haou,* a town only ten days' journey from *Yun-nan Foo,* and it thus affords an easy outlet for the mining districts of eastern and southern *Yun-nan.* There are two large lakes in the province, —one in the neighborhood of *Ta-le Foo,* which is 24 miles in length by six miles in breadth, and the other near *Yun-nan Foo,* which measures from 70 to 80 miles in circumference. Several important roads intersect the province, the chief of which are—1. The road from *Yun-nan Foo* to Bhamo in Burmah viâ *Ta-le Foo* (12 days), *Tăng-yuĕ Chow* or *Momien* (8 days), and *Manwyne,*—an easy road as far as *Ta-le Foo,* but beyond this city the mountain ranges spoken of above present obstacles of no little difficulty; 2. The road from *Ta-le Foo* northwards to *Batang* viâ *Le-keang Foo,* which thus connects western *Yun-nan* with Tibet; 3. The road spoken of in the description of *Sze-chuen,* from *Ta-le Foo* to *Ching-too Foo* viâ *Ning-yuen Foo* and *Ya-chow Foo;* 4. The road from *Yun-nan Foo* to *Seu-chow Foo,* viâ *Tung-chuen Foo* and *Chaou-tung Foo;* 5. The road from the same city to *Wang-ping Chow,* in *Kwe-chow,* viâ *Kwei-yang Foo,* and down the *Yuen River* to *Chang-tĭh Foo* in *Hoo-nan;* and 6. the ancient and important trade road to *Canton.* This route connects *Yun-nan Foo* with *Pĭh-se*

Foo, in *Kwang-se*, on the *Canton* west river, a land journey which occupies about twenty days. From this point the river furnishes in quiet times an easy communication with *Canton*, but of late, owing to the disturbed condition of *Kwang-se*, this route has been little used. The agricultural products of the province are fully sufficient to supply the wants of the inhabitants, but its chief wealth lies in the minerals with which it abounds. On this subject Baron von Richthofen says, "We are now in an extremely remarkable region, which is highly worthy a detailed examination, because a great variety and quality of metalliferous deposits are distributed throughout its extent. The country so distinguished comprehends nearly the whole of *Yun-nan*, from *Ta-kwan-ting* in the north to *Po-urh Foo* in the south, and from the eastern boundary of the province to *Tăng-yuĕ Chow* (Momien) in the west. Besides, it extends across the *Yang-tsze*, and comprises the whole department of *Ning-yuen Foo*, till *Tsing-ke Heen*, a district of *Ya-chow Foo;* and in the east, the district of *Wei-ning Chow* in *Kwei-chow*. There are no positive indications to show that the metalliferous region extends beyond those limits to the south, west, and north, but this is different as regards the direction to the east, or rather north-east. I have had several statements given me concerning the occurrence of ores of copper and silver through a large portion of *Kwei-chow;* but as no mines are worked outside of *Wei-ning Chow*, the statement cannot be considered as proved. It is, however, a remarkable fact, that immediately adjoining the metalliferous region of *Yun-nan* to the north-east, commences a belt distinguished by the occurrence of quicksilver and its ores. It extends through the whole width of the province of *Kwei-chow*. Quicksilver is found only in this belt, and not in *Yun-nan*."

Silver and gold are among the metals produced in *Yun-nan*, but they are not known to exist in any large quantities. Lead is of frequent occurrence in the province, and indeed the area through which copper, silver, lead, tin, and zinc are distributed in sufficient quantities to make mining answer, comprises at least 80,000 square miles. The ores are generally of good quality, and are so deposited as to be easy of extraction. Tea from *Po-urh Foo*, in southern *Yun-nan*, which is well known and appreciated throughout the empire; opium of an inferior quality; medicines in the shape not only of herbs and roots, but also of fossil shells, bones, teeth, and various products of the animal kingdom; and precious stones, principally jade and rubies, are among the other exports from *Yun-nan*.

Shing-king. The imperial province of *Shing-king*, in southern Manchuria, is bounded on the N. by Mongolia and *Tsi-tsi-har;* on the E. by the newly-acquired Russian province of Amoor, the Sea of Japan, and Corea; on the S. by Corea, the Yellow Sea, and the Gulf of Leaoutung; and on the W. by Mongolia. It occupies an area of 43,000 square miles, and contains a population of 6,000,000. Its capital city is *Moukden* (41° 40′ N. lat., 130° 30′ E. long.), or, as it is otherwise known, *Shing-king*, "the Flourishing Capital," or *Shin-yang;* and besides this it has one other prefectural city, namely, *Kin-chow Foo*. The surface of the province is divided between plain and mountain, the latter feature largely predominating. A line drawn from *King-chow Foo* (41° 12′ N. lat., 121° 10′ E. long.) north-east to *Moukden*, and then south by west through *Leaou-yang* and *Hai-ching* to *Kai-chow* and the sea, would define the level country, the rest of the province consisting of mountains intersected with valleys. A large portion of the plain being an alluvial deposit is extremely fertile, but in the neighborhood of the sea that saline exudation so common in the north of China renders futile all attempts at cultivation. To the north and east of this district run numerous mountain ranges, for the most part in a north-and-southerly direction. The climate of *Shing-king* is marked by extremes of heat and cold. In summer the temperature varies from 70° to 90°, and in winter from 50° above to 10° below zero. The mountain scenery is extremely picturesque, and the trees and shrubs are such as are common in England, the mountain ash being the only common English tree which is there conspicuous by its absence. The most important rivers are the *Leaou-ho* and the *Ta-yang-ho*. The former takes its rise in Mongolia, and after running an easterly course for about 400 miles, turns in a south-westerly direction, and empties itself into the Gulf of *Leaou-tung*, in the neighborhood of *Ying-tsze*, up to which town, 20 miles from the bar, the river is navigable for large junks. The *Ta-yang-ho* rises in the mountains to the south of the plain, and empties itself into the Yellow Sea. The principal roads through the province are—1st, The imperial highway from *Peking*, which passes through the Great Wall at *Shan-kai-kwan*, along the shores of the Gulf of *Pih-chih-li* to *Moukden*, and after leaving this city divides into three branches—one going eastward to Corea, another going by *Kirin* and *Alchuku* to *San-sing*, the limit of the empire in this direction, while a third diverges N. by W. to *Fa-kwo-mun*, thence through Mongolia to *Pe-tu-na*, and then to *Tsi-tsi-har*, *Mergen*, and the Amoor; 2d, A road from *Ying-tsze* southward to *Kin-chow*, in the extremity of the promontory of *Leaou-tung;* and 3d, a road from the same point in an easterly direction to *Fung-hwang-ching* and the Gate of Corea. The Treaty Port of the province is *Newchwang*, but owing to the difficulty of reaching this town, the foreign settlement has been established at *Ying-tsze*. During 1874 the value of goods imported into this port was 2,433,135 taels, and that of exports was 1,753,543 taels. The chief agricultural products of *Shing-king* are wheat, barley, millet, oats, maize, cotton, indigo, and tobacco. Coal, iron, and gold are also found in considerable quantities in various localities, but as yet they are very little worked.

History.

History. Far reaching as is the history of China, it yet fails to give us any account of the origin of the Chinese race. Its first page begins by describing the nucleus of the nation as a little horde of wanderers, roving among the forests of Shan-se, without houses, without clothing, without fire to dress their victuals, and subsisting on the spoils of the chase, eked out with roots and insects. Investigation, however, has proved beyond doubt that these wanderers were no indigenous sons of the soil, but were strangers and pilgrims from other lands. Some believe that their point of departure was in the region to the south-east of the Caspian Sea, and that, having crossed the head waters of the Oxus, they made their way eastward along the southern slopes of the Teen-shan. But however this may be, it is plain that as they journeyed they struck on the northern course of the Yellow River, and that they followed its stream, on the eastern bank, as it trended south as far as Tung-kwan, and that then, turning with it due eastward, they established small colonies on the fertile plains of the modern province of Shan-se. But though these immigrants were for the moment wanderers they brought with them habits of settled labor. Some traces are discernible which might possibly be accepted as evidences that the Chinese had at one time a tendency to a nomadic rather than to an agricultural state of existence. In the *Book of Historical Documents* the governors of the province are called "pastors" and "herdsmen," and Mencius speaks of princes generally as "pastors of men." It is impossible also to overlook the identity of outline between the Chinese house and the sweeping roof supported by poles of the Tatar tent; and it is said that when Jengiz Khan in his invasion of China took a city, his soldiers immediately set about pulling down the four walls of the houses, leaving the overhanging roofs supported by the wooden columns,—by which process they converted them into excellent tents for themselves and their horses. To some extent it may be said, too, that the language countenances this belief, since many common words find their expression in characters of which the hieroglyphics for sheep and cattle form part. For instance, we find that the character 義, meaning truthfulness, uprightness, is composed of the two parts, 羊 and 我, or "my sheep," thus apparently pointing to a time when the ownership of flocks was a common cause of dispute; the same is the case also with the character 着, *cho*, "right," which is made up of 自, *Tsze*, "one's own," and 羊, *yang*, "sheep," and 詳, *Tszeang*, "to examine and judge clearly," which is composed of 言, *yen*, "words or talk," and 羊, "sheep," which would indicate that the first idea of a judicial examination arose out of wranglings about sheep. But notwithstanding these apparent evidences in favor of the Chinese having been originally a nomadic rather than an agricultural people, it becomes abundantly evident from the earliest records they possess that at all events, immediately on their arrival in China, they settled

down as agriculturists. They cultivated grain for their sustenance, and flax, which they wove into garments. They knew the value of silk-worms and planted the mulberry tree; they developed trade, and established fairs at certain centres in their districts. Neither were they destitute of the elements of intellectual culture. They had some knowledge of astronomy, and in all probability they brought with them an acquaintanceship with hieroglyphic writing; at all events, at a very early period, we hear of *E Yin* (1743–1710 B.C.), presenting a petition in writing to the king, and there is no surer ground for the belief that knotted cords were in use among them before writing was invented than there is for the legend, that the forms of the characters were first suggested to Tsang-Kĕĕ by the marks on the back of a tortoise.

The possession of these habits and acquirements gave the immigrants a great advantage over the nations of the land. As they advanced they found the country inhabited by "fiery dogs" on the north, "great bowmen" in the east, "the ungovernable vermin" on the south, and the "mounted warriors" on the west. Differing in language, as also in every other respect, from the invaders, these tribes became their natural enemies, but they were unable to stand against the "black-haired race." During the first centuries after the establishment of a regular system of government we hear of them now as common enemies of the Chinese, and now as temporary allies of one or another of the states into which the growing kingdom was divided. But by degrees they drop out of the history of the empire. Step by step they were driven back into the less inhabited parts; whole tribes were transported, others were annihilated, until but a small remnant was left. These wanderers sought and found refuge from their enemies in the mountainous regions of Kwei-chow and Kwang-se, where their descendants, the Meaou-tsze, still maintain themselves against the forces of China.

It was an ancient belief of Chinese writers that there had existed a period of 2,267,000 and odd years between the time when the powers of Heaven and Earth first united to produce man as the possessor of the soil of China, and the time of Confucius. This having been accepted as a fact, it became necessary for the early historians to invent long lines of dynastic rulers to fill up the gap between the creation and the period with which the *Book of Historical Documents* commences. Accordingly, we find a series of ten epochs described as preceding the Chow dynasty. The events connected with most of these are purely fabulous, and it is not until we come down to the eighth period that we can trace any glimmer, however obscured, of history. This, we are told, commenced with the reign of Yew-chaou She (the Nest-having), who, if such a man ever existed, was probably one of the first of those who, as the immigrants increased and multiplied, was chosen to direct their counsels and to lead their armies. This chief induced them to settle within the bend of the Yellow River, the site of the modern province of Shan-se, and taught them to make huts of the boughs of trees. Under the next chief, Suy-jin She (the Fire-producer), the grand discovery of fire was effected by the accidental friction of two pieces of dry wood. He taught the people to look up to *Teen*, the great creating, preserving, and destroying power; and he invented a method of registering time and events, by making certain knots on thongs or cords twisted out of the bark of trees. Next to him followed Yung-ching She, and then Fuh-he, who separated the people into classes or tribes, giving to each a particular name, discovered iron, appointed certain days to show their gratitude to heaven, by offering the first-fruits of the earth, and invented the eight diagrams which serve as the foundation of the Yĭh-king. Fuh-he reigned 115 years, and his tomb is shown at Chin-choo, in the province of Shen-se, at this day. His successor, Chin-nung, invented the plough; and from that moment the civilization of China proceeded by rapid and progressive steps.

As the early history of every ancient people is more or less vitiated by fable, we ought not to be more fastidious or less indulgent towards the marvellous in that of China than we are towards Egyptian, Greek, or Roman history. The main facts may be true, though the details are incorrect; and though the accidental discovery of fire may not have happened under Suy-jin She, yet it probably was first communicated by the friction of two sticks, which at this day is a common method among almost all savages of producing fire. Nor is it, perhaps, strictly correct that Fuh-he made the accidental discovery of iron, by having burnt a quantity of wood on a brown earth, any more than that the Phœnicians discovered the mode of making glass by burning green wood on sand; yet it is not improbable that some such processes first led to these discoveries. And if it be objected against the history, that the reign of 115 years exceeds the usual period of human existence, this, after all, is as nothing when compared with the contemporaneous ones recorded in Biblical history. Thus, also, considerable allowances are to be deducted from the scientific discoveries of Chin-nung in botany, when we read of his having in one day discovered no less than seventy different species of plants that were of a poisonous nature, and seventy others that were antidotes against their baneful effects.

The next sovereign, Hwang-te, was a usurper; but during his reign the Chinese are stated to have made a very rapid progress in the arts and conveniences of civilized life; and to his lady, Se-ling-she, is ascribed the honor of having first observed the silk produced by the worms, of having unravelled their cocoons, and of having worked the fine filaments into a web of cloth. The tomb of Hwang-te is also preserved to this day in the province of Shen-se.

But with the reign of Yaou (2356 B.C.) we emerge to some extent from the mist which hangs over the earlier records of China. Here Confucius takes up the strain, and though his narrative will not bear criticism it yet furnishes us with some historical data. The character of Yaou and his successor Shun have been the theme of every writer on history from the time of Confucius downwards. So strong was the force of the examples they set that virtue pervaded the land, crime was unknown, and the nation increased in size and prosperity. During the reign of Yaou the empire extended from 23° to 40° N. lat., and from the 6th degree of longitude west from Peking to the 10th degree east. He established his capital at Ke-choo in Shan-tung, and established marts and fairs throughout the land. After his death he was succeeded by Shun, who for some years had shared with him the responsibilities of government. It was during this period that the "Great" Yu was employed to drain off the waters of the flood which had visited the north of China in consequence, probably, of one of the numerous changes in the course of the Yellow River. This work he accomplished after having expended nine years' labor upon it, and as a reward for this and other services he was raised to the throne on the death of Shun. After him succeeded a number of rulers, each one less qualified to govern than the last, until one Kĕĕ (1818 B.C.) ascended the throne. In this man were combined all the worst vices of kings. He was licentious, cruel, faithless, and dissolute. From such a one Heaven withdrew her protection. The people rose against him, and having swept away all traces of him and his bloody house, they proclaimed the commencement of a new dynasty, to be called the Shang dynasty, and their leader, Tang, they named the first emperor of the new line (1766 B.C.). Aided by wise counsellors, this monarch restored to the country some of its former prosperity. But the same fatality which attended the descendants of Yu overtook also his successors. They became self-indulgent and effeminate. They lost all hold on the affections of their people, so that when Chow, aided and abetted by his consort Ta-ke, gave vent to passions of a more than usually cruel and debased nature, they revolted, and Woo-Wang ascended the throne as the first emperor of the Chow dynasty. Woo-Wang was all that tradition represents the founders of dynasties to have been. He was brave, talented, and virtuous, but he committed the mistake of dividing his kingdom into seventy-two feudal states in order that he might bestow principalities on his own relations and the descendants of former emperors. The fatal result of this subdivision soon became obvious. Jealousies sprang up among the princes, internecine wars raged unceasingly, and the allegiance of the feudatories to the central authority became daily weakened. Nor were the enemies of the empire confined to those within its borders, for, during the reign of Muh Wang (936 B.C.) we are told that the Tatars, of whom we now hear for the first time, taking advantage of the confusion which reigned within the limits of the empire, made predatory incursions into the states, and though they were invariably driven off, yet from this time they remained a constant source of dan-

ger and annoyance to the Chinese. Such was the state of the empire, distracted by internal wars and harassed by the attacks of a foreign foe, when Confucius was born (551 B.C.), and though the sage devoted his life to the promulgation of virtue and the right principles of government, little or no heed was at the time paid to his remonstrances and exhortations, and he died (475 B.C.) in retirement, a neglected and disappointed man. Neither did the efforts of Laou-tsze, who was a few years senior to Confucius, or of Mencius, who succeeded him after an interval of 107 years, meet with any better success. Disorder was rife throughout the land, and the authority of the central Government was on the wane.

Signs now began to appear foreshadowing the fall of the dynasty. During the reign of Wei-lëĕ Wang, the brazen vessels upon which Yu had engraved the different provinces of the empire were observed to shake violently, and shortly afterwards a mountain fell across the stream of the Yellow River causing a wide-spread inundation. As the empire became weakened by internal dissensions so much the more did the power of the neighboring states increase. Of these the most important was that of Thsin, on the north-west, which, when it became evident that the kingdom of Chow must fall to pieces, took a prominent part in the wars undertaken by Tsoo on the south and Tsin on the north for the coveted prize. But the struggle was an unequal one. The superiority of Thsin in point of size, and in the number of fighting-men at its command, carried all before it, and in 255 B.C. Chaou-seang Wang, having silenced his rivals, possessed himself of the imperial states. Thus fell the Chow dynasty, during the existence of which the empire may have said to have been extended from the 33d to the 38th parallels of latitude, and from the 106th to the 119th degree of longitude, that is to say, it included the southern portions of the province of Chih-li, Shan-se, and Shen-se, the northern portions of Ho-nan and Keang-soo, and the western half of Shan-tung. The capital was fixed at Chang-gan Heen in Shen-se. But though virtually emperor, Chaou-seang Wang abstained from adopting the imperial title, and he died in 251 B.C., leaving his son Heaou-wăn Wang to succeed him. Scarcely was this sovereign seated on the throne when he was attacked with a fatal illness, and after a reign of but three days he became "a guest in heaven," and Chang-seang Wang his son reigned in his stead. The only title to fame possessed by this monarch was that he was the father of one of the greatest rulers China ever had. As he was himself a man of no mark, it was probably fortunate for the country that he occupied the throne for only three years, and at the end of that time (246 B.C.), he yielded up his earthly honors to Che Hwang-te, "the first universal emperor." This sovereign was but thirteen years of age when he ascended the throne, but young as he was he speedily made his influence everywhere felt. He chose Heen-yang, the modern Se-gan Foo, as his capital, and built there a magnificent palace, which was the wonder and admiration of his contemporaries. He constructed roads through the empire, he formed canals and erected numerous and handsome public buildings. Having by these and other means settled the internal affairs of his kingdom, he turned his attention to the enemies beyond his frontier. Chief among these were the Heung-noo Tatars, whose attacks had for years kept the Chinese and neighboring principalities in a state of disquiet. Against these foes he marched with an army of 300,000 men and completely routed them, exterminating those in the neighborhood of China, and driving the rest into the mountains of Mongolia. He had no sooner returned from this campaign than he was called upon to face a formidable rebellion in Ho-nan, which had been set on foot by the adherents of the feudal princes, all of whom he had dispossessed when he reconstructed the empire on the monarchical principle. Against these rebels he was as successful as he had been against the Heung-noo, and as soon as peace was restored he marched southwards to subdue the tribes on the south of the Nan-shan ranges, that is to say the inhabitants of the modern provinces of Fuh-keen, Kwang-tung, and Kwang-se. Having accomplished this vast undertaking, he returned to his capital to administer the empire he had won, the limits of which were as nearly as possible those of modern China proper. One monument remains to the present day to bear witness to his enterprising energy. Finding that the northern states of Thsin, Chaou, and Yen were building lines of fortification along their northern frontier for protection against the incursions of the Heung-noo, he conceived the idea of building one gigantic wall, which was to stretch across the whole northern limit of the huge empire from the sea to the furthest western corner of the modern province of Kan-suh. This work was begun under his immediate supervision in 214 B.C., but though it was energetically proceeded with, he died before it was completed. Notwithstanding all that he had done for the country he was very unpopular with the upper classes. He was a reformer, and reformers were as distasteful to the Chinamen of that time as to those of to-day, and schoolmen and pedants were for ever holding up to the admiration of the people the heroes of the feudal times and the advantages of the system they administered. This doctrine was full of danger to the state, and Che Hwang-te therefore determined to break once and for all with the past. To this end he ordered the destruction of all books having reference to the past history of the empire. This decree was almost universally carried out, and many scholars were put to death for failing in obedience to it. The measure, however, widened the breach between the emperor and the upper classes, and when, on his death, in 210 B.C., his son Urh-she Hwang-te ascended the throne, the wide-spread discontent broke out into tumults. Taking advantage of the confusion which thus arose, the princes who had been dispossessed by Che Hwang-te again attempted to regain the thrones they had lost. Unlike his father, Urh-she Hwang-te was quite unable to grapple with troublous times. He was a weak and debauched youth, and was murdered after having offered a feeble resistance to his enemies. His son Tsze-yung thereupon surrendered himself to Lew Pang, one of the two generals, who at that time were the leaders of the rebellion. Unfortunately, however, he afterwards fell into the hands of Heang Yu, the other chieftain, who was as blood-thirsty as Lew Pang was merciful, and who instantly put him to death along with all his family and associates. The rivalry between these two chieftains broke out into open warfare almost immediately after this event, on Heang Yu usurping to himself imperial honors. For five years war raged between the two combatants, and at the end of that time Lew Pang was left master of the field after a decisive battle before Woo-keang, in which Heang Yu was slain. Lew Pang was then proclaimed emperor (206 B.C.) under the title of Kaou-te, and the new line was styled the Han dynasty.

On ascending the throne Kaou-te established his capital at Lo-yang in Ho-nan, and afterwards removed it to Chang-gan in Shen-se. Having founded his right to rebel on the oppressive nature of the laws promulgated by Che Hwang-te, he abolished the ordinance of Thsin, with the exception of that referring to the destruction of the books—for, like his great predecessor, he dreaded the influence exercised by the *Literati*—and he exchanged the worship of the gods of the soil of Thsin for that of those of Han, his native state. His successor, however, gave every encouragement to literature, and appointed a commission to restore as far as possible the texts which had been destroyed by Che Hwang-te. In this the commission was very successful. It was discovered that in many cases the law had been evaded, and numerous books which had ceased to have any corporeal being were found to exist on the tablets of the memories of scholars. This new period of literary activity added to the general prosperity of the empire. There was peace within its borders, and its frontiers remained unchallenged, except occasionally by the Heung-noo, who suffered many and severe defeats at the hands of the Chinese generals. Thwarted, therefore, in their attacks on China, these incorrigible marauders turned their attention to the kingdom of Yuĕ-che, which had grown up in the western extremity of Shen-se, and after much fighting drove their victims along the Teen-shan nan-loo to modern Western Tartary, that is to say, the territory between Turkestan and the Caspian Sea. This position of affairs suggested to the emperor the idea of forming an offensive and defensive alliance with the Yuĕ-che against the Heung-noo. With this object an ambassador was sent to Western Tartary, who, after having been twice imprisoned by the Heung-noo, returned with no more beneficial result than that his embassy was the means of introducing silk into Europe. However, in 121 B.C., the reigning emperor, Woo-te, sent an

expedition against the Heung-noo, and completely defeated them. The conquered people tendered their submission to the victors, and the Chinese established colonies, built towns, and appointed governors in the vanquished provinces. From this time the power of the Heung-noo began to wane. Dissension broke out among their different chieftains, and in 93 A.D. they were completely driven out of Eastern Asia, and the 3d century witnessed their flight into the district north-east of the Caspian Sea, now occupied by the Kirghese, a broken and impotent remnant. Few Chinese dynasties have lasted much more than two centuries, and the first Han dynasty was no exception to the rule. About the beginning of the Christian era a notable rebel, one Wang Mang, rose in revolt against the infant successor of Ping-te (1 A.D.), and in 9 A.D. proclaimed himself emperor. He, however, at best only gained the suffrages of a portion of the nation, and before long his oppressive acts estranged even these supporters from him. In 23 A.D. Lew Sew headed a formidable rising against him and completely defeated him. He was destined, however, to die by the hands of his followers. In a revolt of his remaining troops his head was struck from his shoulders, and his body was torn in pieces by his own soldiery.

His opponent, Lew Sew, was now proclaimed emperor under the title of Kwang-woo-te, and in consequence of his fixing on Lo-yang in Ho-nan as his capital, the line of which he was the first emperor became known as the Eastern Han dynasty. Within this period are embraced some of the most remarkable events in the history of China. During the reign of his successor Ming-te, 65 A.D., Buddhism was introduced from India into China, and about the same time the celebrated General Pan Chaou was sent on an embassy to the king of Shen-shen, a small state of Turkestan, near the modern Pidjan. So successful was he in his mission, that before long he added the states of Shen-shen, Khoten, Kuché, and Kashgar as apanages to the Chinese crown. But in accordance with precedent, after a time the glory of the dynasty became dimmed. Disturbances occurred in the provinces, and, in 173, a virulent pestilence broke out which held possession of the country for eleven years. A magical cure for this plague was said to have been discovered by a Taouist priest named Chang Keo, who made so good a use of his discovery that in a single month he had gained a sufficiently large following to enable him to gain possession of the northern provinces of the empire. He was, however, opposed and defeated by Tsaou Tsaou, another aspirant to imperial honors, whose son, Tsaou Pei, on the death of Heen-te (220 A.D.), proclaimed himself emperor, adopting the title of Wei as the appellation of his dynasty. But at the same time there were two other Richmonds in the field, Lew Pei and Sam Keuen, and the strength of these three adventurers was so nearly equal that they agreed to divide the empire between them. Tsaou Pei, under the title of Wăn-te, ruled over the kingdom of Wei (220), which occupied the whole of the central and northern portion of China. Lew Pei established the Shuh Han dynasty in the modern province of Sze-chuen (221), and called himself Chaou-lĕĕ-te; and to Sun Keuen Khan fell the southern provinces of the empire, from the Yang-tsze Keang southwards, including the modern Tonquin, which he formed into the kingdom of Woo with Nan-king for his capital, and adopted for himself the imperial style of Ta-te (222 A.D.).

But China during the period of the "Three Kingdoms" was a house divided against itself. Rivalries, the seeds of which had been sown at the time of the partition of territory, broke out more fiercely as soon as the courts were established. Lew Pei, as a descendant of the house of Han, looked upon himself as the rightful sovereign of the whole empire, and he despatched an army under the command of the celebrated general Choo-ko Leang to support his claims. This army was met by an opposing force under the Wei commander Sze-ma E, of whom Chinese historians say that "he led armies like a god," and who, by adopting a Fabian policy, completely discomfited his adversary. But the close of this campaign brought no peace to the country. Wars became chronic, and by degrees the reins of power slipped out of the hands of emperors into those of their generals. Foremost among these were the members of the Sze-ma family of Wei. Sze-ma E left a son, Sze-ma Chaou, scarcely less distinguished than he was himself, and when Sze-ma Chaou was gathered to his fathers his honors descended to Sze-ma Yen, who, finding the country ripe for a change, deposed the ruling sovereign of Wei, and proclaimed himself emperor of China (265 A.D.). His dynasty he styled the Western Tsin dynasty, and he adopted for himself the title of Woo-te. The most noticeable event in this reign was the advent of the ambassadors of the Emperor Theodosius in 284. For some years the neighboring states appear to have transferred their allegiance from the House of Wei to that of Tsin. But the condition of China at this time was such that no government could stand unless administered by an able and powerful chief. Woo-te's successors failing to fulfil these conditions, the country soon fell again into disorder. The Heung-noo, encouraged by the decadence of the Chinese power, renewed incursions into the empire at the beginning of the 4th century, and in the confusion which followed on these attacks from without as well as those that were distracting the country from within, an adventurer named Lew Yuen established himself (in 311) as emperor, first at Ping-yang in Shan-se and afterwards in Lo-yang and Chang-gan. The history of this period is very chaotic. Numerous states sprung up into existence, some founded by the Heung-noo, and others by the Seen-pe tribe, a Tungusic clan inhabiting a territory to the north of China, and who afterwards established the Leaou dynasty in China. The hand of every man was against his neighbor. Nothing was lasting; and in 419 the Eastern Tsin dynasty, which had dragged on a chequered existence for nearly a century, came to an end, and with it disappeared for close on two hundred years all semblance of united authority. The country became divided in two parts, the north and the south. In the north four families reigned successively, two of which were of Seen-pe origin, viz., the Wei and the How Chow, the other two, the Pih Tse and the How Leang, being Chinese. In the south five different houses supplied rulers, who were all of Chinese descent.

This period of disorder was brought to a close by the establishment of the Suy dynasty (590). Among the officials of the ephemeral dynasty of Chow was one Yang Keen, who on his daughter becoming empress (578) was created duke of Suy. Meanwhile, he waited for an opportunity to overturn the reigning house, and as has so often happened in the history of China, he had not long to wait. The last of the house of Chin was as weak and profligate as any of his predecessors. Him Yang Keen deposed and immediately ascended the throne (590). The country, weary of contention, was only too glad to acknowledge his undivided authority; and during the sixteen years of his reign the internal affairs of China were comparatively peaceably and prosperously administered. The emperor instituted a new and improved code of laws, and showed his respect for literature by adding 5000 volumes to the 10,000 which composed the imperial library. Abroad, his policy was equally successful. He defeated the Tatars and chastised the Coreans, who were disposed to throw aside his authority. The only scene of disorder was in his own household. His sons were unruly and violent, and after his death, in 604, his second son forced the heir to the throne to strangle himself, and then instantly assumed the imperial yellow. At first this usurper, Yang-te, gave himself up to every species of debauchery, but wearying of sensual lusts, he was seized with a desire for conquest. He sent expeditions against the Tatars, and regained some of the influence which had formerly belonged to China in Central Asia. He himself headed an expedition against the Ouigours at the same time that one of his generals annexed the Lew Kew Island to the imperial crown. During his reign the volumes in the imperial library were increased to 54,000, and he spent vast sums in erecting a magnificent palace at Lo-yang, and in constructing unprofitable canals. These and other extravagances laid so heavy a burden on the country that discontent began again to prevail, and on the emperor's return from a successful expedition against the Coreans, he found the empire divided into rebellious factions. In the turmoil which followed General Le Yuen rose to the surface, and on the death of the emperor by assassination this man set Kung-te, the rightful heir, on the throne (617) until such time as he should have matured his schemes. In the following year a dose of poison vacated the throne, and Le Yuen forthwith assumed the imperial sceptre, and

proclaimed himself as Tai-tsung the first emperor of the Tang dynasty. At this time the Turks were at the height of their power in Asia, and Tai-tsung was glad to purchase their alliance with money as the Emperor Justinian had been in 558. But divisions weakened the power of this mighty horde, and Tai-tsung, taking advantage of the opportunity, regained much of the position in Central Asia which had formerly been held by China. In 640, Hamil, Turfan, and the rest of the Ouigour territory were again included within the Chinese frontier, and four military governorships were appointed in Central Asia, viz., at Kuché, Khoten, Kharastan, and Kashgar. At the same time the frontier was extended as far as Eastern Persia and the Caspian Sea. So great was now the fame of China, that ambassadors from Nepaul, Magadha, Persia, and Rome (643) came to pay their court to the Great Khan. Before this time, in 635, a Nestorian priest, O-lo-peen by name, arrived from Rome, who so ingratiated himself with the emperor that he built for him a church, and appointed twenty priests to perform the services. Subsequently, on the death of Tai-tsung (649), we find the strange phenomenon of the imperial power seized upon by a woman in a country where women were regarded as little else than slaves. On the accession of Kaou-tsung (650) his wife, Woo How, gained supreme influence in the management of affairs, and on the death of her husband in 683 she set aside his lawful successor, Chung-tsung, and took possession of the throne. Nor was she unequal to the office she had usurped. She governed the empire with discretion, and her armies defeated the Tibetans, who had latterly gained possession of Kuché, Khoten, and Kashgar. Thus she re-established the imperial government in the west, and her generals proved themselves victorious over the Khitan in the north-east. On her death, in 705, Chung-tsung partially left the obscurity in which he had lived during his mother's reign. But his wife, desiring to play a similar *rôle* to that enjoyed by her mother-in-law, poisoned him and set his son, Juy-tsung (710), on the throne. This monarch, who was weak and vicious, reigned but three years, and was succeeded by Yuen-tsung (713), who was in some respects an enlightened and able prince. He busied himself with introducing reform into the administration of the empire, and encouraged literature and learning with wisdom and discretion. During his reign the king of Khokand applied to him for aid against the Tibetans and Arabs, who were advancing to attack him. Yuen-tsung promptly sent an army to his succor, and the aggressors were completely defeated. In a war with the Khitans in the north-east he was not so successful; and in the disorder which arose in consequence of the invasion of the northern provinces by these formidable neighbors, General Gan Luh-shan, an officer of Turkish descent, placed himself at the head of a revolt, and having secured Tung-kwan on the Yellow River, advanced on Chang-gan. In this emergency the emperor fled, and placed his son, Suh-tsung, on the throne (756). This sovereign summoned to his aid the forces of the kings of Khoten and Khokand, of the state of Bokhara, of the Ouigours, and of the Arabs, and with these allies he completely defeated Gan Luh-shan and suppressed the rebellion. The promise held out by this energetic beginning of his reign was not fulfilled by his later career. He fell under the influence of the women and eunuchs of his harem, and died unregretted in 762. During the following reigns the Tibetans made constant incursions into the western provinces of the empire, and Tai-tsung (763–780) was compelled to purchase the assistance of the Ouigours against those intruders by giving a Chinese princess as wife to the Khan. At this epoch the eunuchs of the palace succeeded in gaining an unwonted degree of power, and several of the subsequent emperors fell victims to their plots.

The history of this and the following century is for the most part a monotonous record of feeble Governments, low and vicious intrigues, oppressions, and rebellions. Almost the only relief in the constant rounds of these scenes towards the close of the Tang dynasty was the iconoclastic policy of Woo-tsung (841–847). Viewing the increase of monasteries and ecclesiastical establishments as an evil, he abolished all temples, closed the monasteries and nunneries, and sent the inmates back to their families. Foreign priests were subjected to the same repressive legislation, and Christians, Buddhists, and Magi were bidden to turn their faces westward in the direction of the places from whence they came. With his death terminated also this policy. Buddhism again revived during the reign of the Emperor E-tsung (860–874), who, having had the honor to discover a bone of Buddha, brought it to the capital in great state. By constant internal dissensions and outbreaks the empire became so weakened that the prince of Leang found no difficulty in gaining possession of the throne, and in 907 he assumed the imperial yellow with the title of Tai-tsoo, the first emperor of the later Leang dynasty. Thus ended the Tang dynasty, which is regarded as being the Golden Age of literature.

Five dynasties, viz., the Later Leang, the Later Tang, the Later Tsin, the Later Han, and the Later Chow, followed each other in quick succession between the years 907 and 960. But though the monarchs of these lines nominally held sway over the empire, their real power was confined to very narrow limits. The disorders which were rife during the time when the Tang dynasty was tottering to its fall fostered the development of independent states, and so arose Leang in Ho-nan and Shan-tung, Ke in Shen-se, Hwai-nan in Keang-nan, Chow in Sze-chuen and parts of Shen-se and Hoo-kwang, Woo-yuĕ in Chĕ-keang, Tsoo and King-nan in Hoo-kwang, Ling-nan in Kwang-tung, and the Ouigours in Tangout.

A partial end was made to this recognized disorganization when, in 960, General Chaou Kwang-yin was proclaimed by acclamation of the army emperor in succession to the youthful Kung-te, who was compelled to vacate the throne to make way for his quondam lieutenant. The circumstances of the time justified the exchange. It required a strong hand to weld together again the different parts into which the empire had been divided, and to resist the attacks of the Khitan Tatars, whose rule at this period extended over the whole of Manchuria and Leaou-tung. Against these aggressive neighbors Tai-tsoo *né* Chaou Kwang-yin directed his best efforts with varying success, and he died in 976, while the war was still being waged. His son Tai-tsung (976–997) entered on the campaign with energy, but in the end was compelled to conclude a peace with the Khitans. His successor, Chin-tsung (997–1022), descended a step lower in his dealings with them, and agreed to pay them a tribute to induce them to abstain from their incursions. Probably this tribute was not sent regularly; at all events, under Jin-tsung (1023–1064), the Khitans again threatened to invade the empire, and were only persuaded to forego their intention by the emperor promising to pay them an annual tribute of 200,000 taels of silver, besides a great quantity of silken piece goods. Neither was this arrangement long binding, and so formidable were the advances made by the Tatars in the next and following reign, that Hwuy-tsung (1101–1126) invited the Neu-che Tatars to expel the Khitans from Leaou-tung. The call was readily responded to; the service was effectually performed, but having once possessed themselves of the country they declined to yield it to the Chinese, and the result was that a still more aggressive neighbor was established on the north-eastern frontier of China. Without delay the Neu-che or Kins, as they now styled themselves, overran the provinces of Chih-li, Shen-se, Shan-se, and Ho-nan, and during the reign of Kaou-tsung (1127–1163) they advanced their conquests to the line of the Yang-tsze Keang.

It was during this period that the Mongols began to acquire power in Eastern Asia, and about the beginning of the 12th century they invaded the north-western frontier of China and the principality of Hea, which at that time consisted of the modern provinces of Shen-se and Kan-suh. To purchase the good-will of these subjects of Jenghiz Khan the king of Hea agreed to pay them a tribute, and gave a princess in marriage to their ruler. Hitherto the Mongols had been vassals of the Kin Tatars, but the rapid growth of their power indisposed them to remain tributaries of any monarch, and in consequence of a dispute with the Emperor Wei-chaou Wang, Jenghiz Khan determined to invade the Kin province of Leaou-tung. In this expedition he was aided by the followers of the Khitan leader Yay-lu Tsoo-tsai, and in alliance with this general he captured Leaou-yang the capital city. After an unsuccessful invasion of China in 1212, Jenghiz Khan renewed the attack in the following year and completely defeated the Kins. In the confusion which followed the emperor was murdered by his generals, and Seuen-tsung ascended

the throne. But the change of ruler brought no better fortune to the Kin cause. Jenghiz Khan divided his armies into four divisions, and made a general advance southwards. With resistless force his soldiers swept over the provinces of Ho-nan, Chih-li, and Shan-tung, destroying in their course upwards of ninety cities, and spreading desolation everywhere. It was their boast that a horseman might ride without stumbling over the sites where those cities had stood. Panic-stricken by the danger which threatened him, the emperor moved his court to Kai-fung Foo, much against the advice of his ministers, who foresaw the disastrous effect this retreat would have on the fortunes of Kin. And now, as foes advanced, friends fell off from the tottering house. The state of Sung, which up to this time had paid tribute, now declined to recognize Kin as its feudal chief, and a short time afterwards declared war against its quondam ally. Meanwhile, in 1215, Yay-lu Tsoo-tsai advanced into China by the Shan-hai Kwan, and made himself master of Peking, which until then was one of the few cities in Chih-li which remained to Kin. After this victory his nobles wished him to proclaim himself emperor, but he refused, being mindful of an oath which he had sworn to Jenghiz Khan. In 1216 Tung-kwan, a pass in the mountains between the frontier of Ho-nan and Shen-se, which in the history of China has been the scene of numerous dynastic battles, forming as it does the only gateway between Eastern and Western China, was taken by the invaders. Year after year the war dragged on, the resistance offered by the Kins growing weaker and weaker. In 1220 Tse-nan Foo the capital of Shan-tung was taken, and five years later Jenghiz Khan marched an army westward into Hea and completely conquered the forces of the king; but it was not until the year following the king's death that he took possession of the principality. In the succeeding year Jenghiz Khan himself was gathered to his fathers, and Ogdai his son reigned in his stead.

Thus died at the age of 66 this great general, whose armies had triumphed victoriously over the whole of Central Asia, from the Caspian Sea and the Indus to Corea and the Yang-tsze Keang. With his dying breath he adjured his son to complete the conquest of China, and with a view to this, the crowning desire of his life, he declined to nominate either of the two eldest sons who had been born to his Chinese wives as his heir, but chose rather his third son Ogdai whose mother was a Tatar. On hearing of the death of Jenghiz Khan the Kins sent an embassy to his successor desiring peace, but Ogdai, remembering the last injunctions of his father, told them there would be no peace for them until their dynasty should be overthrown. Up to this time the Mongols had been without any code of law. The old rule,

> "That they should take who have the power,
> And they should keep who can,"

was the maxim on which they guided their mutual intercourse, and the punishments due for offences were left entirely to the discretion of the officials before whom the culprits were tried. The consistency, however, which had been given to the nation by the conquests of Jenghiz Khan made it necessary to establish a recognized code of laws, and one of the first acts of Ogdai was to form such a code. With the help also of Yay-lu Tsoo-tsai, he established custom houses in Chih-li, Shan-tung, Shan-se, and Leaou-tung; and for this purpose divided these provinces into ten departments. Meanwhile the war with the Kins was carried on with energy. In 1230 Se-gan Foo was taken, and sixty important posts were captured. Two years later Too-le, brother of Ogdai, took Fung-tseang Foo and Han-chung Foo, in the flight from which last-named place 100,000 persons are said to have perished. Following the course of the River Han in his victorious career this general destroyed 140 towns and fortresses, and defeated the army of Kin at Mount San-fung.

In the following year the Mongol cause suffered a great loss by the death of Too-le. This famous warrior left behind him twelve sons, two of whom, Mangu, the first-born, and Kublai, the fourth son, were destined to sit in succession on the throne of their uncle Ogdai. But their time was not yet. First of all they had to win their spurs, and well did they prove by their deeds their right to the name of Mongol or "daring." In China, in Central Asia, and on the banks of the Caspian they led their victorious armies. But meanwhile, in 1232, the Mongols made an alliance with the state of Sung, by which, on condition of Sung helping to destroy Kin, Ho-nan was to be the property of Sung for ever. The effect of this coalition soon became apparent. Barely had the Kin emperor retreated from Kai-fung Foo to Joo-ning Foo in Ho-nan when the former place fell into the hands of the allies. Next fell Loyang, and the victorious generals then marched on to besiege Joo-ning Foo. The presence of the emperor gave energy to the defenders, and they held out till every animal in the city had been killed for food, until every old and useless person had suffered death to lessen the number of hungry mouths, until so many able-bodied men had fallen by the hand of the enemy that the women manned the ramparts, and then the allies stormed the walls. Once inside the town the inhabitants, enfeebled by starvation, fell ready victims to their swords. The emperor, like another Sardanapalus, despairing now of success, burned himself to death in his palace, that his body might not fall into the hands of his enemies. For a few days the shadow of the imperial crown rested on the head of his heir Changlin, but in a tumult which broke out amongst his followers he lost his life, and with him ended the "Golden" dynasty, which from that time disappeared from the country's annals until the Manchoo family now reigning came, nearly four centuries later, to claim the throne as heirs of the defender of Joo-ning Foo.

Although China was still by no means conquered, yet the extinction of the Kin dynasty enabled Ogdai to send an army of 300,000 men to ravage the country bordering on the Caspian Sea. But so vast were the resources at his command, that he was able to despatch at the same time a force 600,000 strong into Sze-chuen to subdue the power of Sung in that province. For, notwithstanding the treaty which had been made between Ogdai and Sung, no sooner were the spoils of Kin to be divided than fierce war broke out again between them, in prosecuting which the Mongol armies swept over the provinces of Hoo-kwang, Keang-nan, and Ho-nan, and were checked only when they reached the walls of Loo-chow Foo in Gan-hwuy. Ogdai was not destined to live to see his sway acknowledged over the whole empire. In 1241, he died at the age of fifty-six, having reigned thirteen years, and was nominally succeeded by his grandson Cheliemen. But among the numerous ladies who called Ogdai lord, was one named Toliekona, who on the death of the emperor took possession of the throne, and after exercising rule for four years, established her son Kwei-yew, as Great Khan. But in 1248 his life was cut short, and the nobles, disregarding the claims of Cheliemen, proclaimed as emperor Mangu, the eldest son of Too-le. Under this monarch the war against Sung was carried on with energy, and Kublai, outstripping the bounds of Sung territory, made his way into the province of Yun-nan, which at that time was divided into a number of independent states, and having attached them to his brother's crown he passed on into Tibet, Tonquin, and Cochin-China, and from thence striking northwards entered the province of Kwang-se. On the death of Mangu in 1259 Kublai ascended the throne, and never in the history of China was the nation more illustrious, nor its power more widely felt, than under his sovereignty. During the first twenty years of his reign Sung kept up a resistance, gradually growing weaker and weaker, against his authority; and it was not, therefore, until 1280 that he assumed complete jurisdiction as emperor of China. At this time his authority was acknowledged "from the Frozen Sea, almost to the Straits of Malacca. With the exception of Hindustan, Arabia, and the westernmost parts of Asia, all the Mongol princes as far as the Dnieper declared themselves his vassals, and brought regularly their tribute." It was during this reign that Marco Polo visited China, and he described in glowing colors the virtues and glories of the "Great Khan." But though his rule was characterized by discretion and munificence, his Chinese subjects were uneasy under his yoke. He undertook public works, he patronized literature, and relieved the distress of the poor, but still they never forgot that he was an alien and a barbarian, and he died unregretted in 1294. His son had died during his lifetime, and after some contention his grandson Timur ascended the throne under the title of Yuen-ching. After an uneventful reign this prince was gathered to his fathers in 1307, and as he left no son, Woo-tsung, a Mongol prince, reigned in his stead. To him, succeeded Jin-tsung in 1311, who made himself con-

spicuous by the honor he showed to the memory of Confucius, and by distributing offices more equally between Mongols and Chinese than had hitherto been done. This act of justice gave great satisfaction to the Chinese, and his death ended a peaceful and prosperous reign in 1320. Three years later,—three years of disorder,—his successor, Ying-tsung, was murdered by a band of conspirators. From this time the star of the Yuen dynasty was in the descendant. Tai-ting-te, Ming-tsung, Wăn-te, and Shun-te followed one another on the throne in quick succession. Each reign was more troublous than the last, and in the person of Shun-te (1333–1368) were summed up all the vices and faults of his predecessors. Outbreaks, which up to his time had been local in their character, assumed large and threatening proportions; and finally this descendant of Jenghiz Khan was compelled to fly from his capital before Choo Yuen-chang, the son of a Chinese laboring man. Deserted by his followers, he sought refuge in Ying-chang Foo, and there the last of the Yuen dynasty died. So disunited had the empire become by constant disturbances and rebellions, that Choo Yuen-chang met with little opposition to his forces, more especially as his first care on becoming possessed of a district was to suppress lawlessness and to establish a settled government. In 1355 he crossed the Yang-tsze Keang and captured Nan-king, in consequence of which success he proclaimed himself duke of Woo, but as yet he carefully avoided adopting any of the insignia of royalty. Even when he had taken the capital and was the master of the empire thirteen years later, he still professed to dislike the idea of assuming the imperial title. His scruples, however, on this point were overcome, and he solemnly declared himself emperor in 1368. Once seated upon the throne, he ingratiated himself with his subjects by his generous treatment of his enemies, and by the regard he showed for the welfare of his people. He carried his arms into Tatary, where he subdued the last semblance of Mongol power in that direction, and then bent his steps towards Leaou-tung. Here the Mongols defended themselves with the bravery of despair, but nothing could resist the onslaught of the victorious Chinese, and the conquest of this province left Hung-woo, as the founder of the new or Ming, "Bright," dynasty styled himself, without a foe in the empire. Beyond the frontier of China he cultivated friendly relations with the rulers of the neighboring states. The king of Corea sent an embassy to congratulate him on his accession, and the sovereign of the Lew-chew Islands sent his brothers and sons to his court to be educated. As a quondam Buddhist priest he naturally lent his countenance to that religion to the exclusion of Taouism, whose priests had for centuries earned the contempt of all but the most ignorant by their pretended magical arts and their search after the philosopher's stone. In 1398, and in the thirtieth year of his reign, Hung-woo was gathered to his fathers, and Keen-wăn his grandson reigned in his stead. Aware that the appointment of this youth—his father was dead—would give offence to the young emperor's uncles, Hung-woo dismissed them to their respective governments before death closed his eyes. This, however, only delayed the storm. The prince of Yen, his eldest surviving son, raised the banner of rebellion in his principality as soon as the news reached him of his nephew's accession, and after gaining several victories over the armies of Keen-wăn he presented himself before the gates of Nanking, the capital. Treachery opened the gates to him, and the emperor having fled in the disguise of a monk, the victorious prince clothed himself in imperial yellow and took the title of Yung-lo (1403). At home Yung-lo devoted himself to the encouragement of literature and the fine arts, and, possibly from a knowledge that Keen-wăn was among the Buddhist priests, he renewed the law prohibiting Buddhism. Abroad he swept Cochin-China and Tonquin within the folds of his empire and carried his arms into Tatary, where he made new conquests of waste regions, and erected a monument of his victories. His death took place in 1425, and he was in that year succeeded by his son Hung-ke.

Hung-ke's reign was short and uneventful. He did that which was right as far as his knowledge went. He strove to promote only such mandarins as had proved themselves to be able and honest, and to further the welfare of the people. During the reign of his successor, Seuen-tĭh (1426–1436), the empire suffered the first loss of territory since the commencement of the dynasty. Cochin-China rebelled and gained her independence. But this was but the beginning of troubles. The next emperor, Ching-tung (1436), was defeated and taken prisoner by a Tatar chieftain, a descendant of the Yuen family named Ye-seen, who had invaded the northern provinces. With unusual clemency the Tatar gave him his life, though he kept him a close prisoner until the fortunes of war turned against him. Having been completely defeated by a Chinese force from Leaou-tung, Ye-seen liberated his captive, who returned to his capital amidst the rejoicings of the people, again to occupy the throne which during his imprisonment (1450–1457) had been held by his brother King-te. The two following reigns, those of Ching-hwa (1465–1488) and of Hung-che (1488–1506) were quiet and peaceful. But their successor Ching-tĭh (1506–1522) was called upon to face a very formidable insurrection headed by the prince of Ning. He was, however, victorious over the rebel, who lost 30,000 men in the engagement which put an end to his hopes. The disorder into which the empire had been thrown by this civil war encouraged the foreign enemies of China. First of all from the dreaded north came a Tatar army under Yen-ta in 1542, during the reign of Kea-tsing, which laid waste the province of Shen-se, and even threatened the capital, and a little later a Japanese fleet appeared off the coast and carried fire and sword through the littoral provinces. Ill-blood had arisen between the two peoples before this, and a Japanese colony had been driven out of Ningpo by force and not without bloodshed a few years previously. Kea-tsing was not equal to such emergencies, and his death, which took place in 1567, would have been an advantage to the empire, had his son been a more able prince. But the only weapon Lung-king (1567–1573) was able to wield against the Tatar Yen-ta was a bribe. He made him a prince of the empire, and gave him certain commercial privileges, which were further supplemented by the succeeding emperor Wan-leĭh (1573–1620) by a grant of land in Shen-se. During the reign of this sovereign, in the year 1592, the Japanese successfully invaded Corea, and Taikosama, the emperor of Japan, was on the point of proclaiming himself king of the peninsula, when a large Chinese force answering to the invitation of the king, appeared on the field and completely routed the Japanese army, at the same time that the Chinese fleet cut off their retreat by sea. In this extremity the Japanese sued for peace, and sent an embassy to Peking to arrange terms. But the peace was of short duration. In 1597 the Japanese again invaded Corea and defeated the Chinese army which was sent against them, nor were they less successful at sea. They destroyed the Chinese fleet and ravaged the coast. Suddenly, however, when in the full tide of conquest, they evacuated Corea, which again fell under the direction of China. Four years later Ricci arrived at the Chinese court; and though at first the emperor was inclined to send him out of the country, his abilities gradually won for him the esteem of the sovereign and his ministers, and he remained the scientific adviser of the court until his death in 1610. About this time the power which was destined to overthrow the Ming dynasty began to grow restless. The Manchoo Tatars, goaded into war by the injustice they were constantly receiving at the hands of the Chinese, led an army into China in 1616 and completely defeated the force which was sent against them. Three years later they were again victorious over the Chinese, and they then gained possession of the province of Leaou-tung. This final series of disasters was more than the emperor could bear, and he died of a broken heart in 1620.

In the same year Teen-ning, the Manchoo sovereign, having declared himself independent, and possessed himself of Leaou-tung, moved the court to San-koo, to the east of Moukden, which, five years later, he made his capital. Meanwhile Tai-chang, the son of Wan-leĭh, ascended the Chinese throne, but barely had he assumed the reins of power when he fell ill. Acting on the advice of his doctors he drank of the liquor of immortality and died. The next emperor Teen-ke, after a brief and troublous reign, followed him to the grave in 1627, and to him succeeded Tsung-ching, the last emperor of the Ming dynasty. In his reign the storm-clouds, which had been collecting for some years, burst over the empire. In addition to the threatened danger on the north, rebel bands, enriched by plunder, and grown bold by success, began to assume the proportion of armies. They dominated over whole districts and prov-

inces and paralyzed the imperial forces by their energy and daring. Out of this seething mass of insubordination two leaders showed themselves conspicuously. These were Le Tsze-ching and Shang Ko-he. In order that there should be no dispute as to which should be greatest, they decided to divide the empire between them, and to begin with it was agreed that Shang should take possession of Sze-chuen and Hoo-kwang, and that Le should make himself master of Ho-nan. Bent on this mission Le besieged Kaifung Foo, the capital of the province, and so long and closely did he beleaguer it that in the consequent famine human flesh was regularly sold in the market. At length an imperial force came to raise the siege, with consequences as fatal to the inhabitants as if the rebels had gained the city; for, fearful of meeting Le's army in the field, they cut through the dykes of the Yellow River, "China's Sorrow," and flooded the whole country including the city. The rebels escaped to the mountains, but upwards of 200,000 inhabitants perished in the flood, and the city became a heap of ruins (1642). From Kaifung Foo Le marched against the other strongholds of Ho-nan and Shen-se, and was so completely successful that he determined to attack Peking. A treacherous eunuch opened the gates to him, on being informed of which the emperor committed suicide. When the news of this disaster reached the general-commanding on the frontier of Manchoo Tatary, he, in an unguarded moment, concluded a peace with the Manchoos, and invited them to dispossess the rebel Le Tsze-ching. With ready acquiescence the Manchoos entered China, and after defeating a rebel army sent against them, they marched towards Peking. On hearing of the approach of the invaders, Le Tsze-ching, after having set fire to the imperial palace, evacuated the city, but was overtaken, and his force was completely routed. The object for which the Manchoos had been introduced into the empire having now been accomplished, the Chinese wished them to retire, but, like the Mongols, having once gained a footing in the empire, they declared themselves unwilling to leave it, and having taken possession of Peking they proclaimed the ninth son of Teen-ning emperor of China under the title of Shun-che, and adopted the name of Ta-tsing, or "Great pure," for the dynasty (1644). Meanwhile the mandarins at Nanking had chosen an imperial prince to ascend the throne. But with all the prestige of victory the Tatars bore down all opposition, and at this most inopportune moment "a claimant" to the throne, in the person of a pretended son of the last emperor, appeared at court. This additional complication still further reduced the Chinese power of acting. While this contention prevailed inside Nanking the Tatar army appeared at the walls. But there was no need for them to use force. The gates were thrown open, and they took possession of the city without shedding a drop of blood. Following the conciliatory policy they had everywhere pursued, they confirmed the mandarins in their offices and granted a general amnesty to all who would lay down their arms. As the Tatars entered the city the emperor left it, and after wandering about for some days in great misery, he threw himself into the Yang-tsze Keang and was drowned. Thus ended the Ming dynasty, and the empire passed again under a foreign yoke.

All accounts agree in stating that the Manchoo conquerors are descendants of a branch of the family which gave the Kin dynasty to the north of China; and in lieu of any authentic account of their early history, native writers have thrown a cloud of fable over their origin. These tell us that in remote ages three heaven-born virgins dwelt beneath the shadow of the Great White Mountains, and that while they were bathing in a lake which reflected in its bosom the snow-clad peaks which towered above it, a magpie dropped a blood-red fruit on the clothes of the youngest. This the maiden instinctively devoured, and forthwith conceived and bore a son, whose name they called Ai-sin Ghioro, which being interpreted is the "Golden Family Stem," and which is the family name of the present emperors of China. When his mother had entered the icy cave of the dead, her son embarked on a little boat and floated down the River Hurka until he reached a district occupied by three families who were at war with each other. The personal appearance of the supernatural youth so impressed these warlike chiefs that they forgot their enmities and hailed him as their ruler. The town of O-to-le (43° 35′ N. lat. and 128° E. long.) was chosen as his capital, and from that day his people waxed fat, and at length, as we have seen, kicked against their oppressors, the Chinese.

This legend confirms the general belief that the original seat of the Manchoos was in the valley of the Hurka, a river which flows into the Sungari in about 46° 20′ N. lat., and 129° 50′ E. long. Under a succession of able and hardy chiefs they added land to land and tribe to tribe, until, in the 16th century, we find them able to cope with, and in a position to demand favorable terms by treaty from, their Chinese neighbors. As they became more powerful their complaints became louder against acts of aggressive oppression which they laid at the door of the Mings. But who will say that the fault was all on one side? Doubtless the Mings tried to check their ambition by cruel reprisals—a mistaken policy common to oppressors who find themselves with waning powers in the presence of growing discontent. But if we are to square the account, against this must be put numerous Manchoo raids into Leaou-tung, entailing loss of life and property on the subjects of China. And the ready rapidity with which these Manchurian horsemen swept round the corner of the Great Wall into China proper on the fatal invitation of the Chinese general shows that they were neither unwilling nor unaccustomed to wander beyond their own frontiers.

But the accession to the throne of the Emperor Shun-che did not by any means at first restore peace to the country. In Keang-se, Fuh-keen, Kwang-tung, and Kwang-se the adherents of the Ming dynasty defended themselves vigorously but unsuccessfully against the invaders, while the pirate Ching Che-tung, the father of the celebrated Koxinga, kept up a predatory warfare against them on the coast. On one occasion he was bought over to the Tatar camp and accepted a princess as a reward for his conversion, but he soon returned to his former allegiance, only, however, once again to prove himself a turn-coat. Finding him too formidable as a foe the Tatars determined again to gain his alliance. A general's command proved too tempting a bait to the buccaneer to be refused. He accepted the offer and went on shore to visit the Tatar commander, who received him with all civility. But when the pirate wished to return to his ships he was politely urged to visit Peking. Once there he was thrown into prison, where he died shortly afterwards. His son Koxinga, warned by his father's example, determined to leave the mainland and to seek an empire elsewhere. His choice fell on Formosa, and having driven the Dutch out of the island, he established himself as king and held possession of the island until the reign of Kang-he, when he resigned in favor of the Imperial Government. Meanwhile a prince of the house of Ming was proclaimed emperor in Kwang-se, under the title of Yung-leih. But the Tatars having reduced the provinces of Fuh-keen and Keang-se, and having taken Canton after a siege of eight months, marched against and so completely routed his followers that he was compelled to fly to Pegu. There he remained for some years until, believing that his adherents in Yun-nan and Kwei-chow were sufficiently numerous to justify his raising his standard in those provinces, he crossed the frontier and advanced to meet the imperial forces. On this as on the former occasion, fortune declared against him. His army was scattered to the four winds, and he was taken prisoner and strangled. Gradually opposition to the new regime became weaker and weaker, and the shaved head with the pig-tail—the symbol of Tatar sovereignty—became more and more universally adopted. In 1651 died Ama Wang, the uncle of Shun-che, who had acted as regent during his nephew's minority, and the emperor then assumed the government of the state. Little is known of this monarch. He appears to have taken a great interest in science, and to have patronized Adam Schaal, a German Jesuit, who was at that time resident at Peking. It was during his reign (1656) that the first Russian embassy arrived at the capital, but as the envoy declined to kowtow before the emperor he was sent back without having been admitted to an audience. After an unquiet reign of seventeen years Shun-che was gathered to his fathers (1661), and Kang-he, his son, reigned in his stead. This emperor was as renowned as his father had been unknown. He was indefatigable in administering the affairs of the empire, and at the same time he devoted much of his time to literary and scientific studies under the guidance of the Jesuits. The dictionary of the Chinese language, published under his superintendence, proves him to have been as great a

scholar as his conquest over Eleuths shows him to have been famous as a general. During one of his hunting expeditions to Mongolia he caught a fatal cold, and he died in 1721 after a glorious reign of sixty years. Under his rule Tibet was added to the empire, which extended from the Siberian frontier to Cochin-China, and from the China Sea to Turkestan. Almost the only national misfortune that visited China while he sat upon the throne was an earthquake at Peking, in which 400,000 people are said to have perished.

Kang-he was succeeded by Yung-ching, who, reaping the benefits of his father's vigorous administration, enjoyed a peaceable reign, though a short one. He died in 1735, and Keen-lung his son reigned in his room. Ambitious and warlike, this monarch despised the conciliatory measures by which his father had maintained peace with his neighbors. On but a slight provocation, he marched an army into Ili, which he converted into a Chinese province, and he afterwards added eastern Turkestan to the far-reaching territories of China. Twice he invaded Burmah, and once he penetrated into Cochin-China, but in neither country were his arms successful. He is accused of great cruelty towards his subjects, which they repaid by rebelling against him. During his reign it was that the Mahometan standard was first raised in Kansuh. But the Mussulmans were unable to stand against the imperial troops; their armies were dispersed; ten thousand of them were exiled; and, effectually to prevent a renewal of the outbreak for some years, an order was issued that every Mahometan in Kansuh above the age of fifteen should be put to death (1784). Amidst all the political calls upon his time Keen-lung still found leisure for study. He wrote incessantly, both poetry and prose, and did much to promote the cause of literature by collecting libraries and republishing works of value. His campaigns furnished him with themes for his verses, and in the Summer Palace was found a handsome manuscript copy of a laudatory poem he composed on the occasion of his war against the Gorkhas. This was one of the most successful of his military undertakings. His generals marched 70,000 men into Nepaul to within sixty miles of the British frontiers, and having subjugated the Gorkhas they received the submission of the Nepaulese, and acquired an additional hold over Tibet (1792). In other directions his arms were not so successful. We find no poem commemorating the campaign against the rebellious Formosans, nor lament over the loss of 100,000 men in that island, and the last few years of his reign were disturbed by outbreaks among the Meaon-tsze or hill tribes, living in the mountains in the provinces of Kwei-chow and Kwang-se. In 1795, after a reign of sixty years, Keen-lung abdicated in favor of his fifteenth son, who adopted the title of Kea-king as the style of his reign. He only lived three years in retirement, and died at the age of eighty-eight in 1798.

During the reign of Keen-lung the relations of the East India Company with his Government had been the reverse of satisfactory. All kinds of unjust exactions were demanded from the merchants, and many acts of gross injustice were committed on the persons of Englishmen. So notorious, at length, did these matters become that the British Government determined to send an embassy to the court of Peking, and Lord Macartney was chosen to represent George III. on the occasion. On arriving at Jehol, where the court then was, Lord Macartney was received most graciously by the emperor, and subsequently at Yuen-ming-yuen he was admitted into the imperial presence and was treated with every courtesy. But the concessions he sought for his countrymen were not accorded to him, and in this sense, but in this sense only, his mission was a failure.

Kea-king's reign, which extended over a period of five-and-twenty years, was disturbed and disastrous. In the northern and western provinces, rebellion after rebellion broke out, due in a great measure to the carelessness and incompetency of the emperor, who was as obstinately self-opinionated as he was unfit to rule, and the coasts were infested with bands of pirates, whose number and organization enabled them for a long time to hold the imperial fleet in check. But, fortunately for the Government, dissensions broke out among the pirate chiefs, and, weakened by internal fighting, they finally made their peace with the mandarins and accepted posts under the emperor. Meanwhile the condition of the foreign merchants at Canton had in no wise improved. The mandarins were as exacting and as unjust as ever, and in order to set matters on a better footing the British Government despatched a second ambassador in the person of Lord Amherst to Peking in 1816. On arriving at the mouth of the Peiho he was received by imperial commissioners who conducted him to Yuen-ming-yuen, taking every advantage on the way of pointing out to him the necessity of his performing the kowtow before the emperor if he wished to be allowed to enter the imperial presence. This he declined to do, and he was consequently dismissed from the palace on the same day on which he arrived, and thus a new impetus was given to mandarinic insolence.

Destitute of all royal qualities, a slave to his passions, and the servant of caprice, the emperor Kea-king died in the year 1820, after a reign of twenty-five years, leaving a disturbed country and a disaffected people as a legacy to his successor Taou-kwang.

Though possessed in his early years of considerable energy Taou-kwang no sooner ascended the throne than he turned his powers, which should have been directed to the pacification of the empire, to the pursuit of pleasure and amusement. The reforms which his subjects had been led by his first manifestoes to believe would be introduced never seriously occupied his attention, and the discontent which had been lulled by hope soon became intensified by despair. In Formosa, Kwang-se, Ho-nan, and other parts of the empire insurrections broke out, which the imperial generals were quite unequal to suppress by force, and the Triad Society, which had originated during the reign of Kang-he, again showed a formidable front under his degenerate successor. Meanwhile the hardships inflicted on the English merchants at Canton became so unbearable, that when, in 1834, the monopoly of the East India Company ceased, the English Government determined to send out a minister to superintend the foreign trade at that port. Lord Napier was selected for the office; but so vexatious was the conduct of the Chinese authorities, and so inadequately was he supported, that the anxieties of his position brought on an attack of fever, from which he died at Macao after but a few months' residence in China. The chief cause of complaint adduced by the mandarins was the introduction of opium by the merchants, and for years they attempted by every means in their power, by stopping all foreign trade, by demands for the prohibition of the traffic in the drug, and by vigilant preventive measures, to put a stop to its importation. At length Captain Elliot, the superintendent of trade, in 1839 agreed that all the opium in the hands of Englishmen should be given up to the native authorities, and he exacted a pledge from the merchants that they would no longer deal in the drug. On the 3d April, 20,283 chests of opium were handed over to the mandarins and were by them destroyed—a sufficient proof that they were in earnest in their endeavors to suppress the traffic. This demand of commissioner Lin was considered by the English Government to amount to a *casus belli*, and in 1840 war was declared. In the same year the fleet captured Chusan, and in the following year the Bogue Forts fell, in consequence of which operations the Chinese agreed to cede Hong-Kong to the victors and to pay them an indemnity of 6,000,000 dollars. As soon as this news reached Peking, Ke Shen, who had succeeded commissioner Lin, was dismissed from his post and degraded, and Yih Shan, another Tatar, was appointed in his room. But before the new commissioner reached his post, Canton had fallen into the hands of Sir Hugh Gough, and shortly afterwards Amoy, Ningpo, Tinghai in Chusan, Chapoo, Shanghai, and Chin-keang Foo shared the same fate, and a like evil would have happened to Nanking had not the Imperial Government, dreading the loss of the "Southern Capital," proposed terms of peace. After much discussion, Sir Henry Pottinger, who had succeeded Captain Elliot, concluded, in 1842, a treaty with the imperial commissioners, by which the four additional ports of Amoy, Fuh-chow Foo, Ningpo, and Shanghai were declared open to foreign trade, and an indemnity of 21,000,000 dollars was to be paid to the English. Nor was the remainder of the reign of Taou-kwang more fortunate than its beginning; the empire was completely disorganized, rebellious outbreaks were of frequent occurrence, and the imperial armies were powerless to oppose them. So complete was the demoralization of the troops, that on one occasion the

Meaou-tsze or hill tribes of Kwang-se defeated an army of 30,000 men sent against them by the viceroy of the two Kwangs. In 1850, while these clouds were hanging gloomily over the land, Taou-kwang "ascended on high," and Heen-fung, his son, reigned in his stead.

A cry was now raised for the reforms which had been hoped for under Taou-kwang, but Heen-fung possessed in an exaggerated form the selfish and tyrannical nature of his father, together with a voluptuary's craving for every kind of sensual pleasure, and he lived to reap as he had sown. For some time Kwang-se had been in a very disturbed state, and when, on the accession of the new emperor, the people found that no relief from the oppression they endured was to be given them, they broke out into open revolt and proclaimed a youth, who was said to be the representative of the last emperor of the Ming dynasty, as emperor, under the title of Teen-tih or "Heavenly Virtue." From Kwang-se the flames spread into Hoo-pih and Hoo-nan, and then languished from want of a leader and a definite political cry. Just at the moment, however, when there appeared to be a possibility that, by force of arms and the persuasive influence of money, the imperialists would re-establish their supremacy, a leader presented himself in Kwang-se, whose energy of character, combined with great political and religious enthusiasm, speedily gained for him the suffrages of the discontented. This was Hung Sew-tseuen. Seizing on the popular longing for the return of a Chinese dynasty he proclaimed himself as sent by heaven to drive out the Tatars, and to restore in his own person the succession to China. At the same time having been converted to Christianity, and professing to abhor the vices and sins of the age, he called on all the virtuous of the land to extirpate rulers who, both in their public laws and in their private acts, were standing examples of all that was base and vile in human nature. Crowds soon flocked to his standard. Teen-tih was deserted; and, putting himself at the head of his followers, Hung Sew-tseuen marched northwards into Hoo-nan and Hoo-pih, overthrowing every force which was sent to oppose him. The first city of importance which fell into his hands was Woo-chang Foo on the Yang-tsze Keang, the capital of Hoo-pih. Situated at the junction of the Han River with the Yang-tsze Keang, this city was a point of great strategical importance. But Hung Sew-tseuen was not inclined to rest upon his laurels, knowing full well that he must be able to call Nanking his before there would be any chance that his dreams of empire could be realized. Having made Woo-chang secure, he therefore moved down the river, and after taking Gan-king on his way he proceeded to the attack of Nanking. So wide-spread was the disaffection at this time throughout the country that the city was ripe for falling, and without much difficulty Hung Sew-tseuen in 1852 established himself within its walls, and proclaimed the inauguration of the Tai-ping dynasty, of which he nominated himself the first emperor under the title of Teen Wang or "Heavenly king." For the next few years it appeared as though he had nailed the flag of victory to his staff. His armies penetrated victoriously as far north as Tientsin and as far east as Chin-keang and Soochow, while bands of sympathizers with his cause appeared in the neighborhood of Amoy. As if still further to aid and abet him in his schemes, England declared war against the Tatar dynasty in 1857, in consequence of an outrage known as the "Arrow" affair. In December of the same year Canton was taken by an English force under Sir Michael Seymour and General Straubenzee, and a still further blow was struck against the prestige of the ruling Government by the determination arrived at by Lord Elgin, who had been sent out as special ambassador, to go to Peking and communicate directly with the emperor. In May, 1858, the Taku Forts were taken, and the way having thus been cleared of obstacles, Lord Elgin went up the Peiho to Tientsin *en route* for the capital. At Tientsin, however, he was met by the imperial commissioners, who persuaded him so far to alter his plans as to conclude a treaty with them on the spot, which treaty it was agreed should be ratified at Peking in the following year. When, however, Sir Frederick Bruce, who had been in the meanwhile appointed minister to the Court of Peking, attempted to pass Taku to carry out this part of the arrangement, the vessels escorting him were fired on from the forts with such precision and persistency that he was compelled to return to Shanghai to await the arrived of a larger force than that which he then had at his command. As soon as news of this defeat reached England Lord Elgin was again sent out with full powers, and accompanied by a large force under the command of Sir Hope Grant. The French likewise took part in the campaign, and on 1st August, 1860, the allies landed without meeting with any opposition at Peh-tang, a village twelve miles north of Taku. A few days later the forts at that place which had bid defiance to Sir Frederick Bruce twelve months previously were taken, and from thence the allies marched to Peking. Finding further resistance to be hopeless, the Chinese opened negotiations, and as a guarantee of their good faith surrendered the An-ting gate of the capital to the allies. On the 24th October the treaty of 1858 was ratified by Prince King and Lord Elgin, and a convention was signed under the terms of which the Chinese agreed to pay a war indemnity of 8,000,000 taels. The Emperor Heen-fung did not live long to see the results of his new relations with the hated forciguer, but died in the summer of the following year, leaving the throne to his son Tung-che a a child of five years old.

The conclusion of peace with the allies was the signal for a renewal of the campaign against the Tai-pings, and benefiting by the friendly feelings of the English authorities engendered by the return of amicable relations, the Chinese Government succeeded in enlisting Major Gordon of the Royal Engineers in their service. In a surprisingly short space of time this officer formed the troops, which had formerly been under the command of an American named Ward, into a formidable army, and without delay took the field against the rebels. From that day the fortunes of the Tai-pings declined. They lost city after city, and, finally in July, 1864, the imperialists, after an interval of twelve years, once more gained possession of Nanking. Teen Wang did not survive the capture of his capital, and with him fell his cause. Those of his followers who escaped the sword of the victors dispersed throughout the country, and the Tai-pings ceased to be.

With the measure of peace which was then restored to the country trade rapidly revived, and, with the exception of the province of Yun-nan, where the Mahometan rebels under Suleiman still kept the imperial forces at bay, prosperity was everywhere re-awakened. Against these foes the Government was careless to take any active measures, until in 1872 Prince Hassan, the adopted son of Suleiman, was sent on a mission to England with the object of gaining the recognition of the Queen for his father's government. This step at once aroused the susceptibilities of the Imperial Government, and a large force was instantly organized and despatched to the scene of the rebellion. The war was now pushed on with vigor, and before the year was out the Mahometan capital Ta-le Foo fell into the hands of the imperialists, and the followers of Suleiman at that place and throughout the province were mercilessly exterminated. In the succeeding February the Regents—*i.e.*, the dowager-empresses, who had governed the country since the death of Heen-fung—resigned their powers into the hands of the emperor. This long-expected time was seized upon by the foreign ministers to urge their right of audience with the emperor, and on the 29th June, 1873, the privilege of gazing on the "sacred countenance" was accorded to them. From that time until his death from smallpox on the 12th of January, 1875, Tung-che's name fails to appear in connection with any public act of importance.

The Emperor Tung-che having died without issue, the succession to the throne, for the first time in the annals of the Tsing dynasty, passed out of the direct line, and a cousin of the deceased emperor, a princeling, said to be not quite four years old, was chosen to reign in his room, under the title of Kwang-seu or "Succession of Glory." Thus is the country again doomed to suffer all the inconveniences of a long imperial minority, at a time, too, when events seem to show that the civilization of China has grown old, and is like to vanish away; when the introduction of new ideas and western modes of thought is about to stretch the old bottle of Confucian tradition to its fullest extent; and when, therefore, the empire will sorely need wisdom and strength at the head of affairs to guide it safely through the critical times which lie before it in the future.

Imperial family.

THE IMPERIAL FAMILY.—The present imperial family, on gaining possession of the throne on the fall of the Ta-Ming, or "Great Bright" dynasty, assumed the dynastic title of Ta-Tsing, or "Great Pure," and the first emperor, who was styled She-tsu-chang Hwang-te, adopted the title of Shun-che for his reign, which began in the year 1644. The legendary progenitor of these Manchoo rulers was Aisin Ghioro, whose name is said to point to the fact of his having been related to the race of Neu-chih, or Kin, *i.e.*, Golden Tatars, who reigned in Northern China during the 12 h and 13th centuries. The present emperor, whose reign is styled Kwang-seu or "Succession of Glory," is the eighth from the founder of the dynasty, and is the only ruler since the establishment of the line who has not succeeded as a direct descendant. Kang-he (1661–1722), for instance, was the third son of Shun-che; Yung-ching (1722–1735) was the fourth son of Kang-he; Keen-lung (1736–1795) was the fourth son of Yung-ching; Kea-king (1796–1820) was the fifteenth son of Keen-lung; Taou-Kwang (1821–1850) was the second son of Kea-king; Heen-fung (1851–1861) was the fourth of the nine sons who were born to the emperor Taou-kwang; and Tung-che (1862–1875) was the only son of Heen-fung. As by Chinese law the heir must be younger than the individual from whom he inherits, it became necessary when the Emperor Tung-che "became a guest in Heaven," without issue, in 1875, to select as his successor one of the sons of one of his father's younger brothers, and the choice, which was recorded in his will, fell upon the infant son of the Prince of Chun, the seventh son of the Emperor Taou-kwang.

In order to prevent the confusion which would arise among the princes of the imperial house were they each to adopt an arbitrary name, the Emperor Kang-he decreed that each of his twenty-four sons should have a personal name consisting of two characters, the first of which should be *Yung*, and the second should be compounded with the determinative *she*, "to manifest," an arrangement which would, as has been remarked, find an exact parallel in a system by which the sons in an English family might be called Louis *Edward*, Louis *Edwin*, Louis *Edwy*, Louis *Edgar*, and so on. This device obtained also in the next generation, all the princes of which had *Hung* for their first names, and the Emperor Keen-lung (1736–1795) extended it into a system, and directed that the succeeding generations should take the four characters *Yung*, *Meen*, *Yih*, and *Tsae* respectively, as the first parts of their names. Eight other characters, namely, *P'u*, *Yu*, *Hêng*, *K'ê*, *Taou*, *K'ai*, *Tseng*, *Ke*, were subsequently added, thus providing generic names for twelve generations. With the present generation the first four characters are exhausted, and the sons of the present emperor, should he have any, will therefore be *P'u's*. By the ceremonial law of the "Great Pure" dynasty, twelve degrees of rank are distributed among the princes of the imperial house, and are as follows:—1. Ho-shih Tsin Wang, prince of the first order; 2. To-lo Keun Wang, prince of the second order; 3. To-lo Beileh, prince of the third order; 4. Koo-shan Beitsze, prince of the fourth order; 5 to 8. Kung, or duke (with distinctive designations); 9 to 12. Tseang-keun, general (with distinctive designations). The sons of emperors usually receive patents of the first or second order on their reaching manhood, and on their sons is bestowed the title of *Beileh*. A *Beileh's* sons become *Beitsze;* a Beitsze's sons become *Kung*, and so on.

Language and Literature.

Language.

The Chinese language is the chief among that small class of languages which includes the Tibetan, Cochin-Chinese, Burmese, Corean, and Chinese, and which is usually described as monosyllabic. It is language in its most archaic form. Every word is a root, and every root is a word. It is without inflexion or even agglutination; its substantives are indeclinable, and its verbs are not to be conjugated; it is destitute of an alphabet, and finds its expression on paper in thousands of distinct symbols.

It is then a language of monosyllabic roots, which, as regards the written character, has been checked in its growth and crystallized in its most ancient form by the early occurrence of a period of great literary activity, of which the nation is proud, and to the productions of which every Chinaman even of the present day looks back as containing the true standards of literary excellence.

Written language.

But in treating of the two branches into which Chinese naturally divides itself, namely, the written medium or characters and the spoken medium or sounds, we propose to begin with the former. And in following this course we shall be doing no violence to the language, for it would be quite possible to separate the characters from the sounds, and to treat them as two languages, as indeed has already been partly done in Japan, where the Chinese characters were at one time in general use as representing the phonetic value of their Japanese equivalents. Beginning at the other end, but with a similar ultimate result, various members of the missionary body have published text-books and dictionaries in Romanized Chinese, that is to say, they have avoided the use of the characters by transcribing the sounds of the language in Roman letters. But since, though the characters are rich and copious to a degree, the sounds are out of all proportion poor, this last dismemberment presents the language in a very denuded form, and is at the same time attended with difficulties which only the most sanguine can hope to see overcome. The necessity of distinguishing between words having the same sound can only be met by the adoption of distinct diacritical marks for each word; and as one sound often represents as many as a hundred words, such a system cannot but be attended with confusion.

The characters of the language form the medium which speaks to the eye, and may be described as the equivalents of the written *words* of other languages; but unlike these, instead of being composed of letters of an alphabet, they are either symbols intended to represent images, or are formed by a combination of lines, or of two or more such symbols. All characters, say the Chinese lexicographers, had their origin in single strokes, or in hieroglyphics, and this, no doubt, is a correct view of the case. Legends differ as to who was the first inventor of writing in China. One attributes the invention to Fuh-he (3200 B.C.), who is also said to have instituted marriage, and to have introduced the use of clothing, and who caused the knotted cords, which had been up to that time in use, to be superseded by characters founded on the shapes of his celebrated diagrams. Another record states that Tsang Ke who lived 2700 B.C., was the Cadmus of China. According to received native accounts, Tsang Ke was a man of extraordinary ability, and was acquainted with the art of writing from his birth. While wandering in the neighborhood of his house at Yang-woo, he one day met with a tortoise, and observing its shell distinctly and beautifully spotted, he took it home, and thus formed the idea of representing the objects around him. Looking upwards he carefully observed the figures presented by the stars and the heavenly bodies; he then attentively considered the forms of birds, and of mountains and rivers, &c., and from them at length originated the written character.

But however great the uncertainty may be as to who invented the first characters, we may take it for granted that they were simply pictures of the various objects of sense which were present to the eye of the writer. Thus, when he wished to express a mountain, he wrote, as did also the ancient Egyptians, a symbol which is written at the present day 山; now written 目, served him to signify "the eye," and so on. But such a written medium was naturally extremely limited, and by degrees, in some instances by the addition of strokes, and in others by a combination of one or more of these primary characters, the written language has been formed as it is at the present day. In tracing the growth of the later characters we are assisted by the native philologists, who have divided them into six classes.

Different classes of characters.

The first they call *Siang hing*, lit. characters representing the forms of the objects meant, or, as we should say, hieroglyphics, such as those just mentioned, and about 600 more, as, for example, ⊙ *jih*, "the sun," *ma*, "a horse," &c.; and of these are composed, with a few exceptions, the 214 determinative or radical characters, one of which enters into the composition of every character in the language.

The second class is called *Chi sze*, lit. characters indicating things, that is to say, characters intended to represent ideas to the mind by the position of their parts. Thus the character *tan*, "dawn," in which the sun is represented

as appearing above the horizon, belongs to it, and also such characters as 上 *shang*, "above," and 下 *hea*, "beneath," which are formed in the one case by placing a man above the medium level, and in the other below it.

The third class is made up of *Hwuy i*, lit. characters combining ideas, or ideographics. This class is formed by uniting two or more significant characters to give the idea of a third. Of the time when these characters were invented we know nothing; but it is plain that their introduction must have given a very extended scope to the language, and they offer an interesting study, as, in many instances, giving us an insight into the moral and social conditions of those who framed them. For instance, if we analyze the character 信 *sin*, "sincere," we find that it is formed by the combination of the characters 人 *jin*, "a man," and 言 *yen*, "words," a collocation of ideas which speaks well for the honorable truthfulness of the ancient Chinese, and which, when the unfortunate failing in this respect of their descendants is borne in mind, is decidedly opposed to the Darwinian theory as applied to language. The character 皇 *Hwang*, "Emperor," is another belonging to this class, which gives anything but a contemptible notion of the moral standard of the people. This symbol was originally written thus 皇, and was composed of the characters meaning "oneself" and "ruler;" the emperor was therefore to be ruler of himself, or autocrat in the true sense of the term; for how can a man, said the ancient sages, rule others unless he first learn to be master of himself?

Curiously enough, by the omission of a stroke, this character has assumed its present corrupted form, which consists of parts signifying "white" and "ruler," and this, as was mentioned in a recent letter from the St. Petersburg correspondent of the *Times*, has been literally translated by the Mongols into Tchagan Khan, and then by the Russians into Biely Tsar, or White Tsar, the name by which the emperor of Russia is now known throughout all Asia.

Another character in this class is 明 *ming*, "brightness," which is composed of a combination of the sun and moon to indicate brilliancy. Altogether, of these ideographics there are said to be about 700 in the language, although some writers have held that this class is a very much larger one, and have justified their belief by analyses which, to say the least, are far-fetched. Callery quotes a Jesuit work, in which it is stated that the character 舩 *chuen*, "a ship," contains to the eye of faith—and we should imagine to that eye alone—a reference to the Flood, since it consists of 舟 *chow*, "a ship," 八 *pă*, "eight," and 口 *kow*, "a mouth," plainly pointing. adds the writer, to Noah's ark with its eight inhabitants. and that 婪 *lan*, "to covet and desire," bears traces of Eve's guilt in its component parts, which are 女 *neu*, "a woman," and 木 *muh*, "a tree," twice repeated, illustrating the longing desire which overcame our first parent when between the trees of life and of good and evil.

The fourth class is the *Chuen choo*, or characters which, being inverted, either in form or sound, assume different meanings. These number about 372, and are formed in two ways,—either by some slight alteration of the character, as the turning of a stroke or of strokes to the left instead of the right, as, for instance, the character for the hand pointing to the left in this way 𠂇 means "left," and when turned thus 𠂆 means "right;" or by changing the sound of the character, and with the sound the meaning. Of this kind are such characters as 樂, which, when pronounced *yŏ*, means "music," and when *lŏ*, "delight," and 易, which as *i* means "easy," and as *yih* means to "change."

The fifth class is the *Chia chieh*, lit. characters having borrowed meanings, and consists of about 600 characters, which are applied, as is indicated by the name of the division, in a double sense, and hence have been called metaphorical. As an illustration of this class, Chinese writers adduce the character 矢 *shi*, "an arrow," which, from the straight course of an arrow, has come to signify "direct," "right," "a word spoken to the point."

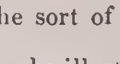
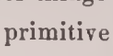
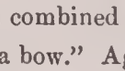
The sixth class, which is known as the *Chieh shing*, or phonetic, embraces over 20,000 characters. The adoption of these phonetics was the turning-point in the progress of Chinese writing. As was the case with the Egyptians, the Chinese found that, having exhausted their power of invention in forming hieroglyphics and ideographics, a further development of the characters was necessary; and, like the subjects of the Pharaohs, they adopted certain characters to represent certain sounds. As to when, or by whom, this system was inaugurated, whether it was introduced from abroad, or whether it was the product of native intelligence, history is silent; but when it was once decided on, the language rapidly increased and multiplied. "A character," writes a well-known Chinese author, "is not sterile; once bound to another, it gives birth to a son; and if this be joined to another, a grandson is born, and so on." The characters, then, which belong to the class called phonetics are composed of two parts, namely, the primitive or phonetic element, that is to say, one of the characters which have been chosen to represent certain sounds, and which gives the sound to the whole character, and one of the 214 determinatives or radical characters of the language.

One or more of these determinatives enter into the composition of every character in Chinese, and as a very large proportion of them are plainly hieroglyphics, they may be said to be the foundation of the written language. As might be expected from their nature as hieroglyphics, they include the most remarkable objects of nature, such as the sun, moon, a river, a mountain, fire, water, earth, wood, stone, &c.; the chief parts of the human body, as the head, the heart, the hand, the foot, the eye, the ear, &c.; the principal parts of a house, as the roof, the door, &c.; domestic animals, such as the sheep, the cow, the horse, the dog, &c.; the primary relations of society, as father, mother, son, daughter, &c.; qualities, such as great, small, straight, crooked, high, low, long, &c.; and actions, such as to see, to speak, to walk, to run, to stop, to enter, to follow, &c. They are thus admirably adapted to form generic terms, and this is the part they play in composition with the primitives. For instance, into the composition of every character signifying anything made of wood such as a table, a chair, a club, &c., the determinative character meaning "wood" is introduced, and it then serves much the same purpose as do the words "mat" and "steam" in the compounds "matshed" and "steamboat."

The number of the primitives has been variously estimated. Dr. Marshman gives them at 3867, Callery at about 1000, and later writers have reckoned them to be from 1100 to 1200. Taking them even at the lowest of these figures, it will readily be imagined how, by combination with the 214 determinatives, they may be made to form the thirty and odd thousand distinct characters of the language, since, of course, it would be possible by combining each of the 1000 primitives with every one of the 214 determinatives, to form more than seven times that number of characters.

To illustrate this system of formation, we will take the primitive 我 *ngo*, "I," which by combination with 27 determinatives, produces as many derivatives having the same phonetic value, in this way—combined with the determinative 山 "a mountain," it becomes 峨 *ngo*, "a high mountain;" with 女 *neu*, "a woman," 娥 *ngo*, "fair," "beautiful;" with 艸 *tsao*, "grass," 莪 *ngo*, "a certain herb;" with 鳥 *neaou*, "a bird," 鵝 *ngo*, "a goose," and so on. From these examples it will be observed that the determinatives play the part in some instances of adjectives; and in combination with their primitives they form an exact parallel with many Egyptian and Assyrian ideophonetics. The following example in Egyptian shows precisely the same formation in the composition of the characters, and in the respective value of their parts, as is seen in the Chinese instance just referred to. *Un* means in Egyptian "a hare;" combined with this determinative , it becomes *Un*, "to open;" and with this *Un*, "an hour." Speaking of Assyrian hieroglyphics, Sir Henry Rawlinson says, "Certain classes of words have a sign prefixed or suffixed to them, more commonly the former, by which their general character is

indicated. The names of gods, of men, of cities, of tribes, of wild animals, of domestic animals, of metals, of months, of the points of the compass, and of dignities are thus accompanied. The sign prefixed or suffixed may have originally represented a word; but when used in the way here spoken of, it is believed that it was not sounded, but served simply to indicate to the reader the sort of word which was placed before it."

These words of Sir Henry Rawlinson may be illustrated by the following examples. means in Assyrian "wood," and is used as the determinative for things made of wood. Thus in combination with the primitive it becomes  "a sceptre;" and when combined with the primitive we have "a bow." Again, is used in the same way as the determinative for all carnivorous animals. Thus, for instance,  is "a dog," and  is "a lion." It will be seen that both the Egyptian and Assyrian characters here quoted are constructed on exactly the same principle as that to be observed in the formation of the majority of Chinese characters, but it is noticeable that in Assyrian the primitives do not retain in composition their phonetic values, as they generally do in Chinese, and as they often do in Egyptian.

Marking, then, the forces of the two parts of the characters, it is easy to imagine the way in which new characters have from time to time been formed. Supposing, for instance, that a tree for which a Chinaman wishes to give a name on paper is known to him colloquially as *ma*. The coiner of the new character would then in the first place choose a common phonetic or primitive possessing the sound *ma;* very possibly he would take the hieroglyphic 馬 *ma*, "a horse," and would combine with it the determinative 木 *muh*, meaning "wood." The new character would then stand thus 樣, and might be understood to signify "the *ma* tree;" but unless previously informed, the reader would be left in complete ignorance as to the sort of tree meant, as the parts of the character would only supply the information that it was either a tree or something made of wood, and that it was to be pronounced *ma*. This is equally the case, speaking generally, with all the characters. By a careful study of the phonetics it is possible to arrive at the sounds or approximate sounds—for certain variations constantly occur—of the characters of the language; but the only hint at their meanings is to be derived from the determinatives, which point only to the general nature of the objects or actions signified.

As has already been said the determinatives are 214 in number, and these have been considered by many of the native dictionary-makers to furnish convenient headings under which to arrange the characters of the language. Again, others have chosen to classify the characters according to their final sounds. Both systems have their advantages. By adopting the first, the headings are comparatively few, and the characters are, roughly speaking, classified according to the generic meanings they have in common; and the second gives constant practice to students in remembering the tones and correct rhyming pronunciation of the characters. But in both the phonetic relationship between the primitives is entirely lost sight of. And this is much to be regretted, since, as Callery and others have pointed out, the scientific way of arranging the characters would be by placing them under their primitives, by which means the respective values of both the primitives and determinatives would be brought out in prominent relief. Only in two Chinese dictionaries that we have met with have any attempts been made thus to arrange the characters, and the older of these, on which the later work was probably framed, owes the system on which it is composed to the experience imported from Japan by the co-compiler, who was a native of that country.

Different styles of writing.

In the course of the above remarks a few instances have been given of the original and modern forms of the same character, as, for example, 鳥 and 馬. But, as may readily be supposed, the change from one to the other was not made all at once, and Chinese books afford instances of six distinct styles of writing, varying in clearness from the square character used in the books at the present day to the Seal and Grass or cursive characters, which are noted for their obscurity. These styles are described as the *Chuen shoo* or "seal character," the *Le shoo* or "official character," the *Keae shoo* or "model character," the *Hing shoo* or "running character," the *Tsaou shoo* or "grass character," and the *Sung shoo* or "Sung-dynasty character," and may be illustrated by the following example, in which the character 草 *tsaou* "herbs" is shown written in all the six styles just specified:—seal character ; official character ; model character 草; running character ; grass character ; and Sung character 草. But above and beyond these six styles of writing, Chinese penmen not unfrequently allow their imaginations to run riot when engaged in fanciful ornamental pieces of caligraphy. An extraordinary specimen of this quaint taste is to be seen in the Chinese Library of the British Museum, where there is a copy of the Emperor Keen-lung's poem on Moukden, printed both in Chinese and Manchoo in 32 kinds of strangely fanciful characters.

Spoken language.

We will now pass on to the sounds of the language; and the first thing concerning them which strikes the student on becoming acquainted with his dictionary is their extreme poverty as compared with the characters. There are over 30,000 characters in the language, and these are represented to the ear by only 500 syllabic sounds. No doubt the adoption of primitives as phonetics, as has been already described, has contributed to this result, since it provided for the due expression of the syllables then existing, but for no more. And thus, though it vastly enriched the written language—one primitive producing as many as 74 derivatives—it at once put a stop to all increase in the number of the sounds. The difficulty then arose as to the way in which 500 syllables were to be made to represent in conversation the thousands of characters in common use. And three methods have been adopted to prevent the confusion which at first sight would appear to be inevitable. These are—

1. By combiuing with the word which it is desired should be understood another, bearing a similar or supplementary meaning, to distinguish it by pointing to its meaning from other words bearing the same sound; thus, for "to hear," it is usual to say in conversation 聽見 *ting keen,—ting* meaning "to hear," and *keen* "to see or perceive."

2. As regards noun substantives, by placing certain classifying words between them and the numerals which precede them. These classifiers bear some resemblance to our expressions *herd, head, fleet, troop,* &c., and have a certain reference to the nature of the substantives to which they are attached. For example, the word 把 *pa*, "to grasp with the hand," is used as the classifier to precede anything which is held in the hand, such as a knife, a spoon, a hatchet, &c. Instead of expressing, therefore, a knife by *yih taou*, which might either mean a knife, a small boot, or a fringe, the classifier is introduced to show which *taou* is meant, and a speaker would say *yih pa taou*, literally "a grasped knife." In like manner 間 *keen* "a space," is used as a classifier for houses and enclosures; 根 *kăn* "a root," for trees, poles, clubs, &c., and so on.

And thirdly by dividing the words of the language among eight tones. These tones partake of the nature of musical intonations, and are divided by the Chinese into two series, the upper and the lower, and are called by them the upper even, the upper rising, the upper departing, the upper entering, the lower even, the lower rising, the lower departing, and the lower entering. To each character is allotted its appropriate tone, which if wrongly rendered is liable to give an entirely different meaning to the word from that intended by the speaker. This possibility will be understood when it is remembered that the thirty and odd thousand characters find expression in about 500 sounds, thus giving an average of one sound to 60 characters, and these figures show that at best the system of tones is but an incomplete solution of the difficulty, since, were this average of 60 characters equally distributed among the full eight tones, there would remain nearly eight characters of each sound identical both in sound and tone.

But as a matter of fact, only the four tones of the upper

series are in general use, to which sometimes the first or even tone of the lower series is added. The even tone is, as its name signifies, simply the ordinary tone of voice; the rising tone gives to the voice somewhat of the effect of an interrogation; the departing tone, of doubtful surprise; and the entering tone, of peremptory command. These may easily be illustrated by repeating our negative "No," first in the ordinary tone of conversation, secondly as an interrogation, thirdly as expressing doubtful surprise, and fourthly as a peremptory refusal—thus 1 No. —, 2 No.ˊ, 3 No.ˋ, 4 No–. The difficulty of acquiring a knowledge of the tones proper even to the characters in common use is, as may be supposed, very great, and the only way to master them, is to learn them as the children learn them, from the lips of the natives themselves. No study of books will give the required knowledge. The Chinese learn them by ear alone, and if an educated man be asked to give the tone of an isolated character, he generally has to repeat a phrase in which the character occurs in order that his lips may tell his ear the intonation proper to it.

It will be easily understood that the mistakes and difficulties into which this intricate system drives Chinese-speaking foreigners are often inconvenient and sometimes dangerous. Some years ago a petition on behalf of a Chinese criminal was presented by a wealthy Chinese merchant in person to the governor and council of Hong Kong. A well-known Chinese scholar undertook to interpret on the occasion, and the Chinaman began his speech with a reference to our *Kwaiˋ Kwok* or "Honorable kingdom," as he designated England. Now the syllable *kwai* pronounced *kwaiˊ* means "devil," and used in combination with *kwok* is an abusive term not uncommonly applied to any foreign country. Unfortunately the interpreter confused the two tones, and turning indignantly to the governor, he reported that at the very outset the petitioner had begun by speaking of England as "the devil kingdom." The just anger of the council knew no bounds, and it was only after some minutes of wild confusion that an explanation followed, which saved the Chinaman from sharing the cell of the man for whom he was pleading. To a Chinaman such a mistake would be well-nigh impossible, for the tones form integral parts of the words, and to the ear of a native the difference between *kwai* in the ascending tone, and *kwai* in the descending tone, would be as great as between *kwai* and *kwan*.

There is only one other point in connection with the sounds of the language to which reference need now be made, and that is the system which has been adopted for spelling, as it were, the various sounds. For this purpose 36 characters which begin with the initial consonants of the language have been chosen, and 38 which end with the final sounds. In order, then, to indicate a desired sound, the writer takes a character of the first series which begins with the required initial, and a character of the second series which ends with the required final. These are placed together, and the initial of the first and the final of the second give the required sound. For instance, supposing a Chinaman were desirous of expressing that the sound of a certain character was *ting*, he would write the two characters 當 *tang* and 經 *king*, the first of which would give the initial *t*, and the second the final *ing*. This syllabic spelling, the initials of which are identical with the initial Sanskrit consonants, was introduced by the Buddhist missionaries in the 5th and 6th centuries, and from the time of the appearance of the dictionary *Yuh pien*, which was published in the year 543, it has been employed in every native dictionary of the language which has since seen the light.

Grammar.

With a language of roots, which is devoid of inflexion or even of agglutination, in which a large number of words each play the part, under varying circumstances, of substantives, adjectives, verbs, and adverbs, it may at first sight appear that grammar must be an impossibility. But inasmuch as there are in Chinese, as there must be in every language, certain words which, to quote Dr. Marshman, "denote things, and others which signify qualities, there must be words to express actions done, and these as done by one or many, already done, now doing, or intended to be done; they must also be described as done absolutely or conditionally, as proper to be done, or peremptorily commanded. Further, the various circumstances of the doer, and of the subject of the action, must also be either plainly expressed or tacitly understood: hence the need of prepositions. Connecting words, too necessarily exist in every language, as well as those which express the emotions of the mind. Thus the principles of grammar must substantially exist in every language." And though the absence of all inflexion in Chinese places the grammar of the language on a different footing from that of the polysyllabic languages, it is yet distinctly defined by the position and connection of the words of the sentence.

Since, when a language is spoken and understood only in the country of its birth or adoption, the study of the grammar affecting it is, as far as the natives are concerned, comparatively unimportant, we find that little attention has been paid by the Chinese to the grammar of their language. But practically the grammar, which, as has just been stated, consists of rules for the construction of the sentence, has for many centuries been enforced by example, and by the censorship of the examiners at the competitive examinations. If then we observe the connection of words which these authorities have preserved, we find that in every Chinese sentence the subject comes first, then the verb, which is followed by the complement direct and the complement indirect, and further that, as is the case in most of the Turanian languages, every word which defines or modifies another invariably precedes it. For instance, the adjective precedes the substantive, the adverb the verb, the genitive the word which governs it, and the preposition the word governed by it.

Position of words in sentences.

The importance of exactly following these rules becomes at once apparent when we remember that often one and the same word is capable of being used as a substantive, an adjective, a verb, or an adverb. This is the case also with some words in English. We use the word *present*, for example, as a substantive when we talk of giving a *present;* as an adjective when we say the *present* time; and as a verb when we say, "I *present* you." *Cut* is another word which we make use of in the same way. We say, "the *cut* of a sword," "*cut* grass," and "to *cut* a man down."

A number of other instances of the same kind might be adduced, but taking a Chinese word, we may show how, by varying its position in a sentence, it changes its grammatical value. The character 好 *hao* has for its meanings "to love," "good," "excellent," "well," &c., and possibly with the intention of illustrating, as it were, these meanings by representing the highest and purest form of natural affection, that which exists between a mother and her child, the inventor of the character has formed it of two parts signifying respectively "a woman" and "a son." If, then, we meet with it in such a connection as this, which is taken from the lips of Confucius, 窺見室家之好 *Kwei keen chih chia che hao*, we recognize it at once as a substantive, since, were it an adjective, it would be followed by a substantive; were it a verb, it would be followed by its complement, and also because it follows a substantive 室家, to which is added 之, the sign of the possessive case. The sentence should then be translated—*Kwei keen*, "to peep and see," *hao*, "the excellence or the goodness," *che*, "of," *chih chia*, "the apartments." In the sentence, also from Confucius, 如好好色 *Joo hao hao sih*, we see by the position of the two *haos* that the first must be a verb, and that the second must be an adjective, since it is followed by a substantive with which it forms the direct complement to the verb. The meaning of the sentence then is *Joo*, "as [when]," *haoˋ*, "we love," *hao/sih*, "excellent beauty." Again, in the modern colloquial expression 好說 we have an example of the use of *hao* as an adverb preceding a verb, and the phrase is then incapable of being translated otherwise than as "well said," *hao*, "well," *shwŏ*, "said."

The number of characters which might be treated as we have dealt with 好 is legion. Little has been said on the subject of this peculiarity of the language by native grammarians, who have not done much more for the science of grammar than to divide the characters into 死字 *Sze tsze* or "dead words," as they call nouns; 活字 *Hwŏ tsze*, "living words," or verbs; and 虛字 *Hsü tsze*, "empty words," or particles. It is worthy of remark that in a great many

instances the transition of a character from one part of speech to another is marked by a change of tone. This is the case with the character *hao*, of which we have been speaking. When it stands for the adjective "good," it should be pronounced in the ascending tone *hao* / ; and when it becomes the verb "to love," it is transferred to the departing tone *hao* \. And in some few cases the character suffers a change of sound as well. 食 *shih*, the verb "to eat," is pronounced in the entering or abrupt tone; but it becomes *sze*\ in the departing tone, when it plays the part of a substantive meaning "food." In a lecture administered to the king of Leang, Mencius, rebuking him, says, 狗彘食人食 *Kow che shih jin sze*\, "Your dogs and swine eat men's food." Here it will be observed the first 食 must by the rules of position be the verb *shih*, "to eat," and by the same necessity this same character at the end of the sentence must be a substantive; and the dictionaries tell us that, when this is the case, it is pronounced *sze*. But though it is true that a vast number of characters can be made to serve a writer in a variety of capacities, yet each belongs more particularly to some one part of speech, and many are identified with that one alone. For instance, we find that certain substantives which express things, such as *cho* "a table," or *e* "a chair," remain fixed as substantives, and that others, if they denote actions, are primarily verbs, and if conditions, such as "honor" or "riches," are in the first instance adjectives.

Gender. As might be expected from the nature of the language of which this interchangeability forms a part, Chinese admits no variations of gender, and in this particular it agrees with the Manchoo, Mongolian, Turkish, and Finnish families of tongues, in which, as Dr. Caldwell points out, not only are all things which are destitute of reason and life denoted by neuter nouns, but no nouns whatever, not even nouns which denote human beings, are regarded in themselves as being masculine or feminine. All nouns as such are neuter, or rather are destitute of gender. "The unimaginative Scythian reduced all things," adds the doctor, "whether rational or irrational, animate or inanimate, to the same dead level, and regarded them all as impersonal." But in every language there are certain words the gender of which must necessarily be distinguished, and in common also with the peoples just referred to, to these the Chinese prefix words denoting sex. Thus a son is spoken of as 男子 *nan tsze* or "man-child," and a daughter as 女子 *neu tsze* or "woman-child." In the case of animals other characters are used. 公 *kung*, "noble," "superior," is employed to denote the male and 母 *moo*, "mother," to indicate the female. Thus 公馬 *kung ma* is "a horse," and 母馬 *moo ma* is "a mare." With birds other characters are considered more appropriate. Thus, the male is described as *kung*, "martial" or "brave," and the female as *tsze*, "weak" or "inferior."

Number. As regards number, Chinese is left in an equally indefinite condition. As a rule it is the connection of the words of the sentence which determines whether a noun is in the singular or plural. Often, however, the plural is indicated by repeating the noun, as 人人 *jin jin*, "the men," or by the presence of a numeral, as in the following expression, taken from the *Confucian Analects*, 三子者出 "The three disciples went out." Here the character *san*, "three," indicates that *tsze* is in the plural, although it has no inherent mark of number. Another way of pluralizing a noun is by adding to it one of certain words signifying "all" or "many." The most common of these are 衆 *chung*, 諸 *choo*, 皆 *keae*, 凡 *fan*, and 等 *tăng*. The first four have for their meaning "all," and the last, *tăng*, means "a class." Its use, like its meaning, is distinct from the others; they precede the noun, *tăng* always follows it, and forms with it a compound such as "animal-class" for animals, "man-class" for men. In colloquial Chinese the character 們 *mun* has been adopted as a sign of the plural, but its use is almost entirely confined to the personal pronouns. Thus 我 *wo* means "I," and 我們 *wo mun* "we."

Case. The rules of position which serve to fix the parts of speech of the words of a sentence are allowed also in great measure to regulate the cases of nouns and the moods and tenses of verbs. But this is by no means always the case. For example, the possessive case is marked by certain particles of which mention will be made presently; and although European writers on Chinese grammar have been in the habit of considering that when two substantives come together, the first is to be taken as being in the possessive case, thus in the sentence 天子好學 *Teen tsze hao heŏ*, which we should translate as "the Son of Heaven loves learning," *teen*, they would say, is in the possessive case,—it may be questioned whether such expressions may not be more appropriately considered as compound terms, in the same way that we treat their equivalents in English. For instance, we should never consider such an expression as "the Chelsea-water-works" to consist of a nominative and two possessive cases, as it would be parsed by these grammarians, were it turned word for word, as it might be, into Chinese. And this treatment becomes still more difficult of adoption when we find, as is often the case in Chinese, a number of substantives strung together, all of which, with the exception of the last, would then have to be considered as a succession of possessive cases. If we take, for example, one of the ordinary marks on porcelain made in China, such as 大明萬曆三年製 *Ta ming Wan leĭh san neen che*, we should be told to consider *Ta ming*, *Wan leĭh*, and *neen*, as possessive cases, and that the phrase should be translated, "The manufacture of the third year of (the reign) Wan-leĭh of the Ta ming dynasty," instead of treating it as a compound expression on the "Chelsea-water-works" principle, thus "The Ta-ming-dynasty-Wan-leĭh-third-year-manufacture."

Besides, Chinese is by no means destitute of case-particles. In the literary and colloquial languages the possessive is expressed by suffixing respectively 之 *che* and 的 *teĭh* to the substantive. Thus these particles answer exactly to the *'s* commonly used in English. 天之恩 *Teen che găn* is "The favor of heaven," or, as we should as often say, "heaven's favor." 那個女人的狗 *Na do neu jin teĭh kow* is "The dog of that woman," or "That woman's dog." If we trace back the case-particle 之 *che* to its earliest use, we find that it was originally a verb, and meant "to proceed to," and thus, as a sign of the possessive case, it implies the sense of partition which is inherent in our "of" and the French *de*. In some instances, by its addition to certain substantives, compound nouns of possession are formed which are capable of being used as adjectives. For example, 金 *kin* is "gold," and 金之 is "of gold," or "golden." It is used also to express relation, but not as frequently as its colloquial equivalent 的 *teĭh*, which is very commonly thus employed. Such expressions as 管兵的 *kwan ping teĭh*,—*teĭh*, "he who," *kwan*, "rules over," *ping*, "soldiers"—are in constant use.

With verbs of giving to and speaking to the dative case is marked by position. The person to whom a thing is given immediately follows the verb, and the thing given comes next. The sentence "The prince gave the officer some money," is in accordance with the Chinese idiom, which would not admit the more usual English form, "The prince gave some money to the officer." The dative case, with the sense of "for," is marked by the use of the characters 代 *tae*, "to succeed," 替 *te*, "to put another instead of," and 爲 *wei*, "to be;" thus 代我寫書 *tae wo seay shoo*, "to write a letter *for* me," 替我的女兒 *te wo teĭh neu urh*, "*for* my daughter," &c.

The accusative case is as a rule marked by position. But occasionally, as has been shown by M. Julien, the particles 以 *e*, 於 *yu*, 于 *yu*, and 乎 *hoo*, are dissociated from their usual signification, and are employed simply as signs of this case.

The instrumental case is indicated by the character 以 *e*, "by," in the language of the books, and by 用 *yung*, "to use," in the colloquial. As an instance of the use of the first we may quote the following passage from Mencius:—難罔以非其道 *Nan wang e fei ke taou*, "(A superior

man) cannot be entrapped *by* that which is contrary to right principles."

The ablative case, having the sense of "from," is marked by the signs 自 *tsze*, and 由 *yew*, and in the colloquial by 從 *tsung*, as in the following examples:—自生民以來 *Tsze săng min e lae*, "*From* the birth of mankind until now;" 由湯至於武丁 *Yew Tang che yu Wooting*, "*From* Tang until you arrive at Woo-ting;" 他從北京來了 *Ta tsung Pĭh king lae leaou*, "He has come *from* Peking."

The remarks which have been made on the gender, number, and case of the substantives apply in like manner to the adjectives, and we need only now refer therefore to the manner in which degrees of comparison are formed. The comparative is denoted either by certain particles meaning "more than," or "beyond," or in the colloquial by forms of expression such as "This man compared with that man is good," or again, "This man has not that man's goodness." As signs of the superlative words such as 最 *tsuy*, "excelling," 極 *keĭh*, "the highest point," or 甚 *shin*, "exceeding," are employed.

Degrees of comparison

Pronouns. In all Oriental languages the personal pronouns play a prominent part from their number and the variety of equivalent terms, whether of self-depreciation or of complimentary adulation, used to express them; and in Chinese they derive additional importance from the fact that in the absence of all verbal inflexion, they serve to indicate the person, and in the spoken language the number of the verb. 吾 *woo*, 爾 *urh*, and 其 *ke*, are the terms most commonly used in classical writings to signify the first, second, and third persons of the personal pronoun, of which 我 *wo*, 你 *ne*, and 他 *ta*, are the common colloquial equivalents. These latter have for their plural *wo mun*, *ne mun*, *ta mun*. Quite separate and apart from these and all their equivalents is the character 朕 *chin*, which is reserved especially for the emperor, and has been the traditional imperial "We" since the time of the three mythical emperors to whose wisdom, energy, and foresight the greatness of China is attributed by the native historians.

But not always does the emperor feel himself entitled to use this inherited character. In times of national misfortune he chooses to believe that his own remissness is the cause of the evils which have overtaken the country, and then it is the custom for him to designate himself *Kwa jin*, or "Deficient man." With his subjects the assumption of a similar humble position is habitual, and among acquaintances the place of "I" is nearly always taken by terms by which the speaker seeks to give a complimentary importance to the person addressed at the expense of his own intellectual or social position. "The dullard," "the little one," and "the man of low degree," are terms most frequently used in this sense, while *nu tsai*, or "slave," is the self-assumed epithet adopted by ministers when addressing the emperor. In like manner the speaker's relations and personal belongings are spoken of as "the little," "the mean," and "the cheap." The respect due to age guides on the other hand the choice of expressions employed towards the persons addressed, who, instead of being called by the second person of the pronoun, hears himself addressed as "Master," "Old Gentleman," or "Senior." The holders of the lower offices, such as the *Heen* or district magistrates, are addressed by law as *Lao ye* or "Old Fathers;" as they rise, they become *Ta lao ye*, "Great Old Fathers;" and when they reach the higher ranks, such as the governors of the provinces, they are called *Ta jin*, "Great Men." In the same spirit it is customary to speak of the belongings of another as being "worshipful," "honorable," or, "august."

Numerals. History is vague as to the date when the Chinese adopted the numerals they at present employ; but as we find reference to them in the *Book of History*, it is fair to infer that they were in existence before the 6th century B.C. They are 17 in number, and are these: 一 *yih*, "one," 二 *urh*, "two," 三 *san*, "three," 四 *sze*, "four," 五 *woo*, "five," 六 *luh*, "six," 七 *tseĭh*, "seven," 八 *pă*, "eight," 九 *kew*, "nine," 十 *shih*, "ten," 百 *pih*, "a hundred," 千 *tseen*, "a thousand," 萬 *wan*, "ten thousand," 億 *yih*, "one hundred thousand," 兆 *chaou*, "a million," 京 *keng*, "ten millions," and 垓 *kai*, "a hundred millions." The last four are now very seldom used, the rest are hourly employed. It will be seen that there is no single numeral between ten and one hundred, and the intervening numbers are therefore expressed by *shih*, "ten," in combination with the lower numerals. For example, the numbers between ten and twenty are expressed by *shih* "ten" with the addition of the number required. Thus "thirteen" would be 十三 *Shih san*. The figures between twenty and a hundred are denoted by 十 *shih* "ten" preceded by the other numeral, and in this way 三十 *San shih* would be "thirty."

Moods and Tenses. After the explanation given of the manner in which the number, gender, and case of nouns are clearly expressed in composition, it need not be a matter of surprise that by position and the use of particles it is possible to give expression to all the moods and tenses of the verb. Such a fact should not astonish us when it is recollected that, as stated by Marshman, in the case of certain English verbs, such as "to cut," position is found equal to the task of forming 211 out of the 215 verbal variations which such verbs undergo, and four only are formed by the addition of terminations to the original monosyllable, namely "cuttest," "cuts," "cutteth," and "cutting." As no change, not even the lengthening of a line, or the addition of a dot, can possibly be effected in a Chinese character without entirely altering its meaning, position has to do everything for the Chinese verb, and it accomplishes its mission in two ways, either by stating the time at which the action has taken place, or is about to take place, or by prefixing or suffixing certain words which by their several meanings supply like information. For instance, in the colloquial sentence 如今他來 *joo kin ta lai*, *joo kin* "now," indicates that the action is present, and the three characters are to be translated "he is coming." But if we were to exchange the *joo kin* for 明年 *ming neen*, "next year," the verb *lai* will be in the future tense, "next year he will come;" and if yet once again we say, *shang yuĕ ta lai*, *shang yuĕ* meaning "last month," the verb will then be in the past tense, and the sentence will run, "last month he came." But more frequently the present tense of the verb is not accompanied with any word to denote the time of the action, and indeed the only tense particles employed are those which serve to explain the past and future tenses. The characters 了 *leaou*, "to complete," and 過 *kwŏ*, "to pass over," are the commonest of those which are suffixed to denote the first, and 將 *tseang*, "to take," and 要 *yaou*, "to want," are the most frequently used to prefixes to mark the second. Thus, *ta keu leaou*, or *ta keu kwŏ*, would mean "he went," while *ta yaou keu* or *ta tseang keu* or *ta yaou keu* would be "he will go."

In every language, as Marshman has pointed out, "it will sometimes be found necessary to indicate or declare a thing, to command an action to be performed, to express it as desirable, obligatory, or possible, to represent it as conditional, and to describe it in a general way," and Chinese is no exception to this rule. In the case of the active and infinitive moods, position, which, as we have already seen, has done so much for Chinese grammar, is again equal to the occasion, but the imperative, the optative, and the potential moods all, although not always, have their distinctive signs.

The third person of the imperative mood, for instance, is formed in modern Chinese by prefixing a verb meaning either "to give" or "to permit," and answers exactly to our "let." 許他去 *heu ta keu* is "let him go," *heu* meaning "to allow," "to permit." The optative mood is formed by the addition of words meaning "to wish" or "to desire," and the potential by the addition of words implying "power," "duty," or "doubt."

The above sketch, although necessarily brief, serves to show that by carefully following the laws of Chinese syntax, it is possible to express in Chinese, as exactly as in other languages, all the parts of speech in all their variety of number, gender, case, mood, tense, and person, and therefore every shade of meaning which it is possible to convey by word of month. The difficulties of acquiring a knowledge of Chinese have hitherto shared that exaggera

tion which surrounds the unknown. It is time that the language was better understood, and at this period of the world's history we cannot afford to leave unnoticed a language so ancient as to dwarf into insignificance the antiquity of western tongues, and one which is the solitary medium of communication between 400,000,000 of our fellow-men.

Literature.

Having thus attempted to trace the growth of the written Chinese character from its first creation as a hieroglyphic to its final development in the more modern ideophonetic form, and also the rules which govern the position of these characters in a sentence, our object will now be to show the use which Chinese authors have made of the characters and of the grammar to which they are subservient. It was obviously necessary to begin with the language, before dealing with the literature, since some of the leading characteristics of the literature are, as is the case in every tongue, plainly traceable to the structure of the language. The words of a sentence are as a piece of clay in the hands of a potter. If they be soft and pliable, that is to say, if they be capable of inflections and of syntactical motion, they may be moulded to express with varying vigor and force the highest fancies and noblest thoughts of an able writer in all the changing beauty of poetic diction or of rhetorical eloquence. But if on the other hand they be destitute of inflection, and be cramped by inexorable laws of position, which cannot for a moment be departed from, without a sacrifice of sense, the result must be that the literature of which they are the component parts will partake to some extent of their hard unyielding nature.

If we turn for a moment to the poetry of ancient Greece and Rome we find that some of the finest effects have been produced by the power which the inflexional nature of those languages gave of transposing the position of words in a sentence, so as to give vigor and grace to the rhythm. To prove the truth of this we have only to take some striking passage, and compare it in the original with a plain straightforward translation in prose. The idea is the same in both, but how differently it appeals to the imagination of the reader. The gem is there, but it has lost the advantage of its setting. It must now be judged by the prosaic rule of its intrinsic value, with no softening surroundings to add grace and brilliancy to its natural beauty.

But the effective weapon which was thus placed in the hands of the poets and authors of ancient Greece and Rome has been completely denied to Chinese writers. As has been explained, the language is absolutely without inflexion, and the grammar consists so entirely of syntax, that no word can be moved out of its determined position in a sentence, without either changing its value or rendering it meaningless. Thus the literature has lost much of the variety and elegance which belongs by nature to that of the polysyllabic languages. And we might go beyond this and say that the lack of that power of expression which is given by syntactical motion has been accompanied by a blighting influence on the imaginations of Chinese authors. Other causes, to which reference will presently be made, are also to some extent responsible for this result; but in our review of the various branches of Chinese literature, we shall find that those which are most dependent for their successful development on the powers of imagination are those which least repay attention, and that the more excellent are those which contain simple narrations of facts, or consist of the arguments of the philosopher or of the man of science.

But notwithstanding this the Chinese are eminently a literary, in the sense of a reading, people. The system of making competitive examinations the only royal road to posts of honor and emolument, and the law which throws these open to everybody who chooses to compete, have caused a wider diffusion of book learning among the Chinese than is probably to be found among any other people. As to the date when the literature first took its rise, it is impossible to speak with any certainty. The vicissitudes which attended the early manuscripts and books which were collected by private individuals and in the imperial libraries have been such as to render the preservation of any ancient record a matter of wonder. Constant references are found in books to works which are said to have existed at early dates, but of many of these the titles are all that remain to us now.

Book of Changes

One of the earliest published works on which we can lay our hands, is the *Book of Changes*, the first, and the most revered, because the least understood, of the nine classics. This work first saw the light within a prison's walls. In the year 1150 B.C. its author Wăn Wang was, we are told, imprisoned for a political offence, and sought to while away the tedium of his confinement by tracing out a system of general philosophy from the eight diagrams and their 64 combinations invented by the Emperor Fu-he. These diagrams have been likened to the mystical numbers of Pythagoras, and the leading idea of Wăn Wang's system seems to have been founded upon the Chinese notions of the creation of the world, according to which all material things proceed from two great male and female vivifying elements, the *Yin* and the *Yang*, which in their turn owe their existence to the *Tai keih*, or the first great cause. As Sir John Davis says, this "might, with no great impropriety, be styled a sexual system of the universe. They, that is to say the Chinese, maintain that when from the union of the *Yang* and the *Yin* all existences, both animate and inanimate, had been produced, the sexual principle was conveyed to and became inherent in all of them. Thus heaven, the sun, day, &c., are considered of the male gender; earth, the moon, night, &c., of the female. This notion pervades every department of knowledge in China. It exists in their theories of anatomy and medicine, and is constantly referred to on every subject. The chief divinities worshipped by the emperor as high priest of the state religion are heaven and earth, which in this sense appear to answer in some degree to the *οὐρανός* and *γῆ* in the cosmogony of the Greeks."

The style and matter of Wăn Wang's writings were, however, so cramped and vague that Confucius among others attempted the task of elucidating their dark places. Many years the sage spent in endeavors to make straight that which was so crooked; and the only result attained has been to add some inexplicable chapters to an incomprehensible book. But the fact that it gave rise to a system of divination saved it from sharing the fate which, in the year 221 B.C., befell all books, except those on medicine, divination and husbandry, at the hand of the Emperor Che Hwang-ti of the Tsin dynasty. This monarch ordered, for political reasons, the destruction of all the books to be found within the empire, except those on the subjects just mentioned. Fortunately, no monarch, however powerful, is able to carry out to the letter an order of so inquisitorial a nature; and the roofs of houses, the walls of dwellings, and even the beds of rivers became the receptacles of the literary treasures of the nation until the tyranny was overpast. The works of Confucius, the *Book of History*, the *Book of Odes*, the *Spring and Autumn Annals*, together with the *Book of Rites*, and the *Four Books* by the disciples of the sage and of Mencius, were all alike condemned to the flames. How all these were preserved we know not, but history tells us that, when in after years efforts were made to restore the *Book of History*, 28 sections out of the 100 composing the entire work were taken down from the lips of a blind man who had treasured them in his memory. One other was recovered from a young girl in the province of Honan. And these are all which would probably have come down to us, had not a complete copy been found secreted in the wall of Confucius's house, when it was pulled down in the year 140 B.C.

Book of History.

This *Book of History* takes us back to about the time of Noah. It consists of a number of records of the Yu, Hea, Shang, and Chow dynasties, embracing the period from the middle of the 24th century B.C. to 721 B.C. These, and a number of other MSS., attracted the attention of Confucius when he was at the court of Chow, and selecting those which he deemed of value, he compiled them in a work which he called the *Shoo-king* or *Book of History*.

This work, as Mr. Wells Williams says, "contains the seeds of all things that are valuable in the estimation of the Chinese; it is at once the foundation of their political system, their history, and their religious rites, the basis of their tactics, music, and astronomy." For the most part it consists of conversations between the kings and their ministers, in which are traced out the same patriarchal principles of government that guide the rulers of the empire at the present day. "Virtue," said the minister Yih, addressing the emperor, "is the basis of good government; and this consists first in procuring for the people the things necessary for their sustenance, such as water, fire, metals,

wood, and grain. The ruler must also think of rendering them virtuous, and of preserving them from whatever can injure life and health. When you would caution them, use gentle words, when you would correct, employ authority." "Do not be ashamed of mistakes, and thus make them crimes," was another piece of wholesome advice offered to the emperor by his advisers, the effect of which is still observable in the outspoken confessions of official incompetence, which are daily to be met with in the columns of the *Peking Gazette*.

Book of Rites.

As we shall have occasion at a subsequent stage to treat at some length of the compilation which stands next on the list of the classics,—the *Book of Odes*,—we pass on to mention a work whose dicta have entered into the very marrow of Chinese life—namely the *Le ke*, or *Book of Rites*. This work is said to have been compiled by the duke of Chow in the 12th century B.C., since which time it has ever been the guide and rule by which Chinamen have regulated all the actions and relations of their lives. No every-day ceremony is too insignificant to escape notice, and no social and domestic duty is considered to be beyond its scope. From the nature of its contents, therefore, it is the work of all the classics which has left the most palpable impression on the manners and customs of the people. Its rules are minutely observed at the present day, and one of the six governing boards at Peking—the Board of Rites—is entirely concerned with seeing that its precepts are carried out throughout the empire.

Speaking of this work, Callery says with justice, "In ceremonial is summed up the whole soul of the Chinese, and to my mind the *Book of Rites* is the most exact and complete monograph that this nation can give of itself to the rest of the world. Its affections, if it has any, are satisfied by ceremonial; its duties are fulfilled by means of ceremonial. Its virtues and vices are recognized by ceremonial; the natural relations of created beings are essentially connected with ceremonial; in a word, for it ceremonial is man, the man moral, the man politic, and the man religious, in their numberless relations with the family, society, the state, morality, and religion."

Spring and Autumn Annals.

But though each and all of the classics bear to some extent the impress of Confucius, only one, the *Chun Tsew*, or *Spring and Autumn Annals*, was written by him. At first sight, therefore, a more than usual interest attaches to this book, which is not lessened by the statements made by the sage himself, and by contemporary scholars concerning it. "The world," says Mencius, "was fallen into decay, and right principles had dwindled away. Perverse discourses and oppressive deeds were again waxen rife. Cases were occurring of ministers who murdered their rulers, and of sons who murdered their fathers. Confucius was afraid, and made the *Chun tsew*." As soon as it appeared, we are told that rebellious ministers quaked with fear and undutiful sons were overcome with terror. "Its righteous decisions," said Confucius himself, "I ventured to make."

The title also of the book, we are told, was given it, because its commendations were life-giving like spring, and its censures life-withering like autumn. The expectant student might therefore be excused for anticipating in its pages an intellectual treat. He would look to have the history of the period dealt with treated as a sustained narrative, interspersed with sage reflections and deep analyses of the characters and circumstances of the time. He would expect to find praise and blame distributed with a discriminating pen, and the foul crimes of regicide and murder denounced in impassioned outbursts of indignation. But how different is the book when we take it up! In the words of Dr. Legge—"Instead of a history of events woven artistically together, we find a congeries of the briefest possible intimations of matters in which the court and state of Loo were more or less concerned, extending over 242 years, without the slightest tincture of literary ability in the composition, or the slightest indication of judicial opinion on the part of the writer. The paragraphs are always brief. Each one is designed to commemorate a fact; but whether that fact be a display of virtue calculated to command our admiration, or a deed of atrocity fitted to awaken our disgust, it can hardly be said that there is anything in the language to convey to us the shadow of an idea of the author's feeling about it. The notices, for we cannot call them narratives, are absolutely unimpassioned. A base murder and a shining act of heroism are chronicled just as the eclipses of the sun are chronicled. So and so took place: that is all. No details are given; no judgment is expressed."

The following extract from the annals of a year taken at random will be sufficient to show that Dr. Legge's remarks are well founded: "1. In the 15th year in spring the duke went to Tse. 2. A body of men from Tsoo invaded Seu. 3. In the third month the duke had a meeting with the marquis of Tse and others, when they made a covenant in Mow-Kew, and then went on to Kwang. 4. Kung-sun Gaou led a force and, with the great officers of the other princes, endeavored to relieve Seu. 5. In summer in the 5th month the sun was eclipsed. 6. In autumn in the 7th month an army of Tse and an army of Tsoo invaded Le. 7. In the 8th month there were locusts. 8. The duke's daughter went to her home in Tsang. 9. On Ke-mao, the last day of the moon, the temple of E-pih was struck by lightning. 10. In winter a body of men from Sung invaded Tsaou." And so on page after page.

The Four Books.

Having thus reviewed the *Five Classics*, we will now briefly consider the *Four Books* which, together with those just mentioned, make up the full complement of the *Nine Classics*. The first three of them—the *Ta-heŏ* or *Great Learning*, the *Chung-yung* or the *Doctrine of the Mean*, and *Lun-yu* or *Confucian Analects*—are all by the pupils and followers of the sage; while the fourth, the *Măng-tsze*, or the *Works of Mencius*, is by a disciple of that philosopher. All these, therefore, represent the views of Confucius, and if we ask what those views point to, we find that they may be summed up in the admonition: "Walk in the trodden paths." For as Confucius said of himself, he came not to originate but to fulfil, and the primary object of his teaching was to revive in a dissolute age the purity, or supposed purity, of former generations; to quote against the *roués* of his day the examples of the ancients, whom he believed to have been scrupulous in fulfilling the universal obligations existing between sovereign and minister, between father and son, between husband and wife, and between friend and friend. He taught that man was a microcosm, and that by striving to improve himself by acquiring knowledge, by purifying his thoughts, by rectifying his heart, and by cultivating his person, he would then be able to regulate his family. When he could regulate his family, he might then be able to govern a state; and when he could govern a state, he might then be trusted to rule an empire. The empire was as one family; and as it was the part of the emperor to cherish and guard his people as a father does a child, so it was the duty of the people to render willing and submissive obedience to their sovereign.

It is due to these political opinions that Confucius has become such an object of respect to both rulers and the ruled. The former see in his teaching a ready argument for the maintenance of their authority, and the people, believing that heaven has constituted for them rulers and teachers, whose duty it is to extend favor and maintain tranquillity throughout the empire, have at the same time learnt to hold that when the ruler ceases to be a minister of God for good, he forfeits the title by which he holds the throne. Confucius was ambitious, and was a courtier as well as philosopher, and beyond this point he avoided in any shape or way indicating the manner in which an oppressive ruler should be induced to abdicate. No such consideration influenced his disciple Mencius, who, being superior to the ordinary ambitions of man, was superior also to their common timidities, and who with much boldness of utterance freely taught that the people were the most important element in a nation, and the sovereign was the lightest; and he did not scruple to admit the conclusion that an iniquitous ruler should be dethroned, and, if circumstances required it, that he should be put to death.

The *Confucian Analects* and the *Works of Mencius* differ in their construction from the *Great Learning* and the *Doctrine of the Mean*, both of which are continuous treatises by individual authors; whereas the two first named are records of the sayings and doings of the two sages, compiled from memory by their faithful disciples, and somewhat resemble in construction, but at a vast interval, the plan of the Gospel narrative.

Doctrine and style of Confucius.

We have dwelt at some length on the classics, because, since they are the sacred books of China, it is natural to suppose that in them we may find the mainspring of the national literature.

Unfortunately, to some extent this is the case, and Confucius has much to answer for, both as regards his teaching and the literary model he bequeathed to his countrymen. Instead of encouraging his disciples to think for themselves, to look into their own hearts, and to acquire that personal knowledge that enables a man to stand alone, he led them out both by precept and example into the dreary waste of cold formalism, in which all individuality is lost, and all force and originality of thinking is crushed out. It may be said that, as far as his teachings were concerned, he strove to suit his system to the capacity of his audience; and that he was successful in so doing is proved by the fact that for twenty-two centuries his name has been revered and his precepts have been followed by his countrymen of whatever rank and station in life.

As has been well observed by Wells Williams, "If Confucius had transmitted to posterity such works as the *Iliad*, the *De Officiis*, or the *Dialogues of Plato*, he would no doubt have taken a higher rank among the commanding intellects of the world; but it may be reasonably doubted whether his influence among his own countrymen would have been as good or as lasting. The variety and minuteness of his instructions for the nurture and education of children, the stress he lays upon filial duty, the detail of etiquette and conduct he gives for the intercourse of all classes and ranks in society, characterize his writings from those of all philosophers in other countries, who, comparatively speaking, gave small thought to the education of the young. The *Four Books* and the *Five Classics* would not, as far as regards their intrinsic character in comparison with other productions, be considered anything more than curiosities in literature, for their antiquity and language, were it not for the incomparable influence they have exerted over so many millions of minds."

But no such apology can be offered for the example he set them in the substance and style of his writings. And we are forced to the conclusion that, though a man of great force of character, he was yet strangely devoid of imagination, and that, in his blind admiration for the ancients, he constrained himself to walk humbly and passively in the paths that had been traced by others. At all events he has done his countrymen an irreparable injury. The inflexible sterility of the earliest specimens of literature might possibly have been the characteristic of a particular phase in the national mind, but Confucius helped to perpetuate it throughout all generations. As might be expected, in no class of the literature is the effect thus produced more apparent than in the commentaries on the classics. These works are to be numbered by thousands, and, with some few exceptions, they are, as has been said of the writings of the scribes at the time of our Lord, cold in manner, second-hand and iterative in their very essence; with no freshness in them, no force, no fire; servile to all authority, opposed to all independence; never passing a hair's-breadth beyond the carefully-watched boundary line of precedent; full of balanced inference and orthodox hesitancy, and impossible literalism; elevating mere memory above genius, and repetition above originality.

But whatever may be the shortcoming of Confucius as a writer, the respect he felt and inculcated for letters gave an impetus to literature. Following the example he set, men began to compile the histories of the various states; and authors with a turn for more original composition busied themselves with the production of works on such arts and sciences, including medicine, mathematics, law, and husbandry, as were known to them. It was just as this new industry was beginning to flourish that the Emperor Che Hwang-ti, to whom reference has already been made, an able and ambitious prince, ascended the throne. By a judicious mixture of force and diplomacy, he abolished the feudal states, into which the empire had up to his time been divided, and drew all power and authority into his own hands.

Wholesale destruction of books.

Estimating the traditions of the past to be almost as potent as Confucius had supposed, and for that very reason deeming them as dangerous to the existence of his rule as Confucius had considered them to be beneficial to the empire, he determined to break with them once and for ever. He therefore issued an order that all books should be burned, except those containing records of his own reign; that all who dared to speak together about the *Book of Odes* or the *Book of History* (harmless subjects enough, one would think) should be put to death, and their bodies exposed in the market-place; that those who should make mention of the past, so as to blame the present, should be put to death along with their relatives; and that any one possessing a book after the lapse of thirty days from the issuing of the ordinance should be branded and sent to labor on the Great Wall for four years. The publication of this edict was followed shortly afterwards by an order for the execution of upwards of 460 scholars who had failed to obey the mandate of the emperor.

Invention of brush-pencil and of paper.

Curiously enough it was during the reign of this uncompromising enemy to literature that the brush-pencil as at present used in China for writing purposes, was invented,—an invention which implies that about this time a substitute was found for the bamboo tablets which had up to that period served the purposes of paper. At first this new material was a kind of closely woven silk. But this was soon found to be as unsuitable for general purposes from its expense as the tablets had been from their cumbrousness; and shortly after the establishment of the Han dynasty, when the decrees of Che Hwang-ti were reversed and every encouragement was given by the state to men of letters, the Marquis Tsae "invented the manufacture of paper from the inner bark of trees, ends of hemp, old rags, and fishing-nets." The increased facility thus afforded for the multiplication of books was eagerly taken advantage of; and from the Annals of the Han dynasty, 206 B.C. to 25 A.D., we learn that the imperial library of that reigning house consisted of 3123 sections on the classics, 2705 on philosophy, 1318 of poetry, 790 on military affairs, 2528 on mathematics, and 868 on medicine. But at the end of the second century an insurrection, which brought the Han dynasty to a close, gave another check to the growing literary taste. And though the then reigning emperor, in his flight from his capital at Lo-yang, attempted to carry off the contents of the imperial library, only half the books reached their destination at Chang-gan, and the remnant was shortly after given to the flames by the successful revolutionists.

Invention of printing.

Such as had been the course of literature up to this time, so it continued until the close of the 6th century, when the art of printing, which became known in Europe nearly 900 years later, was invented in China. A well-known Chinese Encyclopædia tells us that on the 8th day of the 12th month of the thirteenth year of the reign of Wăn-ti (593 A.D.), it was ordained by a decree that the various texts in circulation should be collected, and should be engraved on wood, to be printed and published. Thus within a few years of the time when St. Augustine brought the enlightening influences of Christianity to these Isles, the art of printing—a civilizing agency second only to Christianity—was made known in China. But at first comparatively little use seems to have been made of the invention, for we are told that though it made some way during the Tang (618–907) and the five following dynasties (907–960), it only arrived at its full development under the Sung dynasty (960–1127). It was during this last epoch that a further improvement was made in the art by the introduction of movable types, by a blacksmith named Pe Ching. This inventor, writes M. Julien, used to take a paste of fine and glutinous clay, and make of it regular plates of the thickness of a piece of money, on which he engraved the characters. For each character he made a type, which he hardened at the fire. He then placed an iron plate on the table, and covered it with a cement composed of resin, wax, and lime. When he wanted to print, he took an iron frame divided by perpendicular threads of the same metal, and placing it on the iron plate, ranged his types in it. The plate was then held near the fire, and when the cement was sufficiently melted, a wooden board was pressed tightly upon it, so as to render the surface of the type perfectly even. This method was neither convenient nor expeditious, so says a Chinese writer, when only a few copies of a book were to be printed; but when a large number were required, it printed them off at a prodigious speed.

Historical records.

At this and at later periods the art of printing has been turned to no better purpose in China than to the publication of the histories of the various dynasties. Debarred both by the nature of the material at their command and by a lack of original genius

from indulging in the higher branches of imaginative writing, Chinese authors have devoted themselves with untiring energy and with very considerable ability to the compilation of information concerning the physical and political features of their own and the neighboring countries. Each dynasty has its official chronicle of these subjects, and the celebrated collection of twenty-one histories, which forms a well-nigh unbroken record of the nation's annals, by contemporary authors, from the 3d century B.C. down to the middle of the 17th century, forms a notable monument of the indefatigable industry of their authors. The edition of this huge work which stands on the shelves of the Chinese library at the British Museum is contained in sixty-six European-bound volumes of folio size. In order to facilitate the process of reference the different histories of which it is composed, though they vary considerably in extent, are all formed on the same model. First in order come the Imperial Records, which consist of the purely political events which occurred in each reign; then follow the Memoirs, including articles on mathematical chronology, rites, music, jurisprudence, political economy, state sacrifices, astronomy, elemental influences, geography, literature, biographies, and records of the neighboring countries.

On all these subjects they contain a vast amount of valuable and varied information, much of which possesses considerable interest for European readers. The position which China, as a nation, has occupied and maintained through so many centuries has been such as to render her the natural depository of the annals of the kingdoms of Central and Eastern Asia. With Burmah, Cochin-China, Tibet, Japan, and Corea as her vassals, with a never-ceasing relationship with the tribes of Central Asia, kept up as times and circumstances changed, now as subjects, now as allies, and now as enemies, alone unchanging in her political constitution amidst the recurring wrecks of neighboring states, she has had the means at her command of collecting masses of ethnological information which are beyond the reach of any other people. The movements of the tribes in Central Asia, to which her policy has largely contributed, are all clearly traced in the dynastic annals; and it was with the view of placing the record of these within the reach of European readers that a proposal was recently made to translate, as a beginning, the history of the Han dynasty.

Topographical works.

Allied to these annals are the topographical works of China, which for breadth of scope and for minuteness of detail are scarcely to be equalled in the literature of any other country. The most generally comprehensive of these is the *Tu Tsin yih tung chi*, which forms a geography of the empire, together with the Chinese districts of Mongolia and Manchuria as existing since the accession of the present dynasty. This work, which consists of 356 books, was published at Peking in the year 1744. In it each province, each prefecture, each department, and each district is separately dealt with; and all are severally treated of under the following twenty-four headings:—1. A table of the changes which the district to be described has undergone during the successive dynasties from the Han downwards; 2. Maps; 3. A list of the distances from the various places to the chief towns of the department; 4. Its astronomical bearings; 5. Its ancient geography; 6. Its geographical position and its notable localities; 7. The manners and customs of the inhabitants; 8. Its fortified places; 9. Its colleges and schools; 10. The census of the population; 11. The taxes on land; 12. Its mountains and rivers; 13. Its antiquities; 14. Its means of defence; 15. Its bridges; 16. Its dykes; 17. Its tombs and monuments; 18. Its temples and ancestral halls; 19. Its Buddhist and Taouist temples; 20. Patriotic native officials from the time of the Han dynasty downwards; 21. Celebrated men and things; 22. Illustrious women; 23. Saints and immortals; 24. The products of the soil.

On this model distinct topographies have also been compiled, under official superintendence, of every province, every prefecture, every department, and almost every district. And not only this, but the water-ways of China, as well as the rivers of Manchuria, Mongolia, and Tibet, have all been accurately surveyed and minutely described. The narrow train of thought, however, into which the system of Chinese education has compressed the mind of the people tends to develop in them a faculty for the observation of minute details rather than to foster the power of taking a correct comprehensive view of any wide subject. This peculiarity is observable in the class of works just spoken of; for while they are wonderfully accurate as to details, their maps and general descriptions are often vague and untrustworthy. But when we remember how only recently the very important duty of causing surveys to be made of the British Islands has been undertaken by the Government, it becomes us rather to speak with respect of the energy and wisdom shown by the Chinese topographers, than to criticise too closely their shortcomings.

Encyclopædias.

It would not be dealing fairly by Chinese literature were we to leave this part of our subject without referring to the historical and literary encyclopædias which form so very notable a feature in every library throughout the country. The best known of these compilations, and the one which may be taken as a specimen of the class, is the *Wan heen tung kaou*, by Ma Twan-lin. This work has been more largely drawn upon by European authors than has any other Chinese book of reference, and those who are best acquainted with it are those who speak most highly in its praise. "One cannot cease to admire," says Remusat, "the depth of research which the author was compelled to make in order to collect his materials, the sagacity he has shown in the arrangement of them, and the clearness and precision with which he has presented this multitude of objects in every light. It may fairly be said that this excellent work is a library in itself, and that if Chinese literature contained nothing else, it would be worth while to learn the language in order to read it. One has only to choose the subject one wishes to study, and one finds all the facts recorded and classified, all the sources of information indicated, and all the authorities cited and discussed." "It elevates our opinion," says Wells Williams, "of a nation whose literature can boast of a work like this, exhibiting such patient investigation and candid comparison of authorities, such varied research and just discrimination of what is truly important, and so extensive a mass of facts and opinions upon every subject of historical interest."

In point of size and importance, however, this encyclopædia yields place to one other, entitled *Koo kin too shoo tseih ching*, or *A Complete Collection of Ancient and Modern Books*. During the reign of the Emperor Kang-he (1661–1721) it occurred to that monarch that, in view of the gradual alterations which were being introduced into the texts of works of interest and value, it would be advisable to reprint such from the old editions. He therefore appointed a commission, and directed them to reprint in one huge collection all such works as they might deem worthy of preservation. A complete set of copper type was cast for the undertaking, and when the commissioners brought their labors to a close, they were able to lay before the emperor a very palpable proof of their diligence in the shape of a compilation consisting of 6109 volumes. The contents they divided under thirty-two heads, embracing works on every subject contained in the national literature. Only a small edition was printed off in the first instance, and before long the Government, yielding to the necessities of a severe monetary crisis, ordered the copper type employed to print it to be melted down for cash. Thus only a few copies of the first edition are in existence, and it is but rarely that one finds its way into the market. It so happens, however, that one is now (1876) for sale at Peking, and it is much to be hoped that this copy of a work which is the largest in the world, unique of its kind, and incapable of reproduction, may, though at present fate is adverse, find its way to the shelves of some one of the great libraries of the West.

Space would fail were we even to refer to the immense number of biographies and of works on the sciences, on education, and on jurisprudence, which have from time to time issued, and are still issuing, from the presses in China. Nor need the literature of the religious sects of China—the Confucianists, the Buddhists, and the Taouists—detain us long, since the works of Confucius have already been noticed, and since the great bulk of Chinese Buddhist literature is of Indian origin. It remains, therefore, for us to refer only to the Taouist literature, which has its foundation in *The Sûtra of Reason and of Virtue* by Laoutsze, the founder of the sect. Like Confucius, of whom he was a contemporary, he held office at the court of Chow; but being less ambitious than the sage, he retired early from his post, and we are told that as he

Taouist literature.

passed the frontier on his way westward, whither we know not, he placed in the hands of the officer in charge of the frontier guard a small volume, which embodied the results of his meditations. According to the interpretation put upon his system thus expounded by the famous commentator Choo He, it would appear to bear a strong analogy to those of the Quietists and Manichæists. "Laou-tsze's scheme of philosophy," he tells us, "consists in modesty, self-emptiness, in being void of desires, quiet and free from exertion, in being self-empty, retiring, and self-controlling in actual life." But beyond this his great object seems to have been to elucidate and develop his idea of the relations between something which he calls Taou and the universe. To this Taou, Laou-tsze refers all things as the ultimate ideal unity of the universe. All things originate from Taou, conform to Taou, and to Taou they at last return. Formless, it is the cause of form. It is an eternal road; along it all beings and all things walk; but no being made it, for it is being itself, and yet nothing. It is the path, and also the path-goers, and everything and nothing, and the cause and effect of all.

This is a sufficiently mystical foundation to allow of any superstructures, however wildly superstitious, to be based upon it. And just as the religion of ancient Rome became incrusted and overlaid by superstitious vanities gathered from Egypt, and from wherever the Roman arms penetrated, so the teachings of Laou-tzse have been debased and disfigured in the hands of the later writers, who, casting aside his profound speculations, busy themselves with the pursuit of immortality, the search after the philosopher's stone, the use of amulets, with the observance of fasts and sacrifices, rituals and charms, and the indefinite multiplication of objects of worship.

Poetry. In China, as elsewhere, the first development of literary talent is found in poetry. The songs and ballads which form the *Book of Odes*, already spoken of, date back to a time long antecedent to the production of any works of which we have knowledge. In

Book of Odes. those early days, before China was China, the then empire was divided into a number of feudal states, all of which, however, acknowledged fealty to the ruling sovereign, at whose court were a number of music-masters and historiographers, whose duty it was to collect and set to music the songs of the people, and to preserve the historical records of the empire. In strict imitation of the surroundings of their liege lord the feudatory princes numbered among their retinues officers of like position and professing similar functions. At stated intervals these princes, accompanied by their followings, were in the habit of meeting the king at certain recognized places to take orders for the future and to receive credit or blame as the case might be for their past conduct. On such occasions the music masters would carry with them the ballads and songs collected in their principalities, and present them to their superior at the royal court. These he would collect and classify, reminding one of Queen Elizabeth's minister, who, according to the *Spectator*, "had all manner of books and ballads brought to him, of what kind soever, and took great notice how much they took with the people; upon which he would, and certainly might very well judge of their present dispositions, and of the most proper way of applying them according to his own purposes." Thus it happened, that at the time of Confucius there existed an official collection of some 3000 songs. On these the sage set to work, and, in the words of the historian Sze-ma Tseen, "he rejected those which were only repetitions of others, and selected those which would be serviceable for the inculcation of propriety and righteousness." Such he arranged to the number of 311 under four heads, namely, "National Airs," the "Lesser" and the "Greater Eulogies," and the "Song of Homage," and gave the title of *She king*, or *Book of Odes*, to the collection.

If we can imagine ourselves seated in the study of the royal minister, searching with him into the ballads thus laid before us for an indication of the temper and mind of the people among whom they had had their birth, we should be inclined to congratulate him on the easy task entrusted to him of governing such a population. Through most of them there breathes a quiet calm and patriarchal simplicity of thought and life. There are few sounds of war, little tumult of the camp, but on the contrary, a spirit of peaceful repose, of family love, and of religious feeling. We have brought before the mind's eye the lowly cottage, where dwell a family united by the bonds of affection and of duty. Their food is the produce of the soil and the spoils of the chase. The highest ambition of the men is to excel as archers and charioteers, and their religious worship is the same as that which, untainted by Buddhism or any other form of philosophical teaching, is now practised at the imperial temples of heaven and earth, by the emperor only as high priest. Their wives are objects of affection and respect, and though in one song we find the belief expressed that "a wise woman will ruin a city," yet there seems to have been abundance of regard for honest housewives who did their duty, who shared the toil of their husbands, and enjoyed with them the simple pleasures within their reach.

It is true that now and again we meet with traces of scenes of revelry bordering on licentiousness; but their idyllic surroundings, and the absence of all violence, deprive the most dissolute descriptions of all vulgarity and coarseness. More serious by far are the wailing complaints of misrule and tyranny under which the subjects of certain princes groan. But even here there are no signs of insubordination or tumult; the remedy which suggests itself to a people patient and long-suffering to a degree is to emigrate beyond the reach of the tyrant, not to rise in rebellion against him. In the following lines, for instance, the writer begs his friends to fly with him from the oppression and misery prevailing in his native state, which he likens to the north wind and thickly-falling snow:—

"Cold blows the North wind;
Thickly falls the snow.
Oh come all ye that love me,
Let's join hands and go.
Can we any longer stay,
Victims to this dire dismay?"

Foxes and crows were looked upon as creatures of evil omen, and so, giving play to his imagination, he tells us that the only variations noticeable in the monotony of the present distress were these prognostics of future evil, in these words:—

"Nought red is seen but foxes,
Nor aught else black but crows,
Oh come all ye that love me,
Let's fly before our foes.
Can we any longer stay,
Victims to this dire dismay?"

Though the style and diction of these songs are of the simplest description, yet through some of them there runs a rich vein of sentiment, and in forming a judgment on them it is necessary to remember that they are not studied poems, but simply what they profess to be, songs of the people. Like all political ballads also, many of them refer to contemporary events, about which we know next to nothing. We are therefore much in the hands of the commentators, and they tell us that the following song is intended to depict a rural scene, in which an industrious wife impresses on her husband the necessity of early rising, and encourages him to make virtuous and respectable acquaintances:—

"'Get up, husband, here's the day!'
'Not yet, wife, the dawn's still gray.'
'Get up, sir, and on the right
See the morning star shines bright.
Shake off slumber, and prepare
Ducks and geese to shoot and snare.

"'All your darts and line may kill
I will dress for you with skill.
Thus, a blithesome hour we'll pass,
Brightened by a cheerful glass;
While your lute its aid imparts
To gratify and soothe our hearts.

"'On all whom you may wish to know
I'll girdle ornaments bestow;
And girdle ornaments I'll send
To any one who calls you friend;
With him whose love for you's abiding
My girdle ornaments dividing.'"
(*The Book of Odes*, pt. i. bk. vii. Ode 8.)

One other we will quote, taken from the songs of homage, or hymns which were sung either by or before the emperor when he sacrificed as high priest to God. We are told that this one was sung by King Seuen on the occasion of a great drought in the 8th century B.C. In it he expostulates with

God for bringing this misery upon him, and expresses his belief that he had a right to expect succor instead of disaster from the Most High.

"Brightly resplendent in the sky revolved
The milky way.
The monarch cried, Alas!
What crime is ours, that Heaven thus sends on us
Death and Disorder, that with blow on blow
Famine attacks us?
Surely I have grudged
To God no victims; all our store is spent
Of tokens. Why is it I am not heard?
Rages the drought. The hills are parched, and dry
The streams. The demon of the drought
Destroys like one who scatters fiery flames.
Terrified by the burning heat my heart,
My mourning heart, seems all consumed with fire.
The many dukes and ministers of the past
Pay me no heed.
O God! from Thy great Heaven
Send me permission to withdraw myself
Into seclusion.
Fearful is the drought.
I hesitate, I dread to go away.
Why has the drought been sent upon my land?
No cause for it know I. Full early rose
My prayers for a good year; not late was I
In off'ring sacrifice unto the Lords
Of the four quarters and the land.
Afar
In the high Heaven God listens not. And yet
Surely a reverent man as I have been
To all intelligent Spirits should not be
The victim of their overwhelming wrath."
(*The Book of Odes*, pt. iii. bk. iii. Ode 4.)

Such is the poetry of the *Book of Odes*, and such we should have expected to find it, since the earliest specimens of poetry in every land partake of a simple and religious nature, are crude in their measure, and are wanting in that harmony which is begotten of study and cultivation. The Chinese say of poetry that the *Book of Odes* may be likened to its roots, that during the Han and Wei dynasties it burst into foliage, and that during the Tang dynasty (620–907) it came into full bloom. Certainly the change that came over it after the time of Confucius is very marked. Instead of the peaceful odes of his day, we find pieces reflecting the unsettled condition of political and social affairs. Songs breathing fire and sword, mingled with wild fancies, the offspring of Taouist teaching, have taken the place of the domestic ballads of the *Book of Odes*. The simple monotheistic belief of the early Chinese is exchanged for a superstitious faith in a host of gods and goddesses, who haunt every hill, and dance in every glade. As a specimen of the poetry of this period, we may quote the following "Lament of a Soldier on a Campaign," by Sun Tsze-king, of the Wei dynasty:—

Later poetry.

"On the hilly way blows the morning breeze; the
Autumn shrubs are veiled in mist and rain.
The whole city escorts us far on our way, providing us
with rations for a thousand *li*.
Their very worst have the three Fates done. Ah me!
how can I be saved? There is nought more
bitter than an early death. Do not the Gods desire
to gain perpetual youth?
As Sorrow and Happiness, so are Fortune and Misfortune
intermingled. Heaven and Earth are the
moulds in which we are formed, and in them is
there nothing which does not bear significance.
Far into the future looks the sage, early striving to
avert calamity. But who can examine his own
heart, scrutinize it by the light of heaven, regulate
it for his present life, and preserve it for the
old age which is to come?
Longer grows the distance from what I have left
behind me: my trouble is greater than I can bear."

With other poets this new phase of belief encouraged a contempt for life, and an uncertainty of all beyond it; and these during the first two centuries gave vent to their indifference in odes advocating the Epicurean philosophy, "Let us eat and drink, for to-morrow we die." Eight short dynasties, times of confusion and disorder, followed after the Han dynasties (206 B.C. to 221 A.D.) and then came the Tang dynasty (620–907), a period which is looked back upon as being the golden age of literature, as, indeed, it was in every field which marks a nation's greatness. It was during this epoch that imperial armies occupied Bokhara and Samarcand, that the Buddhist traveller Heuen-tsang made his way to India, and to every spot rendered sacred by the presence of Buddha, and that the softening influences of Christianity were introduced by the Nestorians into the very heart of the empire. It was a time of prosperity and peace. Literature flourished, and skill and art were employed to soften and add harmony to the national poetry. The four syllables, of which nearly all the lines in the *Book of Odes* were composed, were exchanged for five and seven. The subjects also partook of the change. Le Tai-pih, the greatest poet of his time, turned his lyre to notes on the pleasures of wine and of beauty, which would have done honor to Anacreon. Evening feasts amid the parterres of gardens rich with the bloom of a thousand flowers furnished themes upon which he and his imitators were never tired of dilating. Such sonnets are sometimes pretty, and occasionally the ideas they contain are striking; but the disadvantages of the language and of education weigh heavily upon their authors, and they seldom rise beyond the level of the merest mediocrity. The following is taken from the writings of the poet just mentioned, and is translated *lineatim et verbatim*:—

A Solitary Carouse on a Day in Spring.

"The east wind fans a gentle breeze,
The streams and trees glory in the brightness of the Spring,
The bright sun illuminates the green shrubs,
And the falling flowers are scattered and fly away.
The solitary cloud retreats to the hollow hill,
The birds return to their leafy haunts.
Every being has a refuge whither he may turn,
I alone have nothing to which to cling.
So, seated opposite the moon shining o'er the cliff,
I drink and sing to the fragrant blossoms."

Of epic poetry the Chinese know nothing, and this need not surprise us when we remember how entirely that style of writing was an importation from Greece into Western Europe; and Voltaire tells us that, when he was thinking of publishing the *Henriade*, he consulted a friend on the subject, who recommended him to give up the undertaking, "for," said he, "the French have not epic heads." Neither have the Chinese. A sustained effort of imagination is difficult to them, and the strict laws of rhyme and metre which hamper the poet would make a lengthened poem in Chinese the work of a lifetime. It is probably due to this cause that the literature shows no instance of real dramatic poetry. Their dramas abound with short lyrical pieces, which are introduced to break the monotony of the dialogue; but dramas in verse are unknown, except in the case of low plays written in vulgar rhythm. As, however, love for the drama is one of the most noticeable features of the Chinese character, every encouragement has been given to playwrights, and this branch of literature is therefore well supplied both as regards matter and bulk. The most celebrated plays are contained in a collection entitled *The Hundred Plays of the Yuen Dynasty*, many of which have been translated into European languages, and one of which, *the Orphan of Chaou*, served as the groundwork of Voltaire's tragedy, *L'Orphelin de la Chine*. Their dramas are divided in the playbooks into acts, generally four or five, but as there is an absence of all scenery, and as the dresses are never changed during the piece, the acting is as a rule continuous throughout without break or interval. The stage directions are given in their books as in ours, but not with the same minuteness. "Enter" and "exit" are expressed by "ascend" and "descend," and "aside," by "turn the back and say." By the rules of the Chinese, as was the case also in the Greek drama, only two players are allowed to have possession of the stage at any one time. This, and the absence of all scenery, obliges the dramatists to put in the mouths of the actors long pieces of spoken narrative, much after the manner of the prologues in the plays of Euripides, which appear tame and heavy to a European spectator accustomed to have the plot and locality explained by dialogue and scenery. The plots are for the most part simple and well sustained. The unities, though sometimes observed, are more often disregarded, especially that of place, the characters being frequently sent to different parts of the country in the same act, and made to inform the audience of their whereabouts by the simple expedien-

Dramatic literature.

of walking up and down the stage, and exclaiming, "Now I am at such and such a place," or "at such and such a house." The acting, generally speaking, is good. The Chinese are actors by nature, and are no doubt a good deal improved by their inherent cunning and want of sincerity, which make them quick of observation and fertile in resource, and in every-day life enable them easily to catch the tone of those with whom they associate, and on the stage to assume the characters they wish to represent.

The theatre is in China, as it was in Greece, national and religious. It is under the direct control of the law, and is closed by imperial edict during all periods of public mourning, while at the same time it plays a prominent part at all the yearly religious festivals. In order to give some idea of the substance and plot of a Chinese drama, I will quote from Sir John Davis's *China* an abstract of a play, which he has translated and published at full length, entitled *The Heir in Old Age*. This piece serves, as is observed by the translator, to illustrate the consequences which the Chinese attach to the due performance of the oblations at the tombs of departed ancestors, and also the true relation of the handmaid to the legitimate wife. The *dramatis personæ* are, he says, "made up entirely of the members of a family in the middle class of life, consisting of a rich old man, his wife, a handmaid, his nephew, his son-in-law, and his daughter." The old man, having no son to console him in his age, and to perform the obsequies at his tomb, had, like the Jewish patriarch, taken a handmaid, whose pregnancy is announced at the opening of the play, in which the old man commences with saying, "I am a man of Tung-ping Foo," &c. In order to obtain from Heaven a son, instead of a daughter, he makes a sacrifice of sundry debts due to him, by burning the bonds, and this propitiatory holocaust serves at the same time to quiet some scruples of conscience as to the mode in which part of his money had been acquired. He then delivers over his affairs to his wife and his married daughter, dismissing his nephew (a deceased brother's son) with a hundred pieces of silver to seek his fortune, as he had been subjected at home to the persecution of the wife. This done, the old man sets out for his estate in the country, recommending the mother of his expected son to the humane treatment of the family, and with the hope of receiving from them speedy congratulations on the birth of a son.

Abstract of a play.

The son-in-law now betrays to the daughter his disappointment at the expected birth, since, if it prove a girl, they shall lose half the family property, and if a son, the whole. His wife quiets him by a hint how easily the handmaid may be got rid of, and the old man persuaded that she had suddenly disappeared; and shortly afterwards both the son-in-law and the audience are left to infer that she had actually contrived to make away with her. In the mean time the old man awaits the result in great anxiety; his family appear in succession to console him for the loss of his hopes. In the bitterness of his disappointment, he bursts into tears and expresses his suspicions of foul play. He then attributes his misfortunes to his former thirst for gain, resolves to fast for seven days, and to bestow alms publicly at a neighboring temple, in the hope that the object of his charity may treat him as a father. Among the beggars at the temple his nephew appears in the most hopeless state of poverty, being reduced to take up his lodgings under the furnace of a pottery; he is insulted by the son-in-law, and reproached by the old wife, but his uncle, moved with compassion, contrives to give him a little money, and earnestly advises him to be punctual in visiting the tombs of his family at the approaching spring, assuring him that a due attention to those sacred rites must ultimately lead to prosperity. It is on the importance attached to the sepulchral ceremonies that the whole drama is made to turn.

The nephew accordingly appears at the tombs, performs his oblations as well as his poverty will admit, and invokes the shades of his ancestors to grant him their protection. He no sooner departs than the old man appears with his wife, expressing their indignation that their own daughter and son-in-law had neglected to come with the customary offerings. They observe, from the appearances at the sepulchre, that their nephew must have been there. The scene at the tombs, and the reflections of the old man thereon, have considerable interest; he reasons with his wife, and convinces her that the nephew is nearer in blood and more worthy than the son-in-law; she relents, and expresses a wish to make him reparation; he appears, and a reconciliation takes place, and he is received back into the family. The son-in-law and daughter now enter with a great bustle and a procession, to perform the ceremonies, but are received with bitter reproaches for their tardy piety and ingratitude, and forbidden to enter the doors again.

On the old man's birthday, however, they claim permission to pay their respects, when, to the boundless surprise and joy of the father, his daughter presents him with the long-lost handmaid and child, both of whom, it appears, had been secreted by the daughter, unknown to her jealous husband, who supposed they were otherwise disposed of. The daughter is taken back, and the old man divides his money in three equal shares, between her, his nephew, and his newly-found son,—the play concluding with expressions of joy and gratitude that the venerable hero of the piece had obtained an "heir in his old age."

This play furnishes us with a very good type of Chinese plays in general. The incidents are true to life, but they have no psychological interest about them. There is no delineation of character in it, and there is nothing in the plot to make it more appropriate for the groundwork of a play than for that of a novel. In the works of fiction we are treated only to the same crude narration of facts, without any just representation of nature. Exaggerated sentiments, which always precede correct reasoning and refined simplicity, fill the pages of their works of fiction, rendering them favorites only with those who are taught to judge of them according to their own standard of taste. Of the characters portrayed, we have to judge only from actions attributed to them, which are strung together with no connecting links, except those supplied by the iteration of details, which are wearisome to a degree. Several novels have been translated into English by Sir John Davis and others; but, from the causes I have described, few have attracted any public interest. Some of their shorter tales, being to a great extent purged of the cumbrous repetitions common to larger works, are better fitted for translation, and the novelty of many of the situations and incidents serves to keep alive the attention of the reader. Unfortunately the tone of most Chinese novels is not such as to afford any palliation for the dreariness of their contents. If Chinese novelists are to be believed, virtue in women and honor in men are to be found only in a few rarely-gifted individuals, and this has been so constantly insisted on, that it appears to have become one of those beliefs which have been the means of their own justification.

Novels.

If then, having considered the past and present literature of China, we cast a glance into the future, the prospect is not encouraging. Already every subject within the scope of Chinese authors has been largely treated of and infinitely elaborated. Every grain of wheat has long ago been beaten out of it, and any further labor expended upon it can but be as thrashing out of straw. The only hope for the future of the literature is that afforded by the importation of foreign knowledge and experience into the country. For many years these can only be introduced in the shape of translations of books. But the time will come when Chinese authors will think for themselves; and when that period arrives, they will learn to estimate their present loudly-vaunted literature at its true value.

Government.

The government may be described as a patriarchal despotism. The emperor is the father of his people, and as a father is responsible for the training and behavior of his children, receiving blame when they prove unworthy, and reward when they show themselves to be virtuous; so is the people's welfare the emperor's first care, and their preservation from all harm, both moral and physical, his first duty. When the people become unruly the emperor views their conduct as the result of his own negligence or want of wisdom, and when peace prevails he accepts it as the consequence of his fatherly solicitude and care. Like a father, also, he holds autocratic sway over his household,—the empire. In his hand lies the power of life and death. Whom he will he slays, and whom he will he keeps alive. But there is a limit to his absolutism. The duties attaching to the relations existing between emperor and people are reciprocal; and, while it is the duty of the subject to render willing and submissive obedience to the sovereign so long as his rule is just and beneficent, it

is also incumbent on him to resist his authority so soon as he ceases to be a minister of God for good. This sacred right of rebellion was distinctly taught by Confucius, and was emphasized by Mencius, who went the length of asserting that a ruler who, by the practice of injustice and oppression, has forfeited his right to rule, should not only be dethroned, but might, if circumstances required it, be put to death.

All this carries us back to a very primitive state of society—to one which probably existed among the Chinese immigrants who first settled on the plains of China, and which has been perpetuated down to the present day unaltered and without interruption. That among the changing fates of empires this system should have been so accurately maintained in China through so many centuries is a fact into the causes of which it is worth-while to inquire. We find it pictured in the records which make up the *Book of History*, the earliest of which carry us back to the time of Noah, and we find it enforced in the writings of the great apostle of patriarchal institutions, Confucius, and in all the other works which go to make up the nine classics. The reverence with which these scriptures are viewed has been the principal means of perpetuating the primitive form of Chinese imperialism. The contents of their pages form the study of every schoolboy, and supply the only themes at the competitive examinations through which every one must pass who seeks an official career. Thus the mind of the nation is constantly and almost exclusively turned towards them, and their dogmas have become part and parcel of the national training. The isolation in which China, owing to her geographical and political position, has been wrapt for so many centuries has prevented the introduction of foreign opinions and literature, and the national mind has been so emasculated by the constant contemplation of these ready-made models of excellence, that neither from without nor from within has there been any temptation to Chinamen, by the creation of new ideas, on this or any other subject, to dissent from the dicta of Confucius and his predecessors, and the result has been that such as the government was in their time so it is at the present day.

The whole theory of government is the embodiment of parental and filial piety. As the people are the children of the emperor, so is he the *Teen-tsze* or the Son of Heaven; and standing in this intermediary position, it pertains to him, and to him alone, to mediate between his father, Heaven, and his children, his subjects. His sacrifices and prayers to Heaven are conducted with great parade and ceremony. The chief of these state observances is the sacrifice at the winter solstice, which is performed before sunrise on the morning of the 21st of December at the altar of Heaven. The form of this altar is peculiar. "It consists of a triple circular terrace, 210 feet wide at the base, 150 in the middle, and 90 at the top. . . . The emperor, with his immediate suite, kneels in front of the tablet of Shang-tis (The Supreme Being of Heaven), and faces the north. The platform is laid with marble stones, forming nine concentric circles; the inner circle consists of nine stones, cut so as to fit with close edges round the central stone, which is a perfect circle. Here the emperor kneels, and is surrounded first by the circles of the terraces and their enclosing walls, and then by the circle of the horizon. He then seems to himself and to his court to be in the centre of the universe, and turning to the north, assuming the attitude of a subject, he acknowledges in prayer and by his position that he is inferior to Heaven and to Heaven alone. Round him on the pavement are the nine circles of as many Heavens, consisting of nine stones, then eighteen, then twenty-seven, and so on in successive multiples of nine till the square of nine, the favorite number of Chinese philosophy, is reached in the outermost circle of eighty-one stones." On this occasion, also, a bullock of two years old, and without blemish, is offered as a whole-burnt offering in a green porcelain furnace which stands close beside the altar.

Imperial sacrifices.

But though occupying the lofty position described, the power wielded by the emperor of China is circumscribed by ceremonial laws and hampered by precedents. His whole life is one continual round of ceremonial observances. From the day on which he ascends the throne to the time when he is carried to his tomb in the Eastern Hills, his hours and almost minutes have special duties appointed to them by the Board of Rites. He never leaves his palace except on state occasions, and every relaxation from the cares of sovereignty must therefore be found within its walls. It is thus that the temptations of harem life have been the ruin of so many emperors, and it is rarely the case that such sovereigns are to be met with as Kang-he and Keen-lung, who reigned in the last two centuries, and each of whom devoted the sixty years of his reign to the high duties of his position and to the charms of literary pursuits.

In all affairs of state the emperor is assisted in his deliberations by the *Nuy-ko*, or privy council, which, according to the regulations of the present dynasty, consists of nine Manchoos and seven Chinamen; and the administrative departments are presided over by six boards, namely, the Board of War, the Board of Punishments, the Board of Office, the Board of Ceremonies, the Board of Revenue, and the Board of Works. Besides these there are the Board of Music and that of Censors; and this last, though an inferior office, exercises considerable influence, since its officers, both in the capital and in the provinces, are encouraged to criticise freely the actions of the mandarins and even of the emperor himself. Like many of the other branches of Government, this one has fallen a victim to a great extent to the corruption which prevails throughout all the departments, but it is still at times instrumental in bringing to light official misdeeds; and only lately a general in command of an army, acting against the Mahometan rebels in North-Western China, was degraded and dismissed from his post for crimes with which he was first charged by a censor.

Government boards.

The provincial governments are mainly self-governed. Each province (in a few cases, two conjointly) is presided over by a viceroy, who is supreme within his jurisdiction, and who has, in cases of emergency, the power of life and death in his hands. Next to him comes the governor, whose authority in all matters relating to the province is second only to that of the viceroy. After these two officials the treasurer holds the highest rank. He controls the finances of the whole province, receiving the taxes and paying the salaries of the mandarins. The judge, the salt commissioner, and the grain collector are the only other mandarins whose authority extends over the whole province, the remaining officials being charged with the government of the various divisions into which the provinces are divided. The chief of them is the Taou-tai, or intendant of circuit, who has a direct general superintendence over all the affairs of the circuit intrusted to his charge. Each circuit is divided into a number of prefectures and subprefectures which are administered by prefects and subprefects, and these, again, are subdivided into districts over each of which is placed a magistrate. Subordinate to this last-named officer are a host of petty officials, among whom the coroner is one of the most important. Each province collects its own taxes, pays its own expenses, and supports its own army and navy. Its officials are held responsible for the preservation of peace within its borders, and are compelled to contribute a fixed sum annually to the expenses of the Peking Government. Mandarins of all classes are divided into nine ranks, each distinguished by the button worn on the top of the cap. These buttons follow thus in order of superiority—first and highest, a plain red button; second, a flowered red button; third, a transparent blue button; fourth, an opaque blue button; fifth, an uncolored glass button; sixth, a white glass button; seventh, a plain gilt button; eighth, a gilt button, with flowers in relief; ninth, a gilt button, with engraved flowers. These buttons are no indication of the office held by their wearers, but simply of their rank. The peacock's feather, again, which is worn in the hats, has nothing to do with either the office or the rank of the wearer, but is like the European orders, and is specially granted to individuals as a reward for merit.

Provincial governments.

Theoretically the system of government in the provinces is excellent, but as a matter of fact it is corrupt to the core. Several causes have tended to bring about this disastrous state of things. In the first place, the mandarins, even when they receive their salaries, which is by no means always the case, are so wretchedly underpaid that the money they receive from this source is barely sufficient to support the staff which it is necessary for them to maintain. A district

Official corruption.

magistrate, for instance, is supposed to receive about £275 per annum, a prefect about £685, and an intendant of circuit about £1035. The pay of the higher officers varies in different parts of the empire. The salary of the viceroy of the two provinces, Kwang-tung and Kwang-se, is said to be about £9000 a year. The consequence is that, as few mandarins have private means, they are obliged to supplement their official incomes by illegal exactions and bribes. And this evil is further heightened by the regulation which forbids that a mandarin should hold any office for more than three years. It becomes the selfish interest, therefore, of every office-holder to get as much out of the people within his jurisdiction as he possibly can in that time. The instant he arrives at his post it is customary for all the subordinate officials to pay their respects to him, on which occasion they are expected to display their loyalty by offering presents of more or less value according to the means at their command. No subaltern dare absent himself, being perfectly aware that such an omission of duty would deprive him of all hope of promotion, and would subject him on the slightest pretence, or even without any pretence whatever, to official persecution and ruin. Then, again, when the suitor comes with a legal cause to the Yamun, or mandarin's office, he is obliged to fee the mandarin, and all the subordinate officials, the secretary, the police, and the doorkeeper, in proportion to his wealth, or otherwise his chance of gaining a hearing would be very small indeed. In a great many cases also the bribery goes beyond the preliminary fee. In an officialdom, where illegal exactions are recognized, it would be impossible to suppose that the stream of justice should be pure, and a limited acquaintance with the practices of Chinese Yamuns is enough to verify the common belief that justice is bought and sold, and that a suitor's chance of success is in proportion to his wealth.

As may readily be imagined, this corruption in high places has a most demoralizing effect on the people generally. Dishonesty prevails to a frightful extent, and with it, of course, untruthfulness. The Chinese set little or no value upon truth, and thus some slight excuse is afforded for the use of torture in their courts of justice; for it is argued that where the value of an oath is not understood, some other means must be resorted to to extract evidence,

Torture.

and the readiest means to hand is doubtless torture. The kind most commonly inflicted is flogging. The obdurate witness is laid flat on his face, and the executioner delivers his blows on the upper part of the thighs with the concave side of a split bamboo, the sharp edges of which mutilate the sufferer terribly. The punishment is continued until the man either supplies the evidence required or becomes insensible. Numberless other forms of torture are occasionally resorted to, such as tying the witness up to a beam by his thumbs and big toes, squeezing his fingers between pieces of bamboo, &c.; and these, of course, vary both in kind and severity, according to the disposition of the presiding mandarin. Theoretically every safeguard is adopted to secure for

Government offices.

the public service only officers of enlightened and refined dispositions. The law ordains that every man who wishes to obtain Government employment must qualify himself for office by passing the prescribed competitive examinations; and as there is, speaking generally, no hereditary nobility nor any class equivalent to English country gentlemen, office supplies the only distinguishing rank in the empire. The consequence is that it is sought after by all except those who engage in trade. Thus the Government has the cream of the national talent at its disposal, and if posts were only given to the foremost men at the examinations as the law provides, no system could be better, and when it has been carried out China has reaped the benefits of it. Unfortunately, however, it has constantly happened that when the Government has been embarrassed by want of money, offices have been put up for sale, and thus the man who has the longest purse steps into the post of honor; and if, as must often happen, he should chance to be cruel as well as uncultured, unjust as well as ignorant, woe betide the people under him. One great defect in the competitive system in China is that there is no limit to the number of candidates, nor to the age when they may go up for examination, and the result is that, what with the surplus victors and the unsuccessful aspirants who go on trying year after year until they become grey-haired old men, there exists a large non-producing class in the community which acts as a dead weight on the national prosperity.

Punishments.

It is only natural to expect that in a country where the torture of witnesses is permitted, the punishments inflicted on the guilty should exceed in cruelty, and this is eminently the case in China. The Mongolian race is confessedly obtuse-nerved and insensible to suffering, and no doubt Chinese culprits do not suffer nearly as much as members of more sensitive races would under similar treatment. But even granting this, the refined cruelties perpetrated by Chinamen upon Chinamen admit of no apology. Not long since, for instance, at one of the Treaty Ports, an offender was placed in a cage, through the top of which his head protruded, and which was just long enough to allow the tips of his toes to touch the ground. In this position, hanging as it were by his neck, with just enough support from his feet to prevent his neck dislocating, the wretched man remained for days, the object of the jeers and laughter of the passers by, until starvation and exhaustion put an end to his sufferings. As punishments for heinous offences such cruelties would be sufficiently shocking, but the fact that this and kindred tortures are not unfrequently inflicted for very insignificant crimes, and sometimes even to gratify the malice or the greed of the officiating mandarin, is significant of a strangely callous indifference in the Chinese nature to the sufferings of others. For capital offences the usual modes of inflicting the extreme penalty of the law are—in bad cases, such as parricides, "cutting to pieces," and for less aggravated crimes either strangulation or decapitation. The culprit who is condemned to be "cut to pieces" is fastened to a cross, and while thus suspended cuts are made by the executioner on the fleshy parts of the body, and he is then beheaded. Strangulation is reserved for offenders of high rank, it being considered a privilege to pass out of life with a whole body. When it has been granted to a criminal thus to meet his end, a silken cord is sent to him in prison. No explanatory message is considered necessary, and he is left to consummate his own doom. Sometimes, of course, the prisoner's nerve forsakes him at the supreme moment, as was the case with a prince of the blood, who in 1861 was presented with a silken cord for treason. This imperial personage could not make up his mind to be his own executioner, and it became necessary to call in the jailers to carry out the sentence of the law. Decapitation in China is a very speedy death, and were it not that popular sentiment regards it as a peculiarly disgraceful end, it would be a very merciful one. Constant practice makes the executioners wonderfully expert in the performance of their deadly office. No block or resting-place for the head is used. The neck is simply outstretched to its full length by the aid of an assistant, and one blow invariably leaves the body headless.

Social and Domestic Life.

But side by side with all these horrors there is a vast deal of quiet, happy, domestic life in China. It is not every one who gets into the clutches of the mandarins and their satellites, and as long as a man is loyal to the powers that be, and is not over rich, he may expect to be left alone in undisturbed enjoyment of the pleasures within his reach. And in the ordering of a Chinese household there is much that might be imitated with advantage by European families. The duty of filial piety, which is the final object of Chinese religious teaching, represents much more than the ceremonial observances which outwardly mark its performance. The reverence with which children are taught to regard their parents fosters the affection of which this reverence is the outward and visible sign, and the peace of each household is assured by the presence of a supreme authority, against whose dicta there is no appeal. Although sons very generally remain under their fathers' roofs after they are married and have themselves become fathers, yet so impossible would it be for a young Chinaman to rebel against, or even to dispute with, his parent that difficulties seldom arise from this close association of several generations. The patriarchal system of family life is dear to the heart of every Chinaman, and when his time comes to die, death loses to him half its terrors if he is

assured that his sons will be present at his tomb to perform the customary rites and to offer the prescribed sacrifices. It is his belief that the peace of his soul depends on the due celebration of these posthumous observances, and if he has no son present to officiate, to whom can he look for the performance of them?

Marriage customs.

It is mainly due to this cause that early marriages are almost universal in China. Like the Jews of old, the Chinese look upon the possession of children, especially of sons, as the chief blessing of life, and consequently as soon as a young man comes of age his parents cast about to find a helpmate for him. The would-be bridegroom has very little to say in the matter. Marriage is not the result of acquaintanceship ripening into affection, as amongst Western nations. The bridegroom rarely sees his betrothed until she has become his wife. The preliminaries are entirely arranged by a professional "go-between" or "match-maker," who makes it her duty to acquaint herself with all the marriageable young people of both sexes in the neighborhood. When employed by the bridegroom's friends she calls on the parents of some young lady who she considers would make a suitable wife for the future bridegroom, armed with a card on which are inscribed the ancestral name, and the eight symbols which denote the year, month, day, and hour of the birth of the suitor. Should the lady's parents be inclined to accept the proposal they consult a fortune-teller as to the future prospects of such a union. If the answer be favorable a return card is given to the go-between, and this in turn is submitted to the scrutiny of a fortune-teller employed by the man's parents. Should the oracles prophesy good concerning the match the bridegroom prepares two large cards on which are written the particulars of the engagement; and on the outer side of the one which he keeps is pasted a paper dragon, and on the one which is sent to the lady, a phœnix,—emblems of conjugal fidelity. Each card is further sewn together with two pieces of red silk. Legend traces the original of these silken cords to the time of the Tang dynasty (618–907). During that period, it is said that a man named Hwuy Ko, while staying at the town of Sung, saw one evening an old man reading a book by the light of the moon, who addressed him thus: "This book is the register of the engagements of marriage for all places under heaven, and in my pockets I have red cords with which I tie together the feet of those who are destined to become man and wife. When this cord has been tied, though the parties are of unfriendly families, or of different nations, their fates are fixed. Your future wife," said he, "is the child of the old woman who sells vegetables in yonder shop on the north." Upon hearing this Hwuy Ko started off in search of the old woman, and found her possessed of such a hideous little infant of about twelve months old, that in despair he hired a man to kill the child. Years afterwards the prefect of a neighboring district gave Hwuy Ko in marriage a beautiful young lady whom he affirmed to be his own daughter. Seeing that his bride always wore an artificial flower over her eyebrow, Hwuy Ko asked her the reason of her doing so. "I am the daughter," she replied, "of the prefect's brother who died at Sung when I was an infant, leaving me to the care of an old woman who sold vegetables. One day, when I was out with her in the street a ruffian struck me on my eyebrow, and made such a scar that I am obliged to wear this flower to conceal it." On hearing this Hwuy Ko recognized the immutability of fate, and from that time forward red silken cords have been entwined in the marriage cards of every pair in China. Following the exchange of cards, presents of more or less value according to the wealth of the contracting parties pass between the two households, and at last when the happy day has arrived, the bride, surrounded by her friends, starts from her father's house in a sedan chair for her future home. Half-way between the two houses she is met by a party of the bridegroom's followers, who escort her the rest of the way. In this custom it is impossible not to see a survival of the primitive custom of marriage by capture. At the present day, in some parts of Central Asia, the bride rides off on horseback at full gallop from the door of her father's house or tent, followed by the bridegroom, who, after an exciting chase, is allowed to come up with her, and she straightway becomes his property. Among some of the Siberian tribes, again, the bridegroom is obliged to hunt his bride through the compartments of her father's tent, while old women go through the farce of tripping him up and otherwise hindering him in his pursuit. In more civilized China there are fewer traces of the ancient capture, and the contest has there become but a formal act of taking over the bride on her way to the bridegroom's house. On alighting from her sedan chair she is led with her head covered into the room where her future husband awaits her. Without exchanging a word they sit down side by side, and each tries to sit on a part of the dress of the other, it being considered that the one who succeeds in so doing will rule in the household. After this silent trial of skill they adjourn to the reception hall, where stands the family altar, and there they worship Heaven, and Earth, and their ancestors. This done, they drink a glass of wine together, when for the first time the bridegroom is allowed to see the face of his bride. Here the marriage ceremony ends, and the guests give themselves up to feasting and rejoicing.

Infanticide.

Like many other apparent paradoxes, the co-existence of infanticide with an universal desire for children among the Chinese admits of a ready explanation. The chief object of desire is the possession of sons, and in the parts of the country where infanticide exists—and this is the case only in poverty-stricken households in certain districts of certain provinces—female infants are the only victims. In some parts of the province of Fuhkeen the people make no attempt to conceal the existence of the practice, and even go the length of defending it. What is the good of rearing daughters, they say; when they are young they are only an expense, and when they reach an age when they might be able to work for their own living, they marry and leave us. But even the poorest people nourish and cherish their sons. Their labor soon becomes remunerative, they support their parents in their old age, and when these are gathered to their fathers they perform the prescribed observances at their tombs,—offering sacrifices at fixed periods to the souls of the departed, and keeping the tombs in repair. Should anything interfere with the repose of the dead, the living may expect to be visited with misfortune; and to allow the soul of a parent to pass between its tomb and the households of the descendants, the entrance to the grave must be kept unimpeded. Curiously enough, the tombs, especially in the south of China, are all made in the shape of an Ω. This is probably an importation from the West.

Religion.

The principal religions of China are Buddhism, Taouism, and Confucianism, to which must be added Mahometanism in the northern and western provinces of the empire. Buddhism was introduced from India during the 1st century of the Christian era; and thus coming at a time when the national mind had been prepared by the teachings of Confucius and the mysticisms of Laou-tsze for the reception of a religious system which should satisfy the requirements of its higher nature, the new faith spread rapidly through the country, and at the present day numbers more adherents than either of the other two leading religions. Laou-tsze, who was the founder of the Taouist sect, was a contemporary of Confucius. Like that sage also, he held office at the court of Chow, but being disheartened at the want of success attending his efforts to reform the manners of the age he retired into private life and devoted himself to the composition of *The Sûtra of Reason and Virtue*. In this work he enunciated a scheme of philosophy which bears a strong analogy to the doctrines of the Quietists and Manichæists, the leading point being the relation between something which he calls *Taou* and the universe. The philosophical bearing of his system was, however, soon lost sight of and his profound speculations were exchanged for the pursuit of immortality and the search after the philosopher's stone by his followers. But while Buddhism and Taouism find their adherents among the common people, Confucianism is *par excellence* the religion of the learned. The opinions and teachings of the sage are their constant study; and at stated periods they assemble in temples devoted to his honor to worship at the shrine of the "Throneless King." But the process of decay, which has been going on for so many centuries in the distinctive features of these creeds, has served so to obliterate the lines of demarcation which originally separated them, that at the present day the dog

mas of Buddha and Laou-tsze and the teachings of Confucius may, as far as the masses are concerned, be treated as the foundations of a common faith.

Education.

Education is probably more widely spread among the male population in China than in any other country. Being the only high road to honor and emolument it is eagerly sought after by all who are desirous of following an official career, while the universal respect for letters which has become a national tradition encourages all of every degree to gain at least a smattering of learning—except the women. Very little trouble is taken with the education of girls. If they are taught to be good needle-women and expert cooks, if they learn to act modestly and to show due deference to their superiors, little more is as a rule required of them. But it is very different with the men. No one can hold any Government office unless he has passed at least the first of the three great literary competitive examinations, and the whole education of boys is arranged with the object of enabling them to pass successfully through these ordeals. Unfortunately for the real education of the aspirants to office, the only subject required of them is a knowledge of the Nine Classics, and the result is that from childhood upwards these works are the only text-books which are put into the hands of Chinese school-boys. These they are taught to regard as the supreme models of excellence, and any deviation either from the opinions they contain or from the style in which they are written, is looked upon as heretical. The result is that there have grown up in China generation after generation of men who have learned to elevate mere memory above genius, and whose mental powers have been dwarfed by servile imitation and by the paltry literalism of the schools.

Every-day customs.

Turning to the every-day customs and manners of the Chinese, it is passing strange to find how diametrically opposed they are to what we are familiar with. In a country "where," as has been said by Wingrove Cook, "the roses have no fragrance, and the women no petticoats; where the laborer has no Sabbath, and the magistrate no sense of honor; where the needle points to the south, and the sign of being puzzled is to scratch the antipodes of the head; where the place of honor is on the left hand, and the seat of intellect is in the stomach; where to take off your hat is an insolent gesture, and to wear white garments is to put yourself into mourning," it would at first sight seem useless to seek for any point of similarity with ourselves. But it is extremely probable, for instance, that the choice of the left as the seat of honor is in principle entirely at one with our custom of considering the right hand as the place due to the most highly-honored guest, and that both are survivals of the ancient and almost universal adoration of the sun. The needle of the Chinese compass points towards the south, and every house in China of any pretensions faces the same way, as well as the state seats in all reception rooms. The place on the left of the host, therefore, is that nearest to the light-bringing, life-producing East, and hence its title to honor; and in the same way the opposite custom among ourselves is susceptible of a like interpretation. In daily life the Chinese are frugal, sober, and industrious. Their wants are few, and they are easily satisfied. The poorer classes live almost entirely on rice and vegetables, to which they sometimes add small pieces of fish or meat. Their clothes are of the cheapest kind, and they are so accustomed to crowded apartments that house rent forms an insignificant item in a Chinaman's expenditure. Thus a Chinaman can live where a European would starve, and it is on account of the advantages which he thus possesses, combined with sobriety and frugality, that he is able to underbid the American workman in California, and the English colonist in Australia, in almost every branch of industry. The over-populated condition in which China has been for so many centuries has had a powerful influence in thus moulding the national character. Vast as China is, it cannot contain all those who call themselves her sons and daughters, and in many cities a large section of the inhabitants are driven to live in boats on the neighboring rivers and lakes. It would be very difficult to say how the boat population provide food for themselves and their families; indeed, were it not for the extreme cheapness of their ordinary daily food, and for their sober habits, they could not do so. Spirits—they have no wine—appear to have no great attraction for Chinamen. They drink them occasionally, and sometimes to excess, but a reeling Chinaman is rarely to be seen in the streets. Drunkenness is not a national vice, but, unfortunately, their abstinence does not extend to opium, a drug which seems to have a greater attraction for them than for any other people on the face of the earth. They take to it greedily, and when once the habit of smoking it becomes confirmed, the difficulty of relinquishing it is exceedingly great. There has, no doubt, been much exaggeration in what has been talked and written on this subject. But on the testimony of Chinamen themselves the effects of opium smoking must be regarded as injurious to health and destructive to all the better parts of man's nature. From the time of its introduction into the country, the Chinese Government has opposed the traffic; and on the occasion of the last revision of the Treaty by Sir Rutherford Alcock, Prince Kung and his colleagues made a vigorous stand against the clause which legalizes its importation. In this as in other attempts they were unsuccessful, and it remains to be seen whether the policy they appear now to be adopting of encouraging the growth of native opium will extinguish the import trade.

Opium smoking.

Since the conclusion of the treaty in 1860 numerous attempts have been made to induce the Chinese Government to permit the introduction of railways and telegraphs into China, but to all such counsel the emperor's advisers have turned a deaf ear. Not that they are ignorant of the advantages to be derived from these weapons of progress, but they consider that these advantages would be dearly bought if the price to be paid is to be the admittance of foreigners into the interior of the country, coupled with the hold on the soil which these would acquire were they allowed to construct lines of railway and telegraphs through the provinces. It is difficult, however, even for so autocratic a Government as that of China, to carry out such a curbing policy, and in one or two instances lately, events have forced an advance beyond the hard and fast line laid down by the Peking mandarins. The first step in this direction was taken during the war in Formosa, when the viceroy of the province of Fuh-keen ordered the construction of a line of telegraph from Pagoda Island to his Yamun at Fuh-chow Foo. His action was disapproved by the Government, and several attempts were made to frustrate the undertaking, but mainly through the influence of the foreign ministers, who insisted on the fulfilment of the contract with the telegraph company, the line was finished. The introduction of railways is, however, considered to be a more serious matter, and though at several of the arsenals tramways have for some time been employed, no mandarin has, until quite lately, been bold enough to sanction the use of a locomotive. Quite recently the idea was originated of quietly buying up a strip of land between Shanghai and Woo-sung, and of using it for the construction of a railway. The local mandarins and the Peking Government met the projected line with decided opposition; but here again the arguments brought to bear by the resident foreign ministers were sufficiently cogent to induce it to withdraw all actively obstructive measures, and the first railway in China was opened to traffic under the negative approval of the rulers of the soil. Much importance has been attached to this introduction of railways into China, and the crowded trains which daily travel between the two termini are considered to point to the probable speedy extension of railways throughout the country. But the approval given to the Shanghai railway is merely that of the people; and its completion has at present only intensified the determination of the Government to withstand the adoption of the iron road.

Telegraphs and railways.

See *China*, by Sir John F. Davis, 2 vols. 1857, 8vo; *The Middle Kingdom*, by S. Wells Williams, 2 vols. 8vo; *History of China*, by Carl Guetzlaff, 2 vols. 8vo; *The Social Life of the Chinese*, by Justus Doolittle, 2 vols. 8vo; *Letters to the Shanghai Chamber of Commerce*, by Baron von Richthofen; *Travels in North China*, by A. Williamson, 2 vols.; *Geological Researches in China*, by Raphael Pumpelly; *The Treaty Ports of China*, by W. F. Mayers, &c.; *The Chinese Classics*, by James Legge, D.D.; *The Elements of Chinese Grammar*, by J. Marshman.

(R. K. D.)

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CHINCHA ISLANDS, three small islands in the Pacific Ocean, about 12 miles from the coast of Peru, opposite the town of Pisco, and 106 miles distant from Callao, in 13° 38′ S. lat. and 76° 28′ W. long. The largest of the group, known as the North Island or Isla del Norte, is only four-fifths of a mile in length, and about a third in breadth; and their whole importance is due to their immense deposits of guano. They are of granitic formation, and rise from the sea in precipitous cliffs, worn out into countless caves and hollows, which furnish convenient resting-places for the sea-fowl. Their highest points attain an elevation of 113 feet, which was increased about 90 feet by the guano-bed. The name of the islands, and of the town and valley of Chincha on the mainland, is derived from an ancient Indian race which has left some interesting relics of its sojourn. A stone idol and two water-pots of grotesque construction were discovered under 62 feet of guano; and a number of wooden idols, two regal emblems, and a curious stone slab have also been found. That these must be of very great antiquity is obvious; but the rate of increase in the guano deposits is too much a matter of conjecture to furnish even an approximate date. Mr. George Peacock, of the Pacific Steam Navigation Company, calculated the quantity of guano in the islands in 1846 at 18,250,000 tons; and, according to the survey of the Peruvian Government in 1853, they then still contained 12,376,100. The supply is now practically exhausted; and the foreign export which had begun in 1841 was brought to a close in 1872. Between 1853 and 1872, 8,000,000 tons were obtained from the North and Middle Islands. The former was still visited by 35 Peruvian vessels in 1873, and furnished 11,634 tons. Its population in 1874 was only 105 persons, and the other islands were quite deserted; whereas in 1868 the total population

amounted to 6000, who consisted partly of Peruvians, partly of Chinese coolies, and partly of Peruvian convicts. In 1853–4 the Chincha Islands were the chief object in the contest known as the Guano War between President Echenique and General Castilla; and in 1864 they were taken possession of by the Spanish rear-admiral Pinzon in order to bring the Peruvian Government to apologize for its treatment of the immigrants from Biscay.

CHINCHEW, or CHINCHU, is the name usually given in English charts to an ancient and famous port of China in the province of Fuh-keen, of which the Chinese name is *Chwanchow-foo*, or *Tswanchow-foo* (by French scholars written *Thsiouan-chéou-fou*). It stands in 24° 57′ N. lat. and 118° 35′ E. long. It is described by Martini (in the 17th century) as pleasantly situated on a tongue of land between two branches of the river which forms the harbor, and these so deep that the largest (Chinese) ships could come up to the walls. The city, though now occasionally visited by missionaries and others, is not one of the treaty-ports, and modern information about it is not abundant. But large junks still come close to the city. The walls have a circuit of 7 or 8 miles, but embrace much vacant ground. The chief exports are tea and sugar, tobacco, china-ware, nankeens, &c. There are still to be seen the remains of a fine mosque, founded by the Arab traders who resorted thither. The English Presbyterian Mission has had a chapel in the city since about 1862. Beyond the northern branch of the river (which is several miles from the city) there is a suburb called Loyang, which is approached by the most celebrated bridge in China.

Chwanchow was in the Middle Ages the great port of Western trade with China, and was known to the Arabs and to Europeans as *Zaitûn* or *Zayton*, the name under which it appears in Abulfeda's Geography, and in the Mongol history of Rashîduddîn, as well as in Ibn Batuta, Marco Polo, and other mediæval travellers (see CHINA, p. 546). Marco Polo calls it "one of the two greatest commercial havens in the world;" Ibn Batuta, "the greatest seaport in the world."

Some argument has of late been alleged against the identity of Zayton with Chwanchow, and in favor of its being rather *Changchow* (a great city 60 miles W.S.W. of Chwanchow), or a port on the river of Changchow near Amoy. It is possible that the name "Port of Zayton" covered a good deal, and may have embraced the great basin called Amoy Harbor, the chief part of which lies within the *Foo* or department of Chwanchow; but there is hardly room for doubt that the Zayton of Marco Polo and Abulfeda was the Chwanchow of the Chinese.

Ibn Batuta informs us that a rich silk texture made here was called *Zaitûniya;* and there can be little doubt that this is the real origin of our word *Satin,—Zettani* in mediæval Italian, *Aceytuni* in Spanish.

With the question already indicated is connected a singular ambiguity. The name *Chinchew* is now applied as we have defined; but the Chincheo or Chinchew of old English books, and of the Spaniards and Portuguese to this day, is, as Mr. G. Phillips has lately pointed out, not Chwanchow but Changchow. The province of Fuh-keen is often called Chincheo by the Jesuits of the 16th and 17th centuries. Changchow and its dependencies seem to have constituted the port of Fuh-keen with which Macao and Manila chiefly communicated at that period, and where the Portuguese had at one time a factory; and hence they seem to have applied the same name to the port and the province, though Changchow has never been the official capital of Fuh-keen. How English mariners and maps came to transfer the name to Chwanchow is obscure. (See *Journal R. Geog. Soc.*, vol. xliv.; Yule's *Marco Polo*, 2d ed., 1875, vol. ii., &c.) (H. Y.)

CHINCHILLA, a city of Spain, in the province of Murcia, picturesquely situated on an abrupt hill ten miles south-east of Albacete, in the immediate neighborhood of the junction of the railway lines from Cartagena and Valencia to the capital. It is surrounded by walls rebuilt in 1837, and defended by a citadel; and in the principal church there are reservoirs capable of furnishing the city with water for several months. Earthenware and crucibles, coarse linen, and woollen cloths are manufactured. Population, 3500.

CHINCHILLA (*Chinchilla lanigera*), a small Mammal belonging to the order *Rodentia*, inhabits the eastern slopes of the Andes in Chili, Bolivia, and Peru, where it has a vertical range of from 8000 to 12,000 feet. It is very similar in size to the common squirrel, being about 10 inches long exclusive of the tail, and in the form of its head it resembles a rabbit. It is covered with a dense soft fur three-fourths of an inch long on the back, and upwards of an inch in length on the sides, of a slate-grey color, darkly mottled on the upper surface, and of a dusky white beneath; its ears are long and broad and thinly covered with hair. It lives in burrows, and these subterranean dwellings undermine some parts of the Chilian Andes to such an extent as to cause considerable inconvenience and even danger to travellers on horseback. Chinchillas live in communities, forming their burrows among loose rocks, and coming out to feed only in the early morning and towards sunset. They feed chiefly on roots and grasses, in search of which they often travel a considerable distance from their homes; and when eating they sit on their haunches, holding their food in their fore paws. The Indians in hunting them employ a weasel (*Galictis vittata*), which is trained to enter the crevices of the rocks, where the chinchillas often lie concealed during the day in order to avoid the sunshine, and drive them out, when they are readily killed. The fur of this rodent was prized by the ancient Peruvians, who made coverlets and other articles with the skin, and at the present day they are exported in large numbers to Europe—134,000 skins having been imported into London during 1874—where they are made into muffs, tippets, and trimmings for ladies' dresses. That they have not under such circumstances become rare, if not altogether extinct, is doubtless owing to their extraordinary fecundity, the female usually producing five or six young twice a year. They are exceedingly docile in disposition and cleanly in their habits, and are thus well fitted for domestication, and in this state, owing to the value of their furs, might no doubt be profitably reared.

CHINDWARA. See CHHINDWARA.

CHINGLEPUT, the principal town and fortress of a district of the same name, in the presidency of Madras in British India, on the left bank of the Palar River, 36 miles S.S.W. of Madras in 12° 41′ N. lat. and 80° 2′ E. long. Chingleput was taken by the French in 1751, and was retaken in 1752 by Clive. During the wars of the British with Hyder Ali, it was one of the few strongholds which withstood his power, and afforded a secure refuge to the natives. In 1780, after the defeat of Colonel Baillie, the army of Sir Hector Munro sought protection under its walls. The town is noted for its manufacture of pottery, and it carries on a trade in rice. Population, 7500.

CHIN-HAE, or CHING-HAI, a district town of China, in the province of Che-keang, at the mouth of the Yung-keang River, 12 miles N.E. of Ningpo, in 29° 58′ N. lat. and 121° 45′ E. long. It lies at the foot of a hill on a tongue of land, and is partly protected from the sea on the N. by a dike about three miles long, composed entirely of large blocks of hewn granite. The walls are 20 feet high and 3 miles in circumference. The defences were formerly of considerable strength, and included a well-built but now dismantled citadel on a precipitous cliff, 250 feet high, at the extremity of the tongue of land on which the town is built. In the neighborhood an engagement took place between the English and Chinese in 1841.

CHIN-KEANG FOO, a maritime city of China, in the province of Keang-soo, at the junction of the Grand Canal with the Yang-tsze Keang, 48 miles E.N.E. of Nanking. It was formerly a prosperous and important city with a population of about half a million, well defended by brick walls, in many places 35 feet high, and regarded as the key of the empire towards the sea. In 1842 it yielded to the British forces after a desperate resistance. Since then, however, it has not only suffered from the aberrations of the river system of China, but it has also been laid waste by the insurgents in 1853. It was recaptured by the imperial forces in 1858, and has begun to recover its position.

CHINON (in the Middle Ages *Castrum Caino*), a town of France, capital of an arrondissement in the department of Indre-et-Loire, pleasantly situated on the right bank of the Vienne, 28 miles S.W. of Tours. It has a tribunal of primary instance, a communal college, a town house, and some trade in grain, dried fruits, wine, and brandy. Here Henry II. of England died in 1189; and on the rock above the town there are extensive ruins of the castle where Charles VII. of France resided after the occupation of Paris by the English, and first gave audience to Joan of

Arc. In the castle-rock there are large quarries known as Les Valains, from which building materials have been obtained for ages. Rabelais was born in 1483 at the farm-house of La Devinière in the vicinity, and his house is shown in the Rue de la Lamproie. Population in 1872, 5553.

CHINSURAH, a town of British India, situated on the western bank of the Hooghly River, 24 miles above Calcutta, and formerly the principal Dutch settlement in Bengal. It was among the cessions on the continent of India made by the king of the Netherlands in 1824 in exchange for the British possessions in the island of Sumatra. The Dutch erected a factory here in 1656, on a clear and healthy spot of ground, much preferable to that on which Calcutta is situated, and soon attracted a considerable number of natives to settle in the vicinity. About thirty-five years after this they fell under the displeasure of one of the native potentates, who sequestrated their property and prohibited their traffic. In 1686 all their factories were re-established, and their trade long continued to flourish. In 1759 a British force under Colonel Forde was attacked by the garrison of Chinsurah on its march to Chandernagore. The action was short but decisive, for in less than half an hour the Dutch were entirely routed. In 1795, when Holland became a province of France, the British offered to retain Chinsurah for the stadtholder, but the governor having declined to surrender, the settlement was reduced by a detachment from the military stations at Barrackpore, and was occupied by a British garrison during the whole war. At the general peace of 1814 it was restored to the Dutch. The town, which extends for half a mile along the banks of the river, is built neatly, and with great solidity, of bricks and mortar; and the houses are plastered with fine lime, and have flat roofs and green Venetian windows. It is the seat of an extensive military establishment which has been considerably increased since 1858, and is now capable of accommodating 5000 men. The hospital attached is on a large scale. An important educational institution known as Hooghly College is maintained by Government; and there are a number of schools in the town, several of which are carried on by the missionaries of the Free Church of Scotland. Population, about 14,000.

CHIOGGIA, or Chiozza, a town of Italy, on an island of the same name in the Gulf of Venice, 15 miles south of the city of that name. It is united to the mainland by a bridge of 43 arches, protected at the further extremity by Fort Malghera or Haynau; and the port is likewise defended by Forts Caraman and San Felice. The cathedral of Longhera, founded in 1633, is its most remarkable building; the church of S. Andrea was of much greater antiquity, but it was restored in 1734. From Chioggia to Malamocco stretches the great sea-wall of the Murazzi, which protects Venice from the inroads of the ocean. Chioggia is the Roman *Fossa Claudia*, and began to bear the name of Clugia in the 4th century. In 809 it was destroyed by Pepin, and in 901 by the Slavonic invaders. In 1100 it was chosen as his see by the bishop of Malamocco. With the exception of the years from 1379 to 1381, when it was held by the Genoese, it continued subject to Venice till the fall of the republic; but in spite of its proximity and political connection, it has maintained to the present day some peculiarities of language and custom. Population, 26,336.

CHIOS. See Scio.

CHIPPENHAM, a parliamentary and municipal borough and market-town of England, in the county of Wiltshire, 30 miles N.N.W. of Salisbury, and 94 miles from London by the Great Western Railway, in a valley on the left bank of the Avon, which is here crossed by a handsome stone bridge of 22 arches. It consists mainly of one well-built street more than half a mile in length, and has a spacious Gothic church of considerable antiquity, a town-hall, a market-house, and a literary institution. Formerly the seat of an extensive broad-cloth manufacture, it is now mainly an agricultural town, with flour-mills and tanneries, and large cattle and cheese markets. The stone quarries in the neighborhood give employment to three or four hundred workmen. The parliamentary borough, which includes the parishes of Chippenham, Hardenhuish, Langley-Burrell, and Pewsham, and had in 1871 a population of 6875, returns one member to Parliament; up till 1867 it returned two. Chippenham is several times mentioned in connection with the Danish invasion of the 9th century. In the reign of Edward I. it sent representatives to Parliament, but it did not receive its incorporation till the time of Queen Mary. Dr. Thomas Scott, the author of the *Commentary on the Bible*, and Lodovick Muggleton, the founder of the Muggletonian sect, were natives of the town.

CHIPPEWAY INDIANS. See Ojibway.

CHIRON, in Greek mythology, a Centaur, the son of Chronos and Philyra, who dwelt in a grotto at the foot of Mount Pelion, and who was famous as the wisest of his time, as the founder of the healing art, and as the teacher of most of the ancient heroes, including Hercules, Achilles, Æsculapius, Ulysses, Castor and Pollux, Æneas, Theseus, Meleager, and Nestor. Accidentally pierced by a poisoned arrow shot by Hercules, he resigned his immortality to Prometheus, and escaped the prolonged pain by death.

CHISWICK, a village of England, on the north bank of the Thames, in Middlesex, 4½ miles from Hyde Park Corner, on a branch of the South-Western Railway. It contains numerous fine villas, the principal of which is Chiswick House, the residence of the duke of Devonshire, where Fox died in 1806, and Canning in 1827. The parish church is ancient, and in the churchyard is the tomb of Hogarth. In the neighborhood were formerly the gardens of the Horticultural Society, and there are still extensive market-gardens for the supply of the metropolis. The Chiswick Press was founded here in 1811 by Charles Whittingham. The population of the parish and the improvement commissioners district, which are co-extensive, was 6303 in 1851, and in 1871, 8508.

CHITTAGONG, a district of British India, in the division of the same name (which also comprises the districts of Noákhálí, Tipperah, Chittagong Hill Tracts, and Independent Hill Tipperah), under the jurisdiction of the lieutenant-governor of Bengal, lies between 20° 45′ and 22° 59′ N. lat., and 91° 30′ and 92° 23′ E. long. It is bounded on the N. by Hill Tipperah and the Chittagong Hill Tracts, E. by the Chittagong Hill Tracts and Arákán, S. by Arákán, and W. by the Bay of Bengal. It consists of a strip of low-lying land along the Bay of Bengal, about 165 miles in length, and of an average breadth of 50 miles. A few unimportant ranges rise within the north-eastern portion,—the highest hill being the sacred Sítákund, 1155 feet high. Lofty mountains separate Chittagong district from Upper Burmah. The principal rivers are the Karnaphulí, on which Chittagong town is situated, navigable by sea-going ships and steamers as far as Chittagong port, and by large trading boats for a considerable distance higher up, and the Háldá and the Sangu, which are also navigable by large boats. Several creeks afford means of communication with the interior. The wild animals are tigers, elephants, rhinoceros, leopards, and deer. The area extends to 2498 square miles, of which one-third is cultivated, or capable of cultivation. The census of 1872 returns the population at 1,127,402. According to religion, the Hindus numbered 301,138, or 26·7 per cent.; Muhammadans, 795,013, or 70·5 per cent.; Buddhists, 30,149, or 2·7 per cent.; Christians, 1084, or ·1 per cent.; and persons of unspecified religion, 18. The Christian population chiefly consists of the half-caste descendants of the early Portuguese adventurers, or "Firinghis." The principal articles of trade are rice, which is exported by sea; cotton brought down from the hills for use in the district; Liverpool salt, imported by sea; bamboo and thatching grass for building purposes; betel-nuts, dried fish, petroleum from Burmah, tea, poultry, and miscellaneous articles of food. Revenue of the district in 1870–71, £221,116; expenditure, £56,035. The police force in 1872 consisted of 436 men and officers of the regular police, 62 of the municipal police, 2648 of the village watch, making a total strength of 3146 officers and men, costing £14,185. In 1872–73 the Education Department had under its inspection 88 schools attended by 3512 pupils, and maintained at a total cost of £2168, 8s. The climate of Chittagong is comparatively cool, owing to the sea breeze which prevails during the day; but for the same reason, the atmosphere is very moist, with heavy dews at night and fogs. The average annual temperature is 77° Fahr.; the average rainfall for the 13 years ending 1872, 106·50 inches. Chittagong was ceded to the East India Company by Nawáb Mír Kásim in 1760.

Chittagong Port, or Islámábád, the principal town of the above district, is situated on the right bank of the Karnaphulí River, in 22° 20′ 55″ N. lat. and 91° 52′ 35″ E. long. The river is here navigable by ships of 20 feet

draught, and the port has long been a place of considerable maritime trade. In 1870–71, 215 vessels arrived at the port, with a tonnage of 52,891; and 207 left, with a tonnage of 51,587; total value of imports, £182,765; ditto of exports, £276,019. Shipbuilding is carried on to a considerable extent. The town is an agglomeration of small villages, spread over an area of 9 square miles. In 1872, the population amounted to 20,604 souls, viz.—4687 Hindus, 15,051 Muhammadans, 122 Buddhists, and 744 Christians. The municipal income amounted in 1871 to £2136, 12s., and the expenditure to £2381, 6s.

CHITTAGONG HILL TRACTS, a district on the eastern frontier of British India, in the Chittagong division, lies between 21° 13′ and 23° 47′ N. lat., and 91° 46′ and 92° 49′ E. long, and is bounded on the N. by the semi-independent state of Tipperah, on the E. and S. by the district of Arákán in British Burmah, and on the W. by the regulation district of Chittagong. The general aspect of the country is very hilly, with deep ravines and prominent cliffs, covered with forests and gigantic creepers. Irregular masses of jungle, low hills, water-courses, and swamps fill up the intervals between the chief ranges. The principal hills with their heights are—Básitáng, 2181 feet; Mrungá Tang, 1650 feet; Rángráng-dáng, 2789 feet, and Lurain Tang, 2355 feet. The country is divided into four valleys formed by the Phení, Karnaphulí, Sangu, and Mátámurí rivers. Navigation is, however, difficult, owing to the rapidity and violence of their currents, their sharp turns, and whirling eddies; but the hillmen manage to float down timber, bamboo, ratan, thatching grass, cotton, *garjan* oil, *chálmugrá* oil, and a small quantity of wax and ivory. Among the wild animals may be noticed elephants, rhinoceros, bison, and many kinds of deer. The area of the district is 6882 square miles; the population in 1872 was 69,607 souls, or only 10 persons to the square mile. These consist of Hindus, 598, or ·8 per cent.; Muhammadans, 1378, or 2·0 per cent.; Buddhists, 47,875, or 68·8 per cent.; Christians, 31; and persons of unspecified religion, 19,725, or 28·4 per cent. The hill tribes, who are very primitive in their manners and customs, include the Khyoungthas (children of the river), called also the Jumiá Maghs; Chakmás, Tipperahs, Kumis, Mrus, Khyengs, Bangis, Pankhos, Lusháis or Kukis, and Shendus. Rángámátí village is the capital of the district. The principal crops are rice, Indian corn, tobacco, and cotton, raised every year from soil newly cleared from jungle. Two European landholders have tea-plantations in the district. The Chittagong Hill Tracts were separated from the Chittagong district in 1860, and until lately were subject to the incursions of the wild tribes on their borders. The revenue in 1870–71 was £3545, 14s.; the expenditure, £14,332, 12s. The police is a quasi-military force, consisting of 52 officers and 604 men, maintained in 1872 at a total cost of £13,424. This force now suffices to repel the incursions of the border tribes.

CHIUSA, or La Chiusa, a town of Italy on the Pesio, in the province of Cuneo, and about ten miles south-east of the city of that name. It has a population of upwards of 6000, chiefly engaged in the manufacture of silk and glass. It is not to be confounded with a hamlet in the province of Turin, which was named Chiusa (enclosure) from its position near the fortified line erected by Desiderius of Lombardy, in 774, to check the advance of Charlemagne.

CHIUSI, a town of Italy, in the Tuscan province of Siena, situated on a hill, and not far from the Lake of Chiusi. It is a bishop's see, and has a large cathedral, but is chiefly interesting for the Etruscan bronzes, mirrors, vases, and funereal urns found in the vicinity, of which its museums contain collections. Chiusi, the *Clusium* of the Romans, was one of the twelve cities of the Etruscan confederation, and was the headquarters of Porsena. After the decay of the Roman power it sank in importance, and in the Middle Ages malaria greatly reduced the number of its inhabitants; of late years, however, the prospects of the place have greatly improved, in consequence of the drainage of the marshes in the neighborhood. Population, 6460.

CHIVASSO, a city of Italy, in the province of Turin, at a railway junction, 15 miles north-east of the city of Turin. Situated on the left bank of the Po near the influx of the Orco, it was formerly considered the key of Piedmont: but its fortifications were dismantled by the French in 1804, and it is now only enclosed by a single wall with two gates leading to two suburbs. The front of the church of San Pietro, a building of the 15th century, is decorated with ornaments and entire statues in terra cotta, of great elegance, but much defaced. Of the ancient palace of the counts of Montferrat an octagonal tower still remains. The principal trade of the town is in grain and wool; and its lampreys are in repute. On the opposite side of the Po, and a few miles down the stream, are the ruins of the Roman city of *Industria*, which were discovered in 1745. Population, 7800.

CHLAMYDOPHORE (*Chlamydophorus truncatus*), an Edentate Mammal found at Mendoza, on the eastern slope of the Cordilleras, where it is known as the *Pichiciago*, but is so seldom seen as to be regarded with curiosity even by the natives. Its total length is from 5 to 6 inches, and its upper surface is covered with a flexible cuirass somewhat resembling the external armature of the Armadilloes—its nearest allies—but differing from the latter in being attached only by the middle of the back and the top of the head, the frontal bone of the skull being provided with two prominent knobs for this purpose. The dorsal shield, which contains 24 rows of square, cubical, or rhomboidal plates of a leathery texture, makes, at its posterior edge, an abrupt bend downwards, and is continued to the extremity of the tail, thus forming a posterior shield for the protection of the creature's hindquarters while it is burrowing. The sides of the back beneath the shield, the under part of the body, and the limbs are covered with silky hair, of a dirty white color, longer and finer than that of the mole. An examination of the Pichiciago skeleton proves it to be an exceedingly aberrant member of the Armadillo family, having structural affinities with other and widely different mammals. Thus it resembles the beaver in its flattened paddle-like tail, the mole in its short strong legs and powerful claws, the sloth in its teeth, and ruminants in the form of the lower jaw. It also resembles the ornithorhynchus and echidna—the lowest mammalian forms—in points wherein all three show affinity with birds; while in the form of the skull and pelvis it is unique among mammals. According to Dr. Buckland it makes the nearest approach of living *Edentata* to the gigantic extinct *Megatherium*. It is a burrowing animal, living like the mole in the subterranean galleries which it scoops out with its sharp, powerful claws, assisted probably by the flattened tail, which is supplied with strong muscles, and thus well adapted for throwing out the earth which gradually accumulates under the creature. Like the mole, its ears and eyes are exceedingly small and almost hidden by the long silky hair surrounding them. Another species has recently been discovered in Bolivia somewhat larger than the preceding, and differing from it in having the dorsal shield attached all over the skin of the back.

CHLORAL, Trichloraldehyde, or Hydride of Trichloracetyl, C_2Cl_3OH or $CCl_3.COH$, a substance discovered by Liebig in 1832, and further studied by Dumas and Städeler. It is a heavy, oily, and colorless liquid, of specific gravity 1·518 at 0° C., and boiling point 94·4° C. It has a greasy, somewhat bitter taste, and gives off a vapor at ordinary temperature which has a pungent odor and an irritating effect on the eyes. The word *chloral* is derived from the first syllables of *chlorine* and *alcohol*, the names of the substances employed for its preparation. Chloral is soluble in alcohol and ether, in less than its own weight of water, and in four times its weight of chloroform; it absorbs but is not acted upon by chlorine, and dissolves bromine, iodine, phosphorus, and sulphur. Chloral deliquesces in the air, and, like aldehyde, is converted by water into a hydrate, with evolution of heat; it combines also with ethylic alcohol and its homologues, and the derived mercaptans. An ammoniacal solution of nitrate of silver is reduced by chloral; sulphites of the alkalies form with it crystalline compounds; and nascent hydrogen, by replacing its three atoms of chlorine, converts it into aldehyde (Personne, *Ann. Ch. Pharm.*, clvii. 113). By means of phosphorus pentachloride, chlorine can be substituted for the oxygen of chloral, the body $CCl_3.CCl_2H$ being produced; an analogous compound, $CCl_3.C(C_6H_5)_2H$, containing the radicle phenyl in the place of the oxygen, is obtained by treating chloral with benzene and sulphuric acid. With an alkali, chloral gives chloroform and a formate of the base according to the reaction $CCl_3.COH + KHO = CCl_3H + H.CO(OK)$; it is converted

by oxidizing agents into trichloracetic acid $CCl_3.CO(OH)$; and forms with cyanic acid the body $C_5H_3Cl_6NO_3 = (CCl_3.COH)_2.COHN$. When kept for some days, as also when placed in contact with sulphuric acid or a very small quantity of water, chloral undergoes spontaneous change into the polymeride *metachloral*, $C_6H_3Cl_9O_3 = (C_2Cl_3OH)_3$, a white porcelaneous body, slowly volatile in the air, insoluble in water, alcohol, and ether, and reconverted into chloral without melting at 180° C.

Chloral is prepared by passing dry chlorine into absolute alcohol; the latter must be cooled at first, but towards the end of the operation has to be heated nearly to boiling. The alcohol becomes converted finally into a syrupy fluid, from which chloral is procured by treatment with sulphuric acid. The action of chlorine upon alcohol is complex;—first aldehyde, $CH_3.COH$, is produced, which combines with alcohol to form acetal, $CH_3.CH(OC_2H_5)_2$; this, acted on by chlorine, yields trichloracetal, $CCl_3.CH(OC_2H_5)_2$, which is converted by the hydrochloric acid present into chloral alcoholate, $CCl_3.CH.OH.OC_2H_5$, and monochlorethane, C_2H_5Cl. The latter body is also formed directly from alcohol, in the process for the manufacture of chloral, and combines with aldehyde, giving monochlorinated ethylic ether, $CH_3CHCl.OC_2H_5$, which is converted by chlorine into tetrachlorinated ether, $CCl_3.CHCl.OC_2H_5$. By the action of sulphuric acid, chloral alcoholate and tetrachlorinated ether are resolved into alcohol and chloral, and monochlorethane and chloral, respectively. The crude chloral is distilled over lime, and is purified by further treatment with sulphuric acid, and by redistillation. A mixture of starch or sugar with manganese peroxide and hydrochloric acid may be employed instead of alcohol and chlorine for the manufacture of chloral (Städeler, *Ann. Ch. Pharm.* lxi. 101–121). An isomer of chloral, *parachloralide*, is made by passing excess of dry chlorine into absolute methylic alcohol; it is a colorless liquid, insoluble in water, and boils at 182° C. (Cloëz, *Ann. Ch. Pharm.* iii. 180).

Chloral hydrate, $C_2Cl_3OH.H_2O$, or $CCl_3.CH(OH)_2$, the compound formed by the union of water with chloral, occurs in the form of oblique, often very short, rhombic prisms; an acicular form of crystals is considered by Paul to be characteristic only of the alcoholate. The purest samples of chloral hydrate present the appearance of ordinary alum broken into fragments, are perfectly transparent, only slightly odorous, free from powder, and dry to the touch, and do not become white by exposure. Jacobsen gives the melting point of pure chloral hydrate as 50° to 51°, the boiling point as 99° C. It can be distilled unchanged at 120° C.; but when heated with sulphuric acid it is converted into anhydrous chloral and *chloralide*, $C_5H_2Cl_6O_3$. When mixed with water, chloral hydrate causes a considerable degree of cold; and, as with camphor, small fragments of it placed on the surface of water exhibit gyratory movements. An aqueous solution should be neutral or nearly so, and should give but a faint milkiness when boiled with silver nitrate. A drop or two of ammonia added to solutions assists in their preservation. Chloral hydrate may be detected in the presence of other substances by adding an alkali and heating, when chloroform is evolved, which may be collected in a receiver; this process can be employed for the estimation of the commercial hydrate. When ammonium sulphide is added to a solution of pure chloral hydrate, the liquid turns red, and then becomes rapidly brown and thick; the presence of oily impurities in a solution is shown by the brown color it acquires when shaken up with concentrated sulphuric acid. Chloral hydrate has the property of checking the decomposition of a great number of albuminous substances, such as milk and meat; and a mixture of it with glycerine, according to Personne, is suitable for the preservation of anatomical preparations. When heated with concentrated glycerine to a temperature of 110°–230° C., chloral hydrate yields chloroform, $CHCl_3$, and formate of allyl, $HCO(OC_3H_5)$; and by the action of nitric acid and strong sunlight, at 195° C. it is transformed into trichloracetic acid, $CCl_3.COOH$. The effect of chloral hydrate upon fresh blood, like that of formic acid, is to render it darker.

The breaking up of chloral hydrate, in the presence of alkalies, with the production of chloroform and formates, led Liebreich to the conjecture that a similar decomposition might be produced in the blood; and hence his introduction of the drug, in 1869, as an anæsthetic and hypnotic (*Compt. rend.*, 1869, lxix. 486). It has been supposed that its physiological action may be due to formic acid as well as to chloroform set free in the blood, the effects of the formic acid being attributed to the production from it of carbon dioxide. Personne, however, has administered sodium formate to dogs, without perceiving in them the slightest anæsthetic phenomena, or the abnormal formation of carbon dioxide (*Compt. rend.*, 1874, lxxviii. 129). He considers that chloroform is set free in the blood, but is not eliminated as such, being converted into sodium chloride and formate (*ibid.*, 1869, lxix. 983); the prolonged action of chloral on the animal economy he explains on the supposition that, chloroform being produced at the expense of the alkali of the albumen of the blood, the latter, which may be regarded as an amide, forms with the trichlorinated aldehyde chloral a compound which, by the gradual action of the blood, affords a continuous supply of chloroform. Tanret, on the other hand, suggests that as chloral hydrate, when made alkaline with caustic potash, yields in the presence of the oxidizing agent potassium permanganate the formate, chloride, and carbonate of potassium, together with carbon monoxide, the alkalinity of the serum of the blood may determine a similar decomposition of chloral hydrate, the physiological effects of which may therefore be ascribed to poisoning or deoxidation of arterial blood by carbon monoxide (*Compt. rend.*, lxxix. 662; *Journ. Pharm. Chim.* (4), xx. 355–357).

The first effect of a dose of chloral hydrate is to produce a state of congestion of the brain, as evidenced by the condition of the retinal vessels; after 5 or 10 minutes, contraction of the vessels is observed, the retina becomes of a pale pink color, and drowsiness ensues; when this wears off, the retinal and cerebral vessels resume their accustomed size (Dr. W. A. Hammond). In cases of death from chloral, the cerebral vessels have been found much congested.

The effects of chloral hydrate vary with different individuals; but, as a rule, a dose of 20 grains acts in a healthy subject as a mild sedative of the sensory nervous system, and produces, about half or three quarters of an hour after it has been taken, a light, refreshing, and normal sleep, without causing headache or disturbance of the respiration and pulse.

Taken in large quantities chloral hydrate is a powerful soporific; it perceptibly lowers the temperature of the body, and diminishes the frequency and force of the heart's action, probably from paralysis of its intrinsic motor-ganglia; whilst the rate of respiration is lessened, apparently through affection of the medulla oblongata. Excessive doses produce complete insensibility, and diminish, and at last abolish reflex excitability; pallor, coldness of the extremities, lividity, and muscular relaxation ensue; and death may result from cardiac syncope.

M. Oré is the originator of a plan for performing operations during anæsthesia produced by the intra-venous injection of chloral hydrate. He shows (*Compt. rend.*, 1874, lxxviii. 515, 651) that it may be harmlessly injected, and that when thus brought into immediate contact with the blood, it effects complete anæsthesia of long duration, and is a rapid and effectual remedy for tetanus. Chloral hydrate sometimes fails to afford relief from suffering, and when it does not induce sleep, may occasion excitement and delirium. In some cases a dose has produced an eruption of urticaria. It must be administered with caution to children, and to patients having disease of the heart and of the digestive tract, certain affections of the bronchi, or hysteria. It appears that chloral cannot be decomposed and thrown off by a healthy body at a greater rate than from 5 to 7 grains an hour (Richardson, *Lancet*, 1871, 1, 209); and as the limit of the dose that can be safely taken is not affected by the customary use of the drug, as in the case of opium, but rather the reverse, its incautious employment in large quantities, and the practice of habitually resorting to it to gain relief from sleeplessness, from neuralgia, and from the effects of alcoholic excess, have in not a few instances led to fatal results. In consequence of this risk medical practitioners now use it less extensively. The continued use of chloral hydrate, too, is apt to cause a hyperæmic condition of the skin, diffuse inflammatory erythema of the face and chest, conjunctivitis, and interference with respiration; and may bring on deep melancholy, weakness of will, and inability to sleep without the drug.

Chloral hydrate is of special value as a soporific where opium is inadmissible, as in the case of children, in uræmia, and in some fevers. It is used in delirium tremens, rabies,

severe chorea, acute mania, and phthisis, as well as in dyspnœa, pertussis, cholera, sea-sickness, cancer, chronic rheumatism, and gastralgia, and in parturition and eclampsia; and in cases of tetanus it is employed to produce muscular relaxation. Its antagonism to strychnia was first pointed out by Liebreich (*Compt. rend.*, 1870, lxx. 403). When administered to rabbits it has been found to be a remedy for poisonous doses of strychnia (Bennett, *Edin. Med. Journ.*, 1870, xvi. 262); but Oré has shown (*Gaz. Médic. de Paris*, 1872, p. 401) that the hypodermic injection of that drug is of no avail in the case of rabbits poisoned with fatal doses of chloral hydrate. Numerous experiments have led to the conclusions that "chloral hydrate is more likely to save life after a fatal dose of strychnia, than strychnia is to save life after a fatal dose of chloral hydrate;" that after a dose of strychnine has produced tetanic convulsions, these convulsions may be reduced in force and frequency, and life may be saved, by means of the influence of chloral hydrate; but that though the effects of a poisonous dose of the hydrate may be mitigated, the coma produced by its action on the brain is not removed by strychnia (Bennett, Report in *Brit. Med. Jour.*, 1875, 1, 97; Ogilvie Will, *Edin. Med. Jour.*, April, 1875, 907). Chloral hydrate modifies the action of a fatal dose of extract of Calabar bean, but is of little service if given some time after the latter. The effects of chloralism are combated by provoking emesis, and by stimulating freely.

Among the very numerous contributions to the history of chloral, in addition to the above-given, may be mentioned the following:—Liebig, *Ann. Ch. Pharm.*, i. 189; Dumas, *Traité de Chimie*, t. v. 599; Städeler, *Ann. Ch. Pharm.*, cv. 293, cvi. 253; Bouchut, *Compt. rend.*, lxix. 966, *Bull. de Thér.*, lxxvii. 433; Sir J. Y. Simpson, *Med. Times*, Jan. 1, 1870; Byasson and Follet, *Journ. de l'Anat. et de Physiol.*, 1870, 570; Hofmann, *Compt. rend.*, 1870, lxx. 906; Personne, *ibid.*, lxxi. 227; Paul, *Pharm. Journ. and Trans.* (3), i. 621; Hausemann, *Schmidt's Jahrb.*, cli. 81; Jacobsen, quoted in *Journ. Chem. Soc.*, ix. 257; Rokitansky, *Stricker's Jahrbücher* (iii. and iv. Heft), 1874. (F. H. B.)

CHLORINE, one of the chemical elements (symbol Cl), discovered by Scheele in 1774. It was long regarded as a compound; Scheele termed it *dephlogisticated muriatic acid*, and Berthollet about 1785 gave it the name of *oxygenized muriatic acid*, which Kirwan contracted into *oxymuriatic acid*. In 1809 an abstract of a paper was published by Gay-Lussac and Thénard, in the 2d vol. of the *Mémoires d'Arcueil*, in which they demonstrated the possibility of the absence of oxygen from oxymuriatic acid. The attention of Davy being drawn to the subject, he in 1810 communicated to the Royal Society a paper in which he showed that there was no evidence in support of the opinion that oxymuriatic acid contained oxygen; and in a paper published in the following year he comes to the conclusion that oxymuriatic acid is an uncompounded substance, and gives to it the name of *chlorine*, on account of the greenish color it possesses. Chlorine and its combinations with other elements having been already treated of under the heading CHEMISTRY, it will be necessary here only to give some account of the more important commercial chlorine compounds, hydrochloric acid, bleaching powder, and potassium chlorate, and of the methods of preparing them.

Hydrochloric Acid (HCl).—Practically, the whole of the hydrochloric acid now employed in the manufacturing arts is obtained as a collateral product in the celebrated soda process of Leblanc. The first stage in that process consists in treating common salt with sulphuric acid in the salt-cake roasting furnace, by which sodium sulphate and hydrochloric acid are formed:—$2NaCl + H_2SO_4 = Na_2SO_4 + 2HCl$.

Till the year 1863 the acid fumes given off in alkali works were allowed to escape freely into the atmosphere, and being dissolved and brought down by every shower, destroyed or seriously damaged vegetation for miles around the works. In that year the Alkali Act was passed, by which manufacturers were obliged to condense not less than 95 per cent. of the total amount of hydrochloric acid evolved in their establishments; and since that time great attention has been paid to the condensation, so that now in many works practically no acid fumes escape. The hydrochloric acid gas liberated in the roasting furnace is conveyed through a range of stoneware pipes, in connection with which are various devices for cooling it in its passage. It is then conducted into condensing towers—long wide funnels packed with coke—through which a stream of water is made to percolate from the top, an enormous surface of moisture being thus presented to the acid fumes. The solution of the gas in the water constitutes the hydrochloric acid, muriatic acid, or spirit of salt of commerce. So prepared, the acid always contains several impurities, such as arsenious acid, ferric chloride, and sulphurous acid; but these do not interfere with its application to the preparation of bleaching powder, in which it is chiefly consumed. Without any purification it is also employed for "souring" in bleaching, and in tin and lead soldering.

Bleaching Powder, or *Chloride of Lime*.—The history of the application of chlorine to bleaching purposes before the introduction of the so-called chloride of lime will be found under the article BLEACHING. Bleaching powder is made by exposing pure slaked lime to an atmosphere of chlorine till the lime will absorb no more of the gas. Many plans for the preparation of the chlorine have been proposed, and various important processes adopted, since the manufacture of bleaching powder was established by Messrs. Tennant & Co. The original process was as follows:—A mixture of native peroxide of manganese ground to a fine powder, common salt, and sulphuric acid was put into a large, nearly spherical, leaden vessel furnished at the top with an air-tight lid. In this vessel an agitator was placed by which its contents could be from time to time stirred up. From the lid a lead pipe conveyed the liberated chlorine into the chamber in which the lime to be saturated was spread in a thin layer. The exterior of the leaden vessel was cased with an iron covering, space for the circulation of a current of steam between it and the covering being left. Upon the charging of the still, chlorine was at first given off without heat; but after some time a current of steam was made to circulate around the still, so as to maintain a sufficient temperature to disengage all the chlorine. The materials used consisted of common salt, manganese peroxide, and sulphuric acid, and the resulting products were manganous sulphate, sodium sulphate, water, and chlorine:—

$$MnO_2 + 2NaCl + 3H_2SO_4 = MnSO_4 + 2NaHSO_4 + 2H_2O + Cl_2.$$

Through the development of Leblanc's well-known soda process large quantities of hydrochloric acid became available for the manufacture of chlorine, in place, as formerly, of a mixture of common salt and sulphuric acid; and for many years hydrochloric acid alone has been used. Coarsely-ground manganese oxide is placed within an oblong stone still, into which the necessary charge of strong hydrochloric acid is admitted. Steam is then allowed to circulate in the outer case of the still till the temperature of the mixture is raised to about 180° Fahr. When this point is reached, steam at a pressure of 20 to 25 lbs. is blown through the charge at intervals for about six hours, after which the reaction is complete—the whole occupying about twenty-four hours. The chemical changes that take place are expressed in the following equation:—

$$MnO_2 + 4HCl = MnCl_2 + 2H_2O + Cl_2.$$

Native binoxide of manganese being an impure and variable compound has to be used in quantities proportionate to the MnO_2 it contains.

For each molecule of chlorine obtained by the above reaction, it will be observed that one of manganous chloride is formed, a substance that was formerly run off as a waste product. Apart from the nuisance thereby created, the drain on the supply of manganese ore became serious, supplies diminished, and prices rose in proportion. It became therefore an object of much importance to obviate the waste of manganese, and this was sought in two different directions. Efforts in the first place were made to regenerate the manganese waste, so as to render it continuously available for manufacturing purposes; and secondly, it was frequently attempted to dispense altogether with the use of manganese in the process.

The first really successful plan for the recovery and reoxidation of manganese was devised by Mr. Charles Dunlop, and was introduced at Messrs. Tennant's works, at St. Rollox, Glasgow, where it is still (1876) in operation. By Dunlop's process the residual still-liquor is first treated with carbonate of lime to neutralize its free acid and decompose the contained ferric chloride, which thus gives a precipitate, ferric oxide. The clear liquor obtained is a second time mixed with carbonate of lime, then introduced into an enormous iron boiler, in which it boils at a pressure of four atmospheres for about twelve hours. Under the influence of the heat applied the manganese exchanges its chlorine for the carbonic acid of the carbonate of lime, and a hydrated manganese carbonate, suspended in a solution of chloride of calcium, is produced, thus:—

$$MnCl_2 + CaCO_3 + H_2O = MnCO_3 . H_2O + CaCl_2.$$

The manganese carbonate is subsequently allowed to subside, and the solution of chloride of calcium is washed out. The manganese carbonate is drained till it becomes a white putty-like mass, when it is put into shallow iron trays, and roasted in a furnace at a heat gradually increasing to 550° or 600° Fahr. Under the influence of the heat the carbonic acid is driven off, and by degrees, from being a white powder, the manganese compound darkens till on the completion of the process it is a soot-like mass. Owing principally to the expensive nature of the plant necessary, the Dunlop process never extended beyond St. Rollox; but it has satisfactorily maintained its position in that gigantic establishment.

The method of artificially oxidizing manganese which is now almost universally adopted, and has during the past few years quite revolutionized the bleaching-powder manufacture, is that invented by Mr. Walter Weldon. Manganous chloride by treatment with lime becomes changed into the lower oxide of manganese (MnO), a body which with great difficulty is raised to the higher sesquioxide (Mn_2O_3), beyond which stage of oxidation no exposure to oxygen raises it. But when treated with excess of lime the manganous oxide rapidly unites with oxygen, and becomes transformed into the peroxide (MnO_2), which is the chemical compound available for the preparation of chlorine. It was this fact which Mr. Weldon discovered, and has turned to advantage in his process. The phenomenon he accounts for on the assumption that the sesquioxide (Mn_2O_3) formed by the exposure of manganous oxide (MnO) to oxygen is really a manganous manganite, or a combination of MnO with MnO_2, the former having basic, the latter acid functions. The lime added by Mr. Weldon supplies a more powerful base, and enables the whole of the manganese to attain to the condition of peroxide, uniting as it does in such a manner with the lime as to form a calcium manganite ($CaMnO_3$). By employing a diminished quantity of lime along with an increased current of air, it has been found possible to effect the complete oxidation of the manganese, an acid manganite ($CaMnO_3$, H_2MnO_3) being probably formed.

In his treatment of the still-liquors Mr. Weldon first neutralizes the acid, &c., as is done in Mr. Dunlop's process. The clear rose-tinted liquor thereby obtained is passed into a vessel called the oxidizer, at a temperature of about 140° Fahr. A pipe for conveying a current of air passes down the centre of the vessel, terminating near the bottom in a series of distributing pipes, and connected at the other end with a blowing engine. The liquor being at, or brought by injected steam to the proper temperature, then, according to Mr. Weldon (*Soc. of Arts Lecture*, May, 1874), the injection of air is commenced, and there is rapidly added, in the state of very fine division, 1·6 times the quantity of lime equivalent to the manganese in the liquor. This converts the charge into a thin white mud, which consists of solution of calcic chloride holding in suspension manganous oxide, or MnO, and also holding partly in suspension, partly in solution, six-tenths of an equivalent—reckoned on the manganese present—of free lime. When a little of this white mud is thrown on to a filter, the clear filtrate is naturally found, owing to the quantity of free lime present, and to the powerfully solvent action upon lime of hot solution of calcic chloride, to possess a strongly alkaline reaction. As the injection of air goes on, the mud becomes gradually darker in color, owing to the white hydrated MnO becoming converted into black MnO_2 by absorption of oxygen from the injected air, what was originally a thin white mud being at length converted into a thin black mud. During the progress of this conversion of the originally white mud into a black mud, it is found that the alkaline reaction of the filtrate from the mud gradually diminishes in intensity, until at length it entirely disappears; and it is found, too, that when this alkaline reaction ceases, the absorption of oxygen from the injected air ceases also. When this stage is reached, which is at the end of two, three, four, or five hours, according to the relation between the size of the oxidizer and the size of the blowing-engine employed, a little more liquor is run into the oxidizer from the settlers above, the injection of air is continued for a few minutes longer, and the charge is then run off from the oxidizer into one or other of a range of settlers placed below it. In these it separates, in the course of a few hours, into rather more than half perfectly clear solution of calcic chloride, and a little less than half black mud of rather more than twice the density of that which left the oxidizer. The solution of calcic chloride is now decanted, and the settled mud is then ready for use for the liberation of chlorine from hydrochloric acid.

The now practically universal use of regenerated manganese oxide in a state of fine division has considerably modified the older operations for the manufacture of chlorine. Hydrochloric acid, according to the plan at present in use, is first run into the still, and the manganese mud is admitted gradually to it in a carefully-regulated stream. Instead of the old oblong trough-like still, one much more capacious, of pentagonal form, is generally employed. The details of working vary in almost every establishment, but the following may be taken as an example of ordinary practice. A charge of hydrochloric acid, equal to the amount yielded by about 55 cwt. of common salt, is led into the still, and to it is added from 14 to 15 cwt. of 70 per cent. manganese. Finely-slaked lime to the amount of 40 cwt. is spread in a uniform layer on the floor of the chamber, and from these quantities 70 or 71 cwt. of bleaching powder containing from 35 to 37 per cent. of available chlorine is obtained. The lime, after receiving the first charge of gas, is left 24 hours, when it is turned by workmen. Another charge is then admitted, and on the expiry of 24 hours more the bleaching powder is ready to be drawn off and packed in barrels.

Of the many chlorine processes without manganese which have been proposed, the only plan which has stood the test of wide practical application is that introduced in recent years by Mr. Henry Deacon, of Widnes, in Lancashire. Doubtless his is a process which would have been widely introduced but for the economy and satisfactory nature of Mr. Weldon's method. A process for liberating chlorine from hydrochloric acid gas by exposing it with atmospheric air to a high temperature was patented by Mr. Robert Oxland in 1845. Mr. Deacon discovered that in this process, when the air and gas are brought into contact with sulphate of copper the hydrochloric acid is decomposed much more completely and at a far lower temperature than without that salt. In practice hot hydrochloric acid gas and atmospheric air are passed over pieces of brick which have been dipped in a solution of sulphate of copper and sulphate of soda and dried. Chlorine and water are produced by the decomposition, and some traces of hydrochloric acid also pass undecomposed. The water and acid are condensed, and the chlorine mixed with the residual nitrogen of the air passes on to the absorbing chambers. As the chlorine is greatly diluted by the nitrogen, the lime has to be exposed in thin layers over a large area, and Mr. Deacon so arranges his chambers that the mixed gases as they enter meet almost completely saturated lime, but as the chlorine becomes absorbed, less highly chlorinized lime is met, till at the end it is almost fresh hydrate of lime over which they pass. Mr. Deacon obtains from the acid of 1500 cwt. of salt, with the expenditure of 50 tons of small coal, upwards of 50 tons of 35 per cent. bleaching powder. The process is in operation in his own manufactory at Widnes, and in some Continental establishments Mr. Deacon's plant was introduced, but it has been practically abandoned.

Bleaching powder when fresh is a dry, white, lime-like powder emitting a strong odor of hypochlorous acid. Commercial samples vary considerably in strength, but when newly made and of good quality they should contain from 35 to 37 per cent. of available chlorine. On exposure bleaching powder parts with its chlorine with considerable rapidity, losing, according to some experimenters, at the rate of 0·63 per cent. per month. On the composition of bleaching powder see CHEMISTRY, page 428.

Potassium Chlorate or *Chlorate of Potash.*—The preparation of potassium chlorate is an example of the employment of chlorine on an extensive scale, its function, according to the ordinary process of manufacture, being to transform potassium chloride (KCl) into potassium chlorate ($KClO_3$) by supplying the necessary oxygen from lime. It is obtained by passing excess of chlorine into solution of potassium chloride and milk of lime, according to the equation

$$KCl + 3CaO + 3Cl_2 = 3CaCl_2 + KClO_3.$$

The operation is conducted in close leaden vessels, fitted with agitators and heated with steam. On the completion of the above reaction the liquid is filtered and evaporated to near dryness, and the residue is again dissolved in hot water. The two salts—calcium chloride and potassium chlorate—are then easily separated by crystallization; the former, being exceedingly soluble, remains in solution, while the latter deposits in tabular crystals, which may be purified by a slight washing. The salt is very largely used in the manufacture of lucifer matches and various detonating compounds, and in pyrotechny. It is also employed in calico-printing as an oxidizing agent in the fixing of certain colors, and it is a convenient source of pure oxygen in laboratory work.

CHLOROFORM, TRICHLOROMETHANE, TERCHLORIDE OF FORMYL, or DICHLORINATED METHYLIC CHLORIDE, $CHCl_3$, is a substitution-product of marsh-gas, CH_4, from which it can be formed by the action of chlorine. It is a clear, colorless, volatile liquid, which refracts light strongly, with specific gravity of 1·525 at 0° C., and vapor density 1·491. It boils at 60·16° C. (Regnault), and is not frozen at a temperature of −16° C. It has an agreeable ethereal odor, a slightly acrid and intensely sweet taste, is miscible in all proportions with alcohol, but is only slightly soluble in water. Though not ordinarily inflammable, it burns with a green flame when thrown upon hot coals, or if a light be applied to a mixture of it with not less than about 30 per cent. of alcohol. Chloroform may be employed as a solvent for resin, camphor, gutta-percha, iodine, bromine, and the alkaloids. It can be prepared in a great variety of ways:—(1) By the action of alkalies on chloral (see CHLORAL): (2) by boiling trichloracetic acid, $CCl_3.CO(OH)$,

with aqueous solutions of the alkalies; (3) by the replacement of an atom of chlorine in carbon tetrachloride CCl_4, by nascent hydrogen; (4) on the large scale for commercial purposes by the action of bleaching powder on ethylic alcohol and other carbon compounds. About 8 lb of slaked lime, and 80 lb of the strongest chloride of lime, and 22 gallons of water at a temperature of 80°–90° C. are introduced into a leaden vessel or wooden cask, and thoroughly mixed. Two lb of alcohol are then poured in; and if the heat evolved in the ensuing reaction is not sufficient to distil over the chloroform, a current of steam is passed into the vessel. The crude distillate is purified by washing with water and agitation with sulphuric acid, and by redistillation, finally, with a small quantity of slaked lime and calcium chloride, by means of a water-bath. The chief impurities to which chloroform is liable are ether, alcohol, aldehyde, hydrochloric, hypochlorous, and sulphuric acids, chloral, and heavy volatile oils. Pure chloroform does not become opalescent in contact with water, and is not colored yellow or brown by sulphuric acid, or green by chromic acid; with the former, it gradually evolves hydrochloric acid. When exposed to air and light, chloroform becomes decomposed, with the formation of chlorine, hydrochloric acid, carbon tetrachloride, and other products. The presence of chloroform can be detected by adding to the liquid to be tested for it a monamine, such as aniline, $N(C_6H_5)H_2$, and an alcoholic solution of caustic potash, when the characteristic odor of the carbamines is given off at once, or on the application of heat.

The history of chloroform affords but one amongst many instances of the importance of chemical research even when no immediate practical advantages are apparently to be derived from its prosecution. Chloroform was discovered in 1831 by Guthrie[1] in America, and by Soubeiran in France, and by the latter was described as *ether bichlorique*. Liebig, who made the independent discovery of it in the following year, regarded it as a trichloride of carbon; but in 1834 its true constitution was established by Dumas. In March, 1847, Flourens submitted to the Academy of Sciences at Paris a paper containing observations on the anæsthetic powers of chloroform upon animals. In the summer of that year "chloric ether," the active principle of which is chloroform, was used at St. Bartholomew's Hospital by Mr. Lawrence instead of sulphuric ether for the production of anæsthesia; and in the succeeding autumn Dr. J. Y. Simpson of Edinburgh introduced the employment of pure chloroform as an anæsthetic into surgical practice. By its effect upon the nervous system chloroform causes a suspension of voluntary motion and of sensation, whilst respiration and the action of the sympathetic ganglia of the heart are still continued. It is more active, occasions less bronchial irritation, and is easier of application than ether, the use of which in British practice it has to a very great extent superseded; it possesses also the advantage that its vapor is uninflammable. The occurrence, however, from time to time, of death in consequence of the use of chloroform, has led many practitioners to recommend the employment of ether in its stead; but in the majority of instances fatal results may be attributed to some fault in administration; and in some cases death has been thought to be attributable to the giving of a less than customary quantity of chloroform, which, paralyzing the cerebral hemispheres, but not the ganglia of the base of the brain and the medulla, has permitted reflex action of the vagus upon the heart through irritation of a sensory nerve. In operations after which disturbance of the abdomen must be avoided, ether is far preferable to chloroform, on account of the sickness usual for some time after the taking of the latter.

Snow, *Anæsthetics;* Holmes, *System of Surgery*, 2d ed., vol. v. 480 (1871).

CHOCOLATE is a preparation from the seeds of the cocoa or cacao tree (*Theobroma Cacao*), used as food. The term is corrupted from the Mexican name chocolatl, and the preparation was in use in Central America before the discovery of the Western Continent by Columbus. For the history of the plant and other details see under Cocoa. At the present day the general distinction between the preparations known as chocolate and cocoa respectively is that the former embraces the forms prepared as cakes or stiff paste, while prepared cocoa is chiefly sold as a powder or simply the ground nibs of the seed. Chocolate is prepared usually from the finer varieties of cocoa seeds by first roasting, and then shelling, or depriving the seeds of their husks. They are then ground up to a very fine uniform paste on a hot plate or bed, the heat of which, by melting the fat, present in seeds to the extent of about 50 per cent., keeps the paste in a fluid condition. To the ground seeds a proportion of sugar, with sometimes arrowroot, and some flavoring essence, most commonly either vanilla or cinnamon, are added, and when thoroughly incorporated the semi-fluid paste is cast into moulds. In addition to being used as a diet drink, a very large quantity of chocolate, specially prepared under various forms for eating, is now consumed as a sweetmeat, and it forms at once a most wholesome, nutritious, and palatable confection. The French and Italians have long excelled in the manufacture of chocolate; but the varieties made by English manufacturers are also deservedly in high repute.

CHOCTAWS, or Chahtas, a North American tribe now settled in the Indian Territory along the northern banks of the Red River, where they possess about 10,450 square miles. When first known to Europeans they occupied the district now forming the southern part of Mississippi and the western part of Alabama. On the settlement of Louisiana they formed an alliance with the French, and assisted them against the Natchez and Chickasaws; but by degrees they entered into friendly relations with the English, and at last, in 1786, recognized the supremacy of the United States by the treaty of Hopewell. Their emigration westward began about 1800, and the last remains of their original territory were ceded in 1830. In their new settlements the Choctaws continued to advance in prosperity till the outbreak of the civil war, which considerably diminished the population and ruined a large part of their property. They sided with the Confederates, and their territory was occupied by Confederate troops; and accordingly at the close of the war they were regarded as having lost their rights. Part of their land they were forced to surrender to the Government; their slaves were emancipated; and provision was claimed for them in the shape of either land or money. Since then they have considerably recovered their position. In 1873 they numbered 16,000, had 50,000 acres under cultivation, and possessed private property to the value of upwards of $4,700,000. They are governed by a chief and a national council of 40 members, according to a written constitution, which dates in the main from 1838; and they possess a regular judicial system and employ trial by jury. Missions are maintained amongst them by the American Board of Commissioners, the Presbyterians, the Methodists, and the Baptists. The Choctaw language has been reduced to writing, and brought to some degree of literary precision by the efforts of the missionaries, who have produced in the language the Bible, schoolbooks, and hymnals. A newspaper is published weekly in Choctaw and English at New Boggy; and a grammar was composed by the late Rev. C. Byington (Philadelphia, 1870).

CHODOWIECKI, Daniel Nicholas (1726–1801), a painter and engraver of Polish descent, was born at Dantzig. Left an orphan at an early age, he devoted himself to the practice of miniature painting, the elements of which his father had taught him, as a means of support for himself and his mother. In 1743 he went to Berlin, where for some time he worked as clerk in an uncle's office, practising art, however, in his leisure moments, and gaining a sort of reputation as a painter of miniatures for snuff-boxes. The Berlin Academy, attracted by a small engraving of his, entrusted to him the illustration of its yearly almanac. After designing and engraving several subjects from the story of the Seven Years' War, Chodowiecki produced the famous History of the Life of Jesus Christ, a set of admirably painted miniatures, which made him at once so popular that he had laid aside all occupations save these of painting and engraving. Few books were published in Prussia for some years without plate or vignette by Chodowiecki. It is not surprising, therefore, that the catalogue of his works (Berlin, 1814) should include over 3000 items, of which, however, the picture of Calas and his Family is the only one of any reputation.

The title of the German Hogarth, which he sometimes obtained, was the effect of an admiration rather imaginative than critical, and was disclaimed by Chodowiecki himself. The illustrator of Lavater, the painter of the

[1] [Samuel Guthrie (1782–1848), physician at Sackett's Harbor, N. Y., also invented percussion-lock gun. His son Alfred (1805–82) of Chicago was engineer of Illinois and Michigan Canal.—Am. Ed.]

Hunt the Slipper in the Berlin Museum, had indeed but one point in common with the great Englishman,—the practice of representing actual life and manners. In this he showed skilful drawing and grouping, and considerable expressional power, but no tendency whatever to the use of the grotesque.

CHOISEUL, César, Duc de (1598–1675), commonly known as Marshal du Plessis, was born at Paris in 1598. He commanded a regiment at the siege of Rochelle, and defended Oléron and Ré against the English. He was employed by Richelieu against the Spaniards, both as general and envoy, and in both capacities he met with considerable success. He was engaged under Mazarin in the war of the Fronde against Turenne, whom he defeated at Rethel; and he was also concerned in the negotiations of Louis XIV. with Charles II. of England. He became duke in 1665, and died in 1675.

CHOISEUL, Claude Antoine Gabriel, Duc de (1760–1838), was born in August, 1760. He was brought up at Chanteloup under the care of his relative, the Duke Étienne Francois, who was childless. The outbreak of the Revolution found him a colonel of dragoons, and throughout those troublous times he was distinguished for his devotion to the royal house. He made a memorable attempt to rescue Louis XVI. from the hands of the Revolutionists; but the affair was ill-managed; the royal party was recaptured; a price was put upon Choiseul's head, and he had to seek refuge in flight. His hopes, however, of assisting the royal cause were not relinquished, and he succeeded in raising a regiment of hussars with which he joined the royalist army. He was eventually taken prisoner, and confined at Dunkirk. Having escaped, and set sail for India, he was wrecked on the French coast, and condemned to death by the decree of the Directory. Nevertheless, he was fortunate enough to escape with his life. Napoleon allowed him to return to France; and at the Restoration he was called to the House of Peers by Louis XVIII. At the revolution of 1830 he was nominated a member of the Provisional Government; and he afterwards received from Louis Philippe the post of aide-de-camp to the king and governor of the Louvre. He died in Paris in 1838.

CHOISEUL, Étienne Francois, Duc de (1719–1785), a French statesman, was born on the 28th June, 1719. Under the name of Count de Stainville, he entered the army, and rose to the rank of lieutenant-general. Having contracted a wealthy marriage, and gained the friendship of Madame de Pompadour, the mistress of Louis XV., he entered political life as envoy, first to Rome, and then to Vienna; and in November, 1758, he was created Duc de Choiseul and peer of France, and appointed minister of foreign affairs. His first act was to sign a secret treaty of alliance with Maria Theresa of Austria, who had the sympathy and support of Madame de Pompadour. An invasion of Great Britain was Choiseul's next project; and so eager was he to carry out this ill-fated scheme, that the French interests in America and the West Indies were miserably neglected. Choiseul is also responsible for allowing the possessions of France in India to be lost without adequate resistance, and for not interfering in time to prevent the dismemberment of Poland.

The principal achievement of Choiseul's policy is known as the "Family Compact," by which all the sovereigns of the house of Bourbon, viz., the kings of France, Spain, and the two Sicilies, were united in an offensive and defensive alliance (1761). Portugal also was afterwards persuaded to join the confederation in war against England. Great enthusiasm was awakened in France; and Choiseul, having handed over to his cousin, Choiseul-Praslin, the department of foreign affairs, devoted himself to the reorganization of the army and navy. But the plans of Pitt proved successful, and, in November, 1762, France was obliged to cede to England, by the treaty of Fontainebleau, Acadia, Canada, Cape Breton, and all the islands of the Saint Lawrence, all Louisiana to the left of the Mississippi, Ohio, the isles of Grenada and Minorca, and a large part of her possessions in India.

Much more fortunate was his policy against the Jesuits. It was partly due to his influence that they were driven out of Spain; in 1764 he effected their banishment from France; and ten years later he prevailed on Pope Clement XIV. to declare their order abolished.

Until the end of 1770 Choiseul continued to be foremost among the directors of French policy. But after the death of Madame de Pompadour, the intrigues of the Duc d'Aiguillon, the Abbé Terray, and Chancellor Maupeou, backed by the influence of Madame du Barri, whose friendship Choiseul had scornfully rejected, created an estrangement between him and the king, who banished him to his estate at Chanteloup. His fall, however, only increased his popularity, and on his departure the most distinguished of the courtiers crowded round him to bid him farewell. The four years of his retirement were spent chiefly in writing his autobiography, which was published at Paris in 1790. He was recalled to Paris by Louis XVI. in 1774, and died there in May, 1785. Choiseul appears to have been a man of considerable, but not first-rate ability; his disposition was haughty but courteous; and such was the magnificence of his habits that, notwithstanding his vast wealth, he died leaving enormous debts. See his Autobiography and the *Mémoires*, by Besenval and Duclos.

CHOLERA (from χολή, bile, and ῥέω, to flow). Two distinct forms of disease are included under this general term, namely, Simple Cholera and Malignant Cholera. Although essentially different both as to their causation and their pathological relationships, these two diseases may in individual cases present many symptoms of mutual resemblance.

Simple Cholera (synonyms, *Cholera Europæa*, *British Cholera*, *Summer* or *Autumnal Cholera*) is the cholera of ancient medical writers, as is apparent from the accurate description of the disease given by Hippocrates, Celsus, and Aratæus. Its occurrence in an epidemic form was noticed by various physicians in the 16th century, and an admirable account of the disease was subsequently given by Sydenham in describing an epidemic of cholera in London in 1669–72.

The chief symptoms in well-marked cases are vomiting and purging occurring either together or alternately. The seizure is usually sudden and violent. The contents of the stomach are first ejected, and this is followed by severe retching and vomiting of thin fluid of bilious appearance and bitter taste. The diarrhœa which accompanies or succeeds the vomiting, and is likewise of bilious character, is attended with severe griping abdominal pain, while cramps affecting the legs or arms greatly intensify the suffering. The effect upon the system is rapid and alarming, a few hours of such an attack sufficing to reduce the strongest person to a state of extreme prostration. The surface of the body becomes cold, the pulse weak, the voice husky, and the whole symptoms may resemble in a striking manner those of malignant cholera, to be subsequently described. In unfavorable cases, particularly where the disorder is epidemic, death may result within forty-eight hours. Generally, however, the attack is arrested and recovery soon follows, although there may remain for a considerable time a degree of irritability of the alimentary canal, rendering necessary the utmost care in regard to diet.

Attacks of this kind are of frequent occurrence in summer and autumn in almost all countries. They appear specially liable to occur when cold and damp alternate with heat. Occasionally the disorder prevails so extensively as to constitute an epidemic. The exciting causes of an attack are in many cases errors in diet, particularly the use of unripe fruit and new vegetables, and the excessive drinking of cold liquids during perspiration. Outbreaks of this disorder in a household or community can sometimes be traced to the use of impure water, or to noxious emanations from the sewers.

In the treatment, vomiting should be encouraged so long as it shows the presence of undigested food, after which opiates ought to be administered. Small opium pills, or Dover's powder, or the aromatic powder of chalk with opium, are likely to be retained in the stomach, and will generally succeed in allaying the pain and diarrhœa, while ice and effervescing drinks serve to quench the thirst and subdue the sickness. In aggravated cases where medicines are rejected, enemata of starch and laudanum, or the hypodermic injection of morphia ought to be resorted to. Counterirritation by mustard or turpentine over the abdomen is always of use, as is also friction with the hands where cramps are present. When sinking threatens, brandy and ammonia will be called for. During convalescence the food should be in the form of milk and farina-

ceous diet, or light soups, and all indigestible articles must be carefully avoided.

In the treatment of this disease as it affects young children (*Cholera Infantum*), most reliance is to be placed on the administration of chalk and the use of starch enemata. In their case opium in any form cannot be safely employed.

Malignant Cholera (synonyms, *Asiatic Cholera, Indian Cholera, Epidemic Cholera, Algide Cholera*) is probably the most severe and fatal of all diseases. This form of cholera belongs originally to Asia, more particularly to India, where, as well as in the Indian Archipelago, epidemics are known to have occurred at various times for several centuries. It was not, however, till 1817 that the attention of European physicians was specially directed to the disease by the outbreak of a violent epidemic of cholera at Jessore in Bengal. This was followed by its rapid spread over a large portion of British India, where it caused immense destruction of life both among natives and Europeans. During the next three years cholera continued to rage all over India, as well as in Ceylon and others of the Indian islands. The disease now began to spread over a wider extent than hitherto, invading China on the east, and Persia on the west. In 1823 it had extended into Asia Minor and Russia in Asia, and it continued to advance steadily though slowly westwards, while at the same time fresh epidemics were appearing at intervals in India. From this period up till 1830 no great extension of cholera took place, but in the latter year it reappeared in Persia and along the shores of the Caspian Sea, and thence entered Russia in Europe. Despite the strictest sanitary precautions, the disease spread rapidly through that whole empire, causing great mortality and exciting consternation everywhere. It ravaged the northern and central parts of Europe, and spread onwards to England, appearing in Sunderland in October, 1831, and in London in January, 1832, during which year it continued to prevail in most of the cities and large towns of Great Britain and Ireland, and its disastrous effects are still in the recollection of many persons. The disease subsequently extended into France, Spain, and Italy, and crossing the Atlantic spread through North and Central America. It had previously prevailed in Arabia, Turkey, Egypt, and the Nile district, and in 1835 it was general throughout North Africa. Up till 1837 cholera continued to break out in various parts of the Continent of Europe, after which this epidemic disappeared, having thus within twenty years visited a large portion of the world.

About the year 1841 another great epidemic of cholera appeared in India and China, and soon began to extend in the direction traversed by the former, but involving a still wider area. It entered Europe again in 1847, and spread through Russia and Germany on to England, and thence to France, whence it passed to America, and subsequently appeared in the West Indies. This epidemic appears to have been even more deadly than the former, especially as regards Great Britain and France. A third great outbreak of cholera took place in the East in 1850, entering Europe in 1853. During the two succeeding years it prevailed extensively throughout the Continent, and fell with severity on the armies engaged in the Crimean War. Although widely prevalent in Great Britain and Ireland it was less destructive than former epidemics. It was specially severe throughout both North and South America. A fourth epidemic visited Europe again in 1865–66, but was on the whole less extensive and destructive than its predecessors. Cholera has since appeared in the form of limited epidemics in various districts of Russia, Turkey, and Western Asia, while it still continues to maintain its footing in India, where sudden outbreaks are of frequent occurrence, being often connected with the assembling of crowds at native festivals.

A disease so widespread in its distribution and deadly in its effects has naturally engaged the attention of scientific physicians in all countries. Investigations into the nature of cholera and the conditions favoring its propagation have been extensively carried on in England, in Germany, aud in India, not merely by those whose opportunities of observing and treating the disease have been numerous, but by others specially undertaking such inquiries at the suggestion of Governments or other public authorities. Although many conflicting views have been propounded on the above-named points, the result of these investigations has been the collection of an amount of information sufficient to form the basis of a rational theory of cholera, and which may be expected yet to lead to the discovery of means to counteract the spread of this pestilence.

The following points respecting the nature and mode of propagation of cholera are generally admitted by the best authorities:—

1. That cholera is a specific disease depending upon the action in the human system of a morbid material (whether of the nature of a parasitic germ or a poisonous miasm being still undetermined) which is originally generated in certain parts of India, particularly in the delta of the Ganges and the flat lands around Madras and Bombay;

2. That this infective material is capable of spreading from its centre of origin indefinitely, and thus cholera has appeared in an epidemic form in almost all countries; and further that the disease may become acclimatized (endemic) in some places;

3. That when it spreads abroad the vehicle of its transmission is the discharges from the bowels of persons already affected; and that from these the cholera-infecting matter is exceedingly apt to be diffused through the air, to contaminate water, and to become attached to clothing, bedding, furniture, &c., and in these various ways to find ready entrance through the lungs or alimentary canal into the bodies of healthy persons, where it is capable of developing the disease in a more or less severe form according to the quantity introduced;

4. That cholera is thus in a certain sense contagious;

5. That overcrowding and other insanitary conditions, particularly the presence of decomposing organic matter, afford the conditions favorable to the multiplication of the cholera matter, and thus tend to spread the disease, although of themselves incapable of originating it.

But even admitting these propositions, it is obvious that they are insufficient to explain the intense tendency of cholera to spread widely at some times more than others. Without alluding to the various hypotheses which have been advanced on this point, it seems probable, from the history of the disease as exhibited both in Europe and in India, that various factors may alone or together be concerned in the rise and spread of epidemics of cholera. It is stated that a high temperature favors the development of cholera, and in general this appears to be the case, but it is by no means invariable, as some of the most severe epidemics raged with greatest fury in winter. That cholera might be carried by the agency of winds from one country to another must be held as a possibility, although no satisfactory evidence exists upon the point. More probable are the theories which assign to local conditions an important part in the propagation of cholera. With regard to mere locality it appears that the disease has been generally found to prevail more extensively and with greater virulence in low-lying districts than in elevated situations. In connection with this, the relation of the character of the soil to the propagation of cholera has been elaborately investigated by Professor Pettenkofer of Munich, whose work in this department has attained world-wide reputation, and who ascribes a powerful influence in the diffusion of the disease to the ground-water of a locality where cholera is prevailing,—shallow, porous soils affording, according to his views, special facilities for the reception, proliferation, and distribution of the so-called cholera germs. Further, the observations of Dr. Snow, Dr. Frankland, and Mr. Simon in certain epidemics of cholera in London have conclusively connected outbreaks of the disease in various districts with the use of drinking-water contaminated with the discharges from cholera patients. All investigations appear clearly to show that the prime factor, and that without which no other conditions can take effect, is the introduction into the locality of the specific infecting matter, this being accomplished in general by the arrival of infected persons, for cholera epidemics, as is well known, spread mostly in the lines of human intercourse and travel. But further, in this as in other acute infectious diseases, a special liability of individuals must be admitted, as is proved by the fact that among persons living under precisely the same conditions some will suffer while others escape, and likewise that persons inhabiting cholera districts may come to enjoy an immunity from attacks of the disease. Among known predisposing causes, the incautious employment of purgative medicines, the use of unripe fruit, bad and insufficient food, intemperance, per-

sonal uncleanliness, overcrowding, and all kinds of unfavorable hygienic surroundings play an important part during the course of any epidemic of cholera.

In describing the symptoms of cholera it is customary to divide them into three stages, but it must be noted that these do not always present themselves in so distinct a form as to be capable of separate recognition. The first or premonitory stage consists in the occurrence of diarrhœa. Frequently of mild and painless character, and coming on after some error in diet, this symptom is apt to be disregarded. The discharges from the bowels are similar to those of ordinary summer cholera, which the attack closely resembles. There is, however, at first the absence of vomiting. This diarrhœa generally lasts for two or three days, and then if it does not gradually subside either may pass into the more severe phenomena characteristic of the second stage of cholera, or on the other hand may itself prove fatal.

The second stage of cholera is termed the stage of collapse or the algide or asphyxial stage. As above mentioned, this is often preceded by the premonitory diarrhœa, but not unfrequently the phenomena attendant upon this stage are the first to manifest themselves. They come on often suddenly in the night with diarrhœa of the most violent character, the matters discharged being of whey-like appearance, and commonly termed the "rice-water" evacuations. They contain large quantities of disintegrated epithelium from the mucous membrane of the intestines. The discharge, which is at first unattended with pain, is soon succeeded by copious vomiting of matters similar to those passed from the bowels, accompanied with severe pain at the pit of the stomach, and with intense thirst. The symptoms now advance with rapidity. Cramps of the legs, feet, and muscles of the abdomen come on and occasion great agony, while the signs of collapse make their appearance. The surface of the body becomes cold and assumes a blue or purple hue, the skin is dry, sodden, and wrinkled, indicating the intense draining away of the fluids of the body, the features are pinched and the eyes deeply sunken, the pulse at the wrist is imperceptible, and the voice is reduced to a hoarse whisper (the vox cholerica). There is complete suppression of the urine.

In this condition death often takes place in less than one day, but in epidemics cases are frequently observed where the collapse is so sudden and complete as to prove fatal in one or two hours even without any great amount of previous purging or vomiting. In most instances the mental faculties are comparatively unaffected, although in the later stages there is in general more or less apathy.

Reaction, however, may take place, and this constitutes the third stage of cholera. It consists in the arrest of the alarming symptoms characterizing the second stage, and the gradual but evident improvement in the patient's condition. The pulse returns, the surface assumes a natural hue, and the bodily heat is restored. Before long the vomiting ceases, and although diarrhœa may continue for a time, it is not of a very severe character and soon subsides, as do also the cramps. The urine may remain suppressed for some time, and on returning is often found to be albuminous. Even in this stage, however, the danger is not past, for relapses sometimes occur which speedily prove fatal, while again the reaction may be of imperfect character, and there may succeed an exhausting fever (the so-called typhoid stage of cholera) which may greatly retard recovery, and under which the patient may sink at a period even as late as two or three weeks from the commencement of the illness.

Many other complications are apt to arise during the progress of convalescence from cholera, such as diphtheritic and local inflammatory affections, all of which are attended with grave danger.

When the attack of cholera is of milder character in all its stages than that above described, it has been named *Cholerine*, but the term is an arbitrary one and the disease is essentially cholera.

The bodies of persons dying of cholera are found to remain long warm, and the temperature may even rise after death. Peculiar muscular contractions have been observed to take place after death, so that the position of the limbs may become altered. The soft textures of the body are found to be dry and hard, and the muscles of a dark brown appearance. The blood is of dark color and tarry consistence. The upper portion of the small intestines is generally found distended with the rice-water discharges, the mucous membrane is swollen, and there is a remarkable loss of its natural epithelium. The kidneys are usually in a state of acute congestion.

With respect to the mortality from cholera no very accurate estimate can be formed, since during the prevalence of the disease the milder cases are apt to escape notice, and it is certain that some epidemics are of a more virulent character than others. It is generally reckoned, however, that about one-half the cases of fully developed cholera prove fatal, death taking place in a large proportion of instances in from twenty-four to forty-eight hours. It has been noticed that in cholera epidemics the mortality is relatively greater at the commencement of the outbreak. The disease appears to be most fatal in children and aged persons.

As illustrating the destructive effects of cholera, it may be mentioned that in the first epidemic in England and Wales 52,547 deaths were reported to the Board of Health, but this number was doubtless below the actual amount. In the second epidemic (1848–9) there were 55,181 deaths from cholera in England alone, besides 28,900 from diarrhœa. The subsequent epidemics in this country have been much less fatal.

The treatment of cholera embraces those sanitary measures requisite to be adopted with the view of preventing as far as possible the introduction of the disease into localities previously unaffected, or of checking its spread when introduced, as well as the special medical management of those who have been attacked. These topics can be alluded to only in general terms.

When cholera threatens to invade any place, however favorably circumstanced as to its hygienic condition, increased vigilance will be requisite on the part of those entrusted with the care of the public health. Where the disease is likely to be imported by ships, quarantine regulations will be necessary, and, where practicable, measures of isolation should be adopted in the case of individuals or companies of people coming from infected localities, more especially if they have, or have recently had, any symptoms of cholera in their own persons. It is certain that cholera may be introduced into a community by one or more individuals who have themselves only suffered from the first or milder stage of the disease (cholera diarrhœa), since the discharges from the bowels abound in the infective matter, and where sanitary arrangements are deficient may readily contaminate the water or air of a locality.

The utmost care will be demanded, particularly in populous districts, in cleansing and disinfecting places where accumulations of animal refuse are apt to occur. The condition of the drinking water and of the wells in which it is collected will always require inspection, as will also the quality of the food supplied, more especially to the poor. Where suspicion attaches to the water, it should be boiled before being used, and the same holds true of the milk. The establishment of cholera hospitals, with a thoroughly equipped staff of medical attendants and nurses, is one of the first and most important steps to be taken in any threatened epidemic, as affording opportunity for the removal and isolation of those attacked at an early period, while every facility should be given to the poorer classes of obtaining medical aid. Instructions should be issued by the authorities warning all persons against the use of unwholesome food, unripe fruit, and excesses of every kind, and recommending early application for medical advice where there is any tendency to diarrhœa. House to house visitation by members of a sanitary staff will be of great service, not merely in discovering cases of the disease, but in the important work of disinfection, which should not be left entirely to the inhabitants, but be done systematically by the authorities. The discharges from cholera patients should be disinfected with such substances as carbolic acid or sulphate of iron before removal, and special care be taken that they are not disposed of in places where they may contaminate drinking water. Every article of clothing which has been in contact with a cholera patient should if possible be burnt, while infected apartments should be thoroughly disinfected with carbolic acid or by fumigation with sulphur. The early burial of those dying from cholera is obviously a matter of urgent necessity.

The influence of fear in predisposing to attacks of cholera has been greatly exaggerated and is now generally discredited. But apart from such considerations there can be no doubt of the wisdom of those to whom it is practicable in removing from a place where cholera is raging.

With respect to the treatment of cholera, it may be safely affirmed, that as to no disease has so much difference of opinion prevailed or so many extravagant notions been entertained regarding the value of remedies. There is a want of agreement as to fundamental principles of treatment; for while astringents have been regarded by some as their sheet anchor, others have condemned them as worse than useless, and rely on the elimination of the *materies morbi* by means of laxatives. Much evil has been done by the manner in which various systems of treatment have been extolled by over-sanguine practitioners as possessing special curative value. Indeed to enumerate the different medicines which have been suggested and employed for the treatment of this disease would be a work of no little difficulty. It is sufficient to state that no medicinal agent has yet been found to be of infallible efficacy in the treatment of cholera. Nevertheless, much may be done, and many lives saved, by the timely application of certain well-approved remedies. The various stages of the disease demand special treatment. In the earlier period of the attack for the cholera-diarrhœa the use of opium is of undoubted value. Given alone in small and oft-repeated doses, or in combination with other astringents, such as catechu, tannin, bismuth, nitrate of silver, or acetate of lead, it frequently succeeds in quelling this symptom and thus arresting the disease at the outset. Strict confinement to bed and the administration of bland drinks such as milk, barley-water, and beef-tea, along with counter-irritation to the abdomen, will be found valuable adjuvants to treatment. In the second stage of cholera opium is of less value, and other remedies are called for. The violent vomiting and purging and the intense thirst may be relieved by iced effervescing drinks, while at the same time endeavors should be made to maintain the heat of the body by friction with stimulating liniments or mustard to the surface, and by enveloping the body in flannel and surrounding it with hot bottles. For the relief of the cramps the inhalation of chloroform is recommended, and probably chloral would be found of equal value. Stimulants such as ammonia and brandy must be had recourse to where these measures fail to establish reaction and the patient threatens to sink. When reaction occurs and the vomiting ceases, liquid food in small quantities should be cautiously administered.

Report on Epidemic Cholera Morbus . . . in Bengal, 1817, 1818, 1819, by J. Jameson, Calcutta, 1820; *Official Reports on Cholera*, by Drs. Russell and Barry, London, 1832; *Researches into the Pathology and Treatment of Asiatic Cholera*, by E. A. Parkes, M.D., London, 1847; *Report of the General Board of Health on the Epidemic Cholera*, 1848–49, London, 1850; *Report on the Mortality of Cholera in England in* 1848–49, by Dr. W. Farr; *Reports on Epidemic Cholera*, by Drs. Baly and Gull, London, 1854; *Untersuchen und Beobachtungen über die Verbreitungsart der Cholera*, by Dr. Max Pettenkofer, Munich, 1855; *Reports to the Privy Council on the two last Cholera Epidemics*, by Mr. J. Simon, London, 1856; *Mode of Communicating Cholera*, by Dr. J. Snow, 2d ed., London, 1855; *Report on the Constantinople Cholera Conference in* 1866, Calcutta, 1868; *Reports of Medical Officer of Privy Council from* 1865 upwards; *A Treatise on Asiatic Cholera*, by C. Macnamara, London, 1870; Ziemssen's *Cyclopedia of Practical Medicine*, article "Cholera," by Prof. H. Lebert, Engl. Trans., London, 1875; *A History of Asiatic Cholera*, by C. Macnamara, London, 1876. (J. O. A.)

CHOLET, a town of France, in the south of the department of Maine-et-Loire, on the right bank of the Moine. It gives its name to an arrondissement, created in 1857. It has a council of prud'hommes, and a tribunal of commerce; its cattle market is good, and the manufacture of cotton-yarn, calico, cambric, woollen stuffs, and leather is considerable. The town owes the rise of its prosperity to the settlement of weavers there by Colbert. It suffered greatly in the Vendean war in 1793, insomuch that for years afterwards it was almost without inhabitants. Population (1872), 11,550.

CHOLULA, an ancient town of Mexico, situated on the plateau of La Puebla between Vera Cruz and the city of Mexico. Although formerly a populous place, it now contains little over 6000 inhabitants, mostly Indians, who are engaged in agricultural pursuits. At the time of the Spanish conquest Cholula—then known as Chololan—was a town of great importance, consecrated to the worship of the god Quetzalcoatl, who had here one of the noblest temples in the country, built on the summit of a truncated pyramid. This pyramid, which is 160 feet high, is now the most conspicuous feature in the place, and is surrounded by a chapel dedicated to Our Lady *de los Remedios*. The town was visited by Cortez in 1519 in his march to Tenochtitlan, the city of Montezuma, and on that occasion was given over to massacre and pillage, owing to a suspicion against the good faith of the inhabitants.

CHONS, an Egyptian deity called also Khons or Khonsou, principally worshipped at Thebes as the great eldest son of Amen Ra and Mut, and identified with *Aah* the moon. He had two names in the Thebaid, his second being Neferhotep; as such he is called the god of two names. By the Greeks he was called Chon, and considered to be a form of Hercules. Like Horus he is represented as a youthful god, his form mummied, wearing the lock of hair at the right side of his head and a skullcap surmounted by the full and dichotomized lunar disk, or else hawk-headed, wearing the same. He holds a crook and whip. He was a celestial deity, and at a later time connected with Thoth, and was said to have proceeded from Nu or Han the celestial waters, or to be the same as Har or Horus and Shu or Sos. The functions of Chons are exceedingly limited; he is said in the Ritual to overthrow the proud, and to be mystically connected with the Phœnix. But the most remarkable characters of Chons are those mentioned on a tablet found on a temple in the S.W. quarter of Karnak dedicated to the god, which had been repaired or erected by Rameses III. of the 20th dynasty, said to be of sandstone and basalt, the doors plated with gold and electrum. The temple of calcareous stone in the Karnak quarter was dedicated to Chons in two characters, that of giving oracles and of expelling evil, and the remarkable tablet found there records the departure of the god in his ark in the 16th year of the reign of Rameses XII. to the land of Bakhtan to expel a demon which had possessed the daughter of the king of that country and sister of the queen of Egypt. After effecting this miracle, and remaining some time there, the god returned in his ark conducted by priests in the 33d year of the same reign. Attached to this temple were cynocephali, a species of ape supposed to represent the moon and the living avatar or sacred animal of the lunar gods, under the charge of a priest or prophet. The worship of Chons appears to have been very common at the Ptolemaic period, and figures of the god in bronze and porcelain are not uncommon in collections. He is an inferior deity of the Pantheon, and although in type allied with Ptah, Osiris, and Horus, exercises none of the attributes of these deities, his chief function being that of the lunar gods; he represents the youngest as Ammon did the oldest of the divine circle.

Jablonski, *Panth. Ægypt.*, i. 185; Champollion, *Panth. Égypt.*; Wilkinson, *Mann. and Cust.*, v. p. 132; De Rougé, *Stéle Ægypt.*, pp. 16–18.

CHOPIN, Frederic-François (1810–1849), a celebrated composer and pianist, was born at Zelazowa-Wola, near Warsaw, on February 8, 1810. His family was of French origin, but in spite of this he has become the greatest and the most national exponent of Slavonic or more especially Polish nationality in music. In looking through the list of his compositions, teeming with mazurkas, valses, polonaises, and other forms of national dance music, one could hardly suppose that here one of the most melancholy natures has revealed itself. This seeming paradox is solved by the type of Chopin's nationality, a nationality of which it has justly been said that its very dances are sadness intensified. But notwithstanding this strongly pronounced national type of his compositions, his music is always expressive of his individual feelings and sufferings to a degree rarely met with in the annals of the art. He is indeed the lyrical composer *par excellence* of the modern school, and the intensity of his expression finds its equal in literature only in the songs of Heinrich Heine, to whom Chopin has been justly compared. A sensation of such high-strung passion cannot be prolonged. Hence we see that the shorter forms of music, the étude, the nocturne, besides the national dances already alluded to, are chosen by Chopin in preference. Even where he treats the larger forms of the concerto or the sonata, this concentrated not to say pointed character of Chopin's style becomes obvious. The more extended dimensions seem to encumber the freedom of his movements. The concerto for pianoforte with accompaniment of the orchestra in E may be

instanced. Here the adagio takes the form of a romance, and in the final rondo the rhythm of a Polish dance becomes recognizable while the instrumentation throughout is meagre and wanting in color. Chopin is out of his element, and even the beauty of his melodies and harmonies cannot wholly banish the impression of incongruity. Fortunately he himself knew the limits of his power, and with very few exceptions his works belong to that class of minor compositions of which he was an unrivalled master. Barring a collection of Polish songs, two concertos, and a very small number of concerted pieces of chamber music, almost all his works are written for the pianoforte solo; the symphony, the oratorio, the opera he never attempted.

The outer life of Chopin was exceedingly simple and almost totally wanting in incident of any kind. His first musical education he received from a Polish musician of the name of Ziwna, who is said to have been a passionate admirer of J. S. Bach. He also received a good general education at one of the first colleges of Warsaw, where he was supported by the liberality of Prince Antoine Radziwill, a generous protector of artistic talent and himself well known as the composer of music to Goethe's *Faust* and other works. His musical genius opened to Chopin the best circles of Polish society, a society at that time unrivalled in Europe for its ease of intercourse, the beauty and grace of its women, and its liberal appreciation of artistic gifts. These early impressions of refined life were of lasting influence on Chopin's development both as a man and as an artist. He never was and never wished to be a popular composer; his works are full of the subtlest touches of sentiment, they breathe indeed the perfume of the *salon*, and it is the sign of highest power in Chopin that his artistic nature could live in, and even derive new vitality from this dangerous atmosphere. While at college he received thorough instruction in the theory of his art from Joseph Elsner, a learned musician and director of the conservatoire at Warsaw. When in 1829 he left his native town for Vienna, where his *début* as a pianist took place, he was in all respects a perfectly formed and developed artist. This feature again is characteristic of Chopin's work. There is in his compositions little of that gradual progress which, for instance, in Beethoven necessitates a classification of his works according to different periods. Chopin's individuality and his style were distinctly pronounced in that first *Don Giovanni Fantasia* which excited the wondering enthusiasm of Robert Schumann. The same mine of sentiment he worked ever after, but it was one of unbounded wealth. His first appearance in public seems to have been marked by considerable success. A correspondent of the *Allgemeine Musikalische Zeitung*, at that time the first organ of music in Germany, writing from Vienna, November, 1829, says that "M. Chopin has placed himself in the first rank of pianists," and goes on to speak in enthusiastic terms of "his delicacy of touch, his rare mechanical dexterity, the melancholy tints of his *nuances*, and the splendid clearness of his phrasing." In 1831 he left Vienna with the intention of visiting London; but on his way to England he reached Paris and settled there for the rest of his life. Here again he soon became the favorite and musical hero of society. His connection with Madame Dudevant, better known by her literary pseudonym of George Sand, is an important feature of Chopin's life. When in 1837 his health began to fail, George Sand went with him to Majorca, and it was mainly owing to her tender care that the composer recovered his health for a time. The last ten years of his life were a continual struggle with the pulmonary disease to which he succumbed October 17, 1849. The year before his death he visited England, where he was received with enthusiasm by his numerous admirers. A distinguished English amateur thus records his impressions of Chopin's style of pianoforte-playing compared with those of other masters: "His technical characteristics may be broadly indicated as negation of *bravura*, absolute perfection of finger-play, and of the *legatissimo* touch, on which no other pianist has ever so entirely leant, to the exclusion of that high relief and point which the modern German school, after the examples of Liszt[1] and Thalberg, has so effectively developed. It is in these features that we must recognize that *Grundverschiedenheit* (fundamental difference) which according to Mendelssohn distinguished Chopin's playing from that of these masters, and in no less degree from the example and teaching of Moscheles. . . . Imagine a delicate man of extreme refinement of mien and manner, sitting at the piano and playing with no sway of the body and scarcely any movement of the arms, depending entirely upon his narrow feminine hands and slender fingers. The wide arpeggios in the left hand, maintained in a continuous stream of tone by the strict legato and fine and constant use of the damper-pedal, formed an harmonious substructure for a wonderfully poetic cantabile. His delicate pianissimo, the ever-changing modifications of tone and time (tempo rubato) were of indescribable effect. Even in energetic passages he scarcely ever exceeded an ordinary mezzoforte. His playing as a whole was unique in its kind, and no traditions of it can remain, for there is no school of Chopin the pianist, for the obvious reason that he could never be regarded as a public player, and his best pupils were nearly all amateurs."

A detailed analysis of Chopin's single works would be impossible. The following is a list of the most important of his compositions:—Two concertos for pianoforte, with orchestra, in E minor (Op. 11) and F minor (Op. 21) respectively; trio for pianoforte and strings, in G minor (Op. 8); three sonatas for pianoforte solo (Op. 4, 35, 58); one for pianoforte and violoncello (Op. 65), G minor; fifty-two mazurkas, contained in the collections numbered Op. 6, 7, 17, 24, 30, 33, 41, 50, 56, 59, 63, 67, 68 (Nos. 50–52 without number of Op.); études (Op. 10, 25); nocturnes (Op. 9, 15, 27, 32, 37, 48, 55, 62, 72); preludes (Op. 28, 45); polonaises (Op. 3, 22, 26, 40, 44, 53, 61, 71); valses (Op. 18, 34, 42, 64, 69, 70); besides numerous variations, impromptus, and other miscellaneous compositions, also settings of seventeen Polish national songs for one voice, with pianoforte accompaniment. Franz Liszt has written a charming sketch of Chopin's life and art (*F. Chopin*, par F. Liszt, Paris, 1851), and a very appreciative though somewhat eccentric analysis of his work appeared anonymously in 1842 (*An Essay on the Works of Frederick Chopin*, London). A complete and excellent collection of Chopin's pianoforte works in 6 vols. has been edited by K. Klindworth. (F. H.)

CHOREA, the scientific name of the disease popularly known as St. Vitus's Dance.

CHORLEY, a manufacturing town of North Lancashire, England, is situated eight miles south-east of Preston on the River Yarrow and the Leeds Canal, and on the Lancashire and Yorkshire Railway. The town, which has a weekly market, is well built and is abundantly supplied with water. It contains an old church in the Norman style with some interesting monuments, and several dissenting chapels. A town-hall has been erected recently at a cost of £30,000. Chorley is the seat of a considerable manufacturing industry. Numerous mills have been erected within and around the town for the manufacture of calico, muslins, jacconets, and fancy goods, while several bleachfields and print works are in the immediate neighborhood. Railway-wagon building is extensively carried on. The district contains a number of coal mines and stone quarries. The area of the parish, which forms a local board district, is 3614 acres; the population in 1861 was 15,013, and in 1871 16,864, of whom 7910 were males and 8954 females.

CHORUS. See DRAMA and MUSIC.

CHOSROES. See KHOSRU and PERSIA.

CHOUANS (a Bas-Breton word signifying screech-owls), the name applied to the royalist insurgents in the west of France, at the time of the Revolution. It has been suggested that the name arose from the cry they used when approaching their nocturnal rendezvous; but it is also maintained that it was derived from a nickname applied to their leader Jean Cottereau. Originally a contraband manufacturer of salt, Cottereau had been seized in a scuffle with the Government officers, and condemned to death, but his mother's entreaty gained his pardon from Louis XVI., and he never forgot his benefactor. He then became a soldier but deserted, and was imprisoned; on his release he settled down in a legal occupation, and joined the national guard. On the outbreak of the Revolution he gathered round him a band of royalist peasantry with whom he retired to the wood of Misdon, where they lived in huts and subterranean chambers. From Lower Maine the insurrection soon spread to Brittany, and throughout the west of France. In 1793 Cottereau joined Laval with some 500 men; and the band grew rapidly and swelled into a considerable army, which assumed the name of La Petite Vendée. Cottereau greatly distinguished himself by his personal bravery and his military ability. But after the decisive defeats at Le Mans and Savenay, he retired again to his old haunts in the wood of Misdon, and resumed his old course

[1] [Franz (1811–86), pianist, a Hungarian musical prodigy, called Abbé from having received tonsure, Kapellmeister at Weimar, wrote masses and oratorios. A natural daughter married Wagner, whose operas the Abbé popularized in Germany.—AM. ED.]

of guerilla warfare. Misfortunes here increased upon him, until through treachery he fell into an ambuscade and was mortally wounded. He died among his followers, July 28, 1794. Ignorant as he was, he appears to have been a man of no slight ability. His gratitude was intense; and his magnanimity was such that he is said on several occasions to have spared those who had most deeply injured him. After the death of Cottereau, the chief leaders of the Chouans were Georges Cadoudal and a man who went by the name of Jambe d'Argent. For several months the Chouans continued their petty warfare, which was disgraced by many acts of ferocity and rapine; in August, 1795, they dispersed. See Duchemin-Descepeaux, *Lettres sur la Chouannerie;* Seguin, *Histoire de la Chouannerie;* and Muret, *Histoire des Guerres de l' Ouest.*

CHRESTIEN, Florent (1541–1596), a satirist and Latin poet, was the son of Guillaume Chrestien, an eminent French physician and writer on physiology, and was born at Orleans. A pupil of Henri Estienne, the famous Hellenist, and a zealous Calvinist, at an early age he was appointed tutor to Henry of Navarre, afterwards Henry IV., who made him his librarian. De Thou says of Chrestien that he was an excellent man, a man of such an enlightened and noble soul that he was incapable of writing aught from a base and servile complaisance, but that it was not safe to irritate his Calvinism, as if that were done he hit hard and straight, trusting to reconciliation afterwards. Florent Chrestien was the author of many good translations from the Greek into Latin verse,—amongst others, of versions of the *Hero and Leander* attributed to Musæus, of several plays, and of many epigrams from the Anthology, all of which were enriched with excellent notes and commentaries. In his translations into French, among which are remarked those of Buchanan's *Jephthes* and of Oppian *De Venatione*, he is not so happy, being rather to be praised for fidelity to his original than for excellence of style. He wrote in verse against Ronsard, and in prose against Pibrac, the apologist of the Saint-Bartholomew; but his principal claim to a place among memorable satirists is as one of the authors of the *Satyre Menippée*, the famous pasquinade in the interest of his old pupil, Henry IV., his share in which, however, cannot now be exactly determined.

CHRESTIEN DE TROYES, the most eminent of the early French writers of romance, was born at Troyes in Champagne in the 11th century. Nothing whatever is known of his life; but from the fact that several of his works are dedicated to Philip of Alsace, count of Flanders, it is conjectured that he was attached to the court of that prince. He was much esteemed and highly praised by his contemporaries, and by the writers of the century following, and not without reason, being a master of style, and possessing in an eminent degree the qualities of invention and conduct, together with a great purity and range of thought, and a remarkable knowledge of men and manners. His books, therefore, apart from the interest attached to them as specimens of the mediæval epic, and by reason of their relation to the rest of the Arthurian literature, and in spite of the difficulties and crudities of the unformed language in which they are written, are still readable, and are rich in instructive details concerning the age that gave them birth. Many romances are attributed to Chrestien des Troyes. Modern criticism has selected six only as undoubtedly his. These are—(1) *Irec et Énide*, which contains some seven thousand verses, and which has supplied the materials for one of the legends of Tennyson's Arthurian cycle; (2) *Cligés*, or *Cliget*, a second Round Table romance; (3) *Le Chevalier au Lion*, containing nearly seven thousand verses, an offshoot of the Arthurian legend, if not absolutely forming part of it; (4) *Guillaume d'Angleterre*, a specimen of a more modern style, containing three thousand three hundred verses; (5) *Le Chevalier de la Charette*, a romance of nearly seven thousand verses, written by Chrestien and continued by Godefroid de Laigny, the hero of which is Lancelot du Lac; and (6) *Perceval le Gallois*, a poem of twenty thousand verses, begun by Chrestien and continued by Gautier de Denct and by Menassier,—perhaps the earliest instance of that alliance of the Holy Grail and Round Table legends which enjoyed such an immense popularity in the Middle Ages—translations and imitations of which have appeared in English, French, German, Spanish, Flemish, and Icelandic. Two other romances are known to have been written by Chrestien,—*Tristan, ou le Roi Marc et la Reine Yseult*, and *Le Chevalier de l'Epée*, but these are wholly lost; and he is credited with the authorship of six songs and of several Ovidian translations or imitations still unpublished.

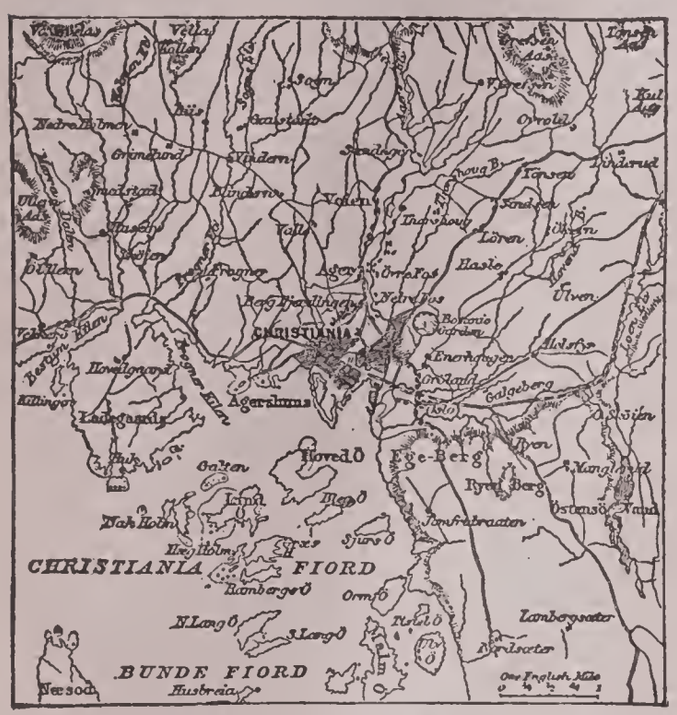
CHRIST (Χριστός, *the Anointed One*), the official title given in the New Testament to Jesus of Nazareth, equivalent to the Hebrew *Messiah*. See Jesus Christ.

CHRISTCHURCH, a parliamentary borough of South Hampshire, England, is situated at the confluence of the rivers Avon and Stour, 1½ miles from the sea, 22 miles S.W. of Southampton, and 111 miles from London by rail. Its history commences in Saxon times, when it was known as *Tweonaeteam*, a name which continued till recently in the form of Christchurch Twineham. The town, which is nominally governed by a mayor, recorder, and councillors, consists of two long irregular strects. It manufactures chains for clocks and watches, and hosiery, while the salmon fishery employs some hands. It is, however, to its priory church that it owes its distinction. This building, which is a conspicuous object at sea, belongs partly to the Norman and partly to the perpendicular styles of architecture, and is one of the best specimens of its kind, measuring 311 feet long by 104 broad. It was first established as an Augustinian priory by Baldwin, earl of Devon, in the 12th century, and thereafter received successive grants from the Crown. Within recent years the work of restoration has been carried on to a considerable extent. The church contains a very fine rood screen of the 14th century, a chapel of the 16th century, built by Margaret, countess of Salisbury, an altar tomb of the same century with effigies, and many other objects of architectural interest. A monument has been erected in the Western tower to Shelley the poet. Little remains of the old castle but an adjoining ruin called the Norman House, which is supposed to date from the time of Henry II. The population of the town in 1871 was a little over 2000, but the parliamentary borough, which extends to 22,350 acres and includes the greater part of Bournemouth and the parish of Holdenhurst, contained 15,415 persons; it returns one member to Parliament.

CHRISTCHURCH, the capital of the province of Canterbury, New Zealand, is situated in 43° 34′ S. lat. and 172° 35′ E. long., on both banks of the small river Avon, about five miles from the sea. It is built upon the great Canterbury plain, which here is a dead level, though the monotony of the site has been much relieved by extensive plantations of English and Australian trees. The town is about a mile square, and the streets, which are wide and well paved, cross one another for the most part at right angles. Christchurch contains a number of handsome public and private buildings, is lighted with gas, and is amply supplied with water from numerous artesian wells. It is the centre of the rapidly extending railway system of the province, and is connected with its port, Lyttelton, by a line eight miles in length, which penetrates the hills enclosing Port Cooper, on which Lyttelton stands, by means of a tunnel a mile in length. The population of the municipality of Christchurch in March, 1876, was officially estimated at 10,750, and that of the electoral district at 13,000.

CHRISTIANIA, the capital of Norway and of a stift of the same name, is situated about 80 miles from the sea, at the head of the Christiania fiord, at the foot of the Egeberg, in a finely-wooded and picturesque neighborhood, in 59° 54′ N. lat. and 10° 45′ E. long. It is a seat of the king and of the Storthing or Parliament, of the Hoieste-ret or final court of appeal, and of the bishop of the stift. The new town, or Christiania proper, was founded in 1624 by Christian IV.; the old town, Opslo, commenced in 1058 by King Harold Haardrada, formerly the capital, is now only one of the suburbs of Christiania. The fortress of Agershuus defends the fiord and the greater part of the town; it contains the regalia and national records, and its ramparts afford an agreeable promenade. The streets of Christiania are at right angles to one another, and are lighted by gas; the houses, except in the suburbs, are of brick or stone, and are mostly two-storied. Amongst the buildings may be mentioned the royal palace, containing some of Tidemand's best pictures; the cathedral, a brick edifice in the shape of a Greek cross; the university, founded in 1811, opened in 1813, with a library of about 150,000 volumes; the legislative hall; the free museums; the observatory; the naval, military, and art schools; the lunatic and two orphan asylums; the prison, near the Opslo

Kirke; the railway station, Freemasons' Hall, Athenæum, two theatres, and the large dining-hall or Damp-Köjkken. The botanical gardens, about a mile from the town, contain a large collection of plants from Spitzbergen and Iceland. The industrial establishments of Christiania and the circumjacent amt of Agershuus include weaving and cotton-spinning factories, paper and saw-mills, soap and oil works, distilleries, breweries, and tobacco manufactories. As a place of commerce Christiania has surpassed Bergen, and is now the first port of Norway; by the extension of its railway communications it has also become the chief emporium for the inland produce of the country. Its exports are wood, pitch, hides, seal-skins, oil and linseed cake, fish-manure, herrings, anchovies, stock-fish, and iron; and it imports wheat, salt, hardware, wines, preserved fruits, and fancy goods. In 1871 the total value of the imports was



Environs of Christiania.

about £2,151,225; the vessels that entered the port in 1872 were 1787, of total tonnage 393,598, out of which 143 steamers and sailing-ships were British. The customs duties in 1873 amounted to £329,175. Christiania is in steam communication with Gothenburg, Copenhagen, Lübeck, Hamburg, Amsterdam, London, and Hull, as well as with various places on the fiord, and all the ports of Norway. The town is healthy and has an excellent supply of good water. In winter its average temperature is 23° Fahr., in summer 59·9°, giving an average for the year of 41·4°. The harbor during three or four months of the year is ice-locked, and ships then lie at Drobak, about 18 miles south of the town. The population, which in 1812 did not exceed 10,000, had in 1835 reached 21,757; and at the end of 1873 it was 72,725, or, with that of the suburbs, about 83,000.

CHRISTIANITY is derived from the adjective *Christian*, which is formed from the name Χριστός, the Anointed, and means the religion introduced by Jesus Christ and communicated by Him to His circle of followers.

The two factors in Christianity.

The Christian religion is the result of two factors, neither of which can be omitted if a true description is to be given. On the one hand there is the objective element, which consists in the manifestation and revelation of God to His people for the purpose of salvation; and on the other side there is the subjective element, which consists in the appropriation of this manifestation and what it implies by man through faith. Both elements enter into and form the constituent elements of a new *life*, which all Christians share in common, and which is the essence of Christianity. This common life of Jesus and His people has many ways by which it can make itself seen and known. Christians have from the beginning exercised no small influence upon the ordinary political and moral life of the world. They have been able to effect changes in generally received moral ideas and maxims. They have altered the course and character of legislation. They have introduced new opinions and beliefs. They have formed fellowships for worship, built places of meeting, held councils and assemblies, and in many ways given evidence of their presence and power in the world. But it must always be remembered that Christianity is neither the church simply, nor theology, nor Christian ethics. It is more than all these put together. The common life of Jesus and His people, which is the core of Christianity, manifests itself in an outward visible organization for the purpose of worship, which is commonly called the church (see CHURCH). But this worship is not Christianity; still less are the various institutions and ceremonies according to which worship is carried on.

Christianity cannot help powerfully affecting the whole of the intellectual side of man's life. The spiritual events on which it rests must have their rationale, and the spiritual forces which course through it must have their rule, and man must more or less comprehend them, and assimilate them. The Christian cannot help having a very different idea of God from that held by Aristotle or Plato. The Christian regards sin as something which affects the whole human race, while the pagan believes it to be the mistake or misfortune of individuals. Christianity cannot help remoulding the beliefs and opinions of mankind, but theology and Christianity are two very different things.

The Christian is moved by moral impulses and guided by moral principles which are peculiar to himself. He cannot look on marriage, for example, from either the purely economic or the purely sensuous point of view. He cannot help reorganizing the scheme of virtues, and giving to the principle of love a pre-eminence which it has not in pagan ethics. Christianity cannot help putting a new face on morality, but Christian ethics and Christianity are still not one and the same thing.

Christianity includes all these and much more besides. It is nothing less than the whole round of human life in all its various departments in so far as it is related to and illumined and dominated by the divine love revealed in Jesus Christ. It is the presence of Jesus among His people and all that is implied in such a presence.

Christianity and Christ.

The close and inseparable connection between Jesus Christ and Christianity, which is implied in the name, and which study only makes more and more evident, produces the inevitable consequence that our view of the nature and characteristics of Christianity must depend on the answer which we give to the question which Jesus himself put to his disciples—"Whom do ye say that I, the Son of man, am?" There are different theories of Christianity, because there are different theories of Christ, and in order to know how various conceptions of the nature of Christianity arise it is necessary to be familiar with the various views which men have held and hold about the nature and work of Christ. For example, different theories of Christianity arise when we ask what was the relation existing between Jesus and what went before Him, what was the relation in which Jesus stood to His contemporaries and His immediate followers, what is the connection which subsisted between Jesus and the future. All these inquiries reveal different theories about the nature and work of Christ, which are reproduced in different theories of the essential nature of Christianity, and enable men whose opinions and principles are widely different to call themselves, to their own satisfaction at least, Christians.

The relation of Christ and Christianity to what went before.

Jesus Christ claimed to have a definite relation to the past history of that people among whom He was born. In His teaching He put himself at the end of the Old Testament, and declared that He came to fulfil the Law and the Prophets. Christianity, therefore, however it be explained, has a close connection with Judaism, and the religion of Jesus cannot be considered without regard to the religion of Moses. This is now universally acknowledged, however variously the relation between the two may be explained. Criticism finds an ample confirmation of the claims of Christ in the intimate connection in which His teaching, life, and work stand to the Old Testament and the past life of the inspired Hebrew people. The whole of the Mosaic dispensation, the whole of the Jewish economy, with its prophecy, priesthood, and kingship, is recognized as summed up in the person and work

of Christ. The Old Testament, which without Christ is but a collection of sacred books written at different times and in various manners, is regarded when looked at through Christ as an harmonious whole of anticipatory revelation. Indeed, one of the chief differences which critical apologetic finds between the Old Testament and other so-called sacred books is, that Christ is at the end of the Old Testament, and that no other scriptures have such a conclusion. But all this implies that Christianity is a development from Judaism, and that our idea of the one will be modified by our conception of the other. Those who refuse to admit that Judaism is more than one of the many natural religions of mankind can hardly admit the supernatural character of Christianity or regard it in any other light than as the outcome, perhaps the highest outcome possible, of that side in man's nature which has been called by some the religious faculty. Those who attempt to derive Mosaic institutions from Egypt, who seek the basis of Hebrew prophecy in epileptic tendencies, and see nothing in the theocratic idea which was not suggested by ordinary kingship, cannot have much difficulty in analyzing Christianity into the natural development of the religious sentiment aided by a somewhat extravagant enthusiasm. Those, on the other hand, who find it impossible to accept the assumptions, and to get over the innumerable difficulties attending the naturalist theory of the Old Testament and of the history of the Hebrew people, find in Christianity something different in kind as well as in degree from all natural religions. Modern criticism even of the negative kind often indirectly supports the supernaturalist theory of the Old Testament and of Christianity, for its fundamental maxim, that waters cannot rise higher than their source, has proved the impossibility of explaining away Old Testament institutions and New Testament truths into merely the natural outcome of the religious faculties of a peculiar people. It has proved that the Old Testament religion contains materials which were not got from the intercourse of the Jews with other nations, and which did not arise naturally from the geographical position or the ethnographical characteristics of the Hebrew people. It has shown that the Old Testament religion was not a natural stream gathered from many a smaller rill, but came forth gushing, like the water of Hebrew history, from the rock which contained it; and in doing so it has given its testimony to the altogether unique and supernatural character of Christianity.

The relation of Jesus to His contemporaries.

The relation of Jesus to His contemporaries, and of His disciples and their writings to the founders of the various ethnic religions, is another point whence proceed various views of the nature of Christianity. The old deist view, adopted and intensified by the Encyclopedists, that Jesus was a charlatan, that His disciples were partly cheats and partly dupes, and that Christianity was founded in fraud and perpetuated by deceit, has to all intents and purposes disappeared. But many believe that Christianity is only one of the many religions which are all of them true though none of them contain the whole truth. The modern notion of evolution has been called in to enforce this view, and Christianity is explained to be the most perfect development yet reached by the religious spirit of mankind; while the character of Jesus and the New Testament writings are explained on the same principle. On theories of this kind Christianity is the production of the natural forces of the period which gave birth to it, and contains nothing which cannot be traced back to the circumstances of the time, and the conditions of humanity. All such theories commonly rest on the general principle that the supernatural is impossible, and that whatever involves a miracle is *ipso facto* incredible, and then proceed by means of some special principle to explain the presence of facts which seem to imply the supernatural. (See article Apologetics.) These principles are used to explain not so much the origin of Christianity itself as the origin of the Christian writings of the New Testament, and the production of the scheme of doctrine and morals therein contained. Perhaps the most ingenious of these theories is that cluster which has been produced by the writers of the Tübingen school, who have suggested the general method which has been almost universally followed by anti-supernaturalist writers. The method is by an ingenious negative criticism to separate between the original elements of Christianity as these were present in the mind of Jesus and communicated by Him to His disciples, and those elements which were afterwards added by more philosophical adherents, and to explain how, out of the conflict between the two opposite tendencies of Judaism and anti-Judaism, the various and conflicting elements at last settled into a somewhat harmonious whole. By this ingenious method Jesus is reduced to the position of a Jewish rabbi, not much more noticeable than some of his contemporaries, and Christianity is not the religion of Jesus, but what grew out of that religion when it was subjected to the influences of Roman civilization, Greek philosophy, and Eastern theosophy. Such theories are unsupported by external, and rest confessedly on internal evidence. The weakness of internal evidence when unsupported by external is well known, and in this case the internal evidence is anything but strong. There are many serious objections to be taken to the Tübingen hypotheses (see article Bible) merely as hypotheses, and these difficulties are so great that it is almost evident the hypotheses would never have been put forward unless the anti-supernaturalist idea of Christianity had been taken for granted at the outset. There can be little doubt that if the supernatural be admitted these various hypotheses, while they suggest some difficulties which have not yet been solved, will be found to be at variance with the plain results both of external and internal evidence.

On the other hand those who believe in the supernatural take a different view of the relation of Jesus to His contemporaries. He was no mere Jewish rabbi, but spake as never man spake, and did what never man did. He was the manifestation of God, and came to give by His presence, person, and work, as well as by what He said, the full revelation of God. He was while on earth the centre of the world's history, to whom all had looked forward, to whom all look back. And Christianity is not the simple product of the contemporary philosophical and religious systems, but is the embodiment of the unique appearance and work of Christ.

Christianity and the future.

The relation in which Christianity stands to the future is also a basis on which various views of its nature have been rested, according to the theory of the peculiar powers of diffusion and propagation which it is supposed to possess. Anti-supernaturalists consider Christianity to be merely a moral force, acting through mere moral enlightenment; but this has already been sufficiently dwelt upon. There are, however, what may be called two Christian views of the *modus propagandi* of Christianity, which produce two of the real nature of Christianity itself. This difference of view is best seen in the variety of answers given to the question how Christianity subsisted after the departure of Christ, and how it subsists now from age to age, a more or less compact organic life in the world. The various answers given may be roughly placed in two classes as they lay stress on the spiritual or the mechanical side of the process, and enlarge on the spiritual or the mechanical influences at work. Those who take what may be called the spiritual view of Christianity hold that it was sustained after the ascension of Christ by the mission and work of the Holy Spirit, whose presence and influence enable it to go on from age to age, spreading in the world and developing according to the laws of its growth. And they believe that as the chief result of Christ's work consisted in a change of moral relation between God and those for whom Christ died, the spread and permanence of Christianity is purely moral, and manifests itself mainly in a change of will. Of course all this takes place in special ways and by appropriate means. These means are called the means of grace, and are usually held to be the Word, Sacraments, and Prayer; but it is always to be understood that all such means are secondary or subordinate, and that the primary means of grace is the Holy Spirit, who works through these subordinate means, but may and does work in other ways. It is always understood that the operations of the Spirit cannot be limited to special actions nor confined by mechanical laws. On the other hand those who look at Christianity from what may be called the mechanical point of view are inclined to lay stress upon the means by which the Spirit works. They do not ignore the mission of the Holy Ghost nor His work, but are apt to say that He works only in certain prescribed ways, and through one set of means, and the tendency is to lay almost exclusive stress on one set of subordinate means—the Sacraments, and to represent that the persistence and spread of Christianity depend upon the constancy and correctness of sacramental ceremonies.

These opposite views of the nature of Christianity depend upon differences of dogmatic conception which may be briefly indicated. All through the one view, a change in the relationship between God's will and man's will is held to be the fundamental result which flows from the work of Christ. All through the other view man's nature rather than man's will is considered, and the result of Christ's work is looked on rather as a process within human nature than as a change in moral relations between man and God. In this way the progress of Christianity is looked on as the gradual semi-physical impregnation of human nature by the nature of Christ, a prolongation of the Incarnation rather than a development of the consequences of the finished work of Christ, to be produced by keeping Christ incarnate in the sacrifice of the Mass and impregnating mankind by means of Transubstantiation in the Sacrament of the altar. The one view is the view of churches which have accepted the Reformation, the other is that of churches which have not.

Christianity and the Bible.

These various conceptions of Christianity may be further illustrated by the views which are held by the partisans of each concerning the relations between Christianity and the Bible. The Bible and Christianity cannot be separated, but different opinions may be and have been held about the relation in which the two stand to each other. On the one hand naturalists, and those who take the mechanical view of Christianity, are inclined to regard the Bible chiefly as a compendium of abstract truths, which may be condensed into dogmas and summarized in creeds; while those who take the spiritual view of Christianity regard the Bible as the medium which reveals God and His gracious dealings personally to the believing reader or hearer. To the one the Bible is a quarry of doctrines to be rationally criticised or implicitly accepted when once stamped as genuine by the church, to the other it is above all things a means of grace which the most ignorant can use and profit by. To the naturalist the Bible has been formed by the church, it is simply the natural production of the minds of those who formed the old Jewish and the early Christian communities, and grew to be what it is without the aid of superhuman intervention. To those who have adopted a mechanical view of Christianity the Bible is also the product of the church, but of the supernatural power in the church, and has grown to be what it is because it has been sanctioned by the church. To those who take the spiritual view of the nature of Christianity, the Bible, on the other hand, is and always has been the formative power in the church and that round which the church gathers itself, for it is the presence of God speaking to His people.

Both naturalists and those who hold a mechanical theory of Christianity agree in holding that there is an external sort of development in the Bible, and that the church can go beyond the Bible, whereas those who hold the spiritual view of Christianity deny both these positions. Naturalists hold that one part of the Bible is beyond the other, and since the Bible is simply the outcome of man's religious thoughts and feelings in certain ages and places, they believe that men now may give utterance to thoughts and sentiments which in depth of feeling and insight may surpass those contained in the Bible. The Tübingen theologians, for example, believe that the New Testament is a series of deposits of religious truth, in which the truths taught by Jesus are supplemented by the teachings of His disciples, by the lessons of Paul, and by the theories of Christians educated in the philosophy of Greece; while Dr. Newman considers that the church, in virtue of a supernatural gift bestowed upon her, can add to the doctrines contained in the Bible according to certain well-defined lines of development. On the other hand those who hold the spiritual view of Christianity believe that the church can never go beyond the Bible, and that progress in Christian theology means greater insight into the manifestation of God in the Bible and greater power to interpret the supernatural facts and forces made known therein.

The various theories differ also in the closeness of connection which they think subsists between Christianity and the Bible. The naturalist and those who put the church above the Bible as the formative power in Christianity both make the relation between Christianity and the Bible a purely intellectual one, whereas those who hold by the spiritual view make the Bible a means of grace and not merely the quarry whence to hew theological dogmas. But the naturalist agrees with spiritual Christians in maintaining the authoritative character of the Bible, while the mechanical Christian sets the Bible aside when it does not agree with church tradition. With the naturalist, however, the Bible is authoritative because it is the only set of documents which tell him about Christianity in its primitive state. It is authoritative because it is the only witness to the historical facts of Christianity, not because it is to be a law to him. To the spiritual Christian, on the other hand, the Bible is authoritative because it is a revelation of those spiritual forces and a record of those spiritual events on which Christianity still depends, and which teach him the way of salvation.

Definition.

To sum up, then, Christianity claims to be no mere social revolution or natural step in the march of human progress. It is a religion whose sources are not to be found within man's nature, but outside of it in the saving revelation of God in Christ, and Jesus is thus the author and giver of an eternal life which spreads itself and is maintained, not by mechanical contrivance, but by the living Spirit of God entering into human history, and building on the basis of reconciliation a kingdom of God which is both human and divine, and which comes and comes again and again in wave after wave of developing completion until the will of God is done on earth as in heaven.

Preparation of the world for the entrance of Christianity.

Christianity began its career in the world at a time singularly propitious both politically, socially, and religiously for the advent of a new universal and spiritual religion.

Even apart from the entrance of Christianity the reign of Augustus over the whole Roman empire was an epoch-making period. Never before had the various races of mankind been united under one universal empire which promised to be permanent. For the Roman power was different from the governments of Asiatic adventurers and Greek warriors. Where Rome planted her foot was fated to remain Roman. The ancient Asiatic empires had been for the most part the creation of victorious generals, and had been kept in life only by a tolerably rapid succession of dynasties; their power seemed to depend on the character of the individual ruler. And the empire of Alexander, while more enduring, was not coherent. But from the beginning of her conquests the spirit of Rome herself seemed always to be greater than the vigor and ability of her generals and rulers, and she alone of empires seemed to be indifferent to the precarious stability of government ensured by regular dynastic succession. "The Romans conquered like savages, but ruled like philosophic statesmen, till, from the Euphrates to the Atlantic, from the shores of Britain and the borders of the German forests to the sands of the African desert, the whole Western world was consolidated into one great commonwealth, united by bonds of law and government, by facilities of communication and commerce, and by the general dissemination of the Greek and Latin languages." The world had a centre as it never had before, and the golden threads of well-established government connected all the world with Rome. Roads were made connecting Rome with the remotest countries, and a system of posts established which provided for easy communication with the capital. Military colonies carried Roman usages and manners, civilization and privileges, to the remotest corners of the empire. Magnificent cities were built in such outlying dependencies as Britain, Gaul, and Germany. The arts and civilization were gradually extending their dominion and subjugating the most distant and most desolate places. To all this Augustus added a more perfectly devised centralization which made the empire a more compact whole, so that any new influence made its throbs felt from centre to extremities in a wonderfully short time. The world was made ready for the furtherance of the spread of opinions as it had never been before, and for becoming spell-bound by invisible spiritual laws like those which Christian morality weaves around its disciples. The time of Augustus, if it was the beginning of the decline and fall of the Roman empire as a visible earthly dominion, was also the beginning of its permanent establishment on earth in a purely invisible way, when its policy, statesmanship, and legislation were to pass into all the nations of the earth and become part of their lives so long as the world endured.

Socially, too, the world was wonderfully ripe for the en-

trance and spread of a universal religion. Slavery it is true flourished, and there were conquerors and conquered, privileged and unprivileged classes. But the beginning had already been made of that lavish distribution of Roman citizenship which laid the foundation of a common political life throughout the empire.

The religious character of the times was also marvellously adapted for furthering the advance of Christianity. The old national creeds were fast disappearing, and were being submerged in the vast cosmopolitan religion of Rome. It was the wise custom of conquering Rome to do nothing to disturb the religions of the peoples subdued by her armies, and commonly the principal deities of the conquered nations were added to the overcrowded pantheon of Rome. This religious tolerance or indifference gradually began to eat the heart out of paganism, and all over the civilized world the pagan creeds sat lightly on their worshippers. The various deities were looked on as interchangeable manifestations of a supreme fate-power who reigned alone in the invisible world, while in this visible earth the genius of Rome seemed to be the one object of worship. The old national religions with their well-defined outlines and limits were being gradually effaced, and men were longing for some religion which, while it had the universal character which the times required, should have more individuality and personal power in it than were supplied by the thoughts of a supreme spiritual fate, or by the mere materialist conception of the genius of Rome. And all this bred a thirst for information about sacred things which was unknown in earlier times. The claims of conflicting religions were philosophically discussed, and amid all the gross materialism of the period there were longings for some deeper, truer religion than any they had known. These longings were further stimulated by the gradual but almost universal advance of new religious ideas, coming from the far East, which was then regarded as the cradle of science and philosophy. In the 5th century before our era the vast Buddhist movement had overspread all the East from Thibet to Ceylon, and the Greek and Roman conquests in Asia brought Europe within the intoxicating influence of its subtle religious ideas.[1] This strange Eastern theosophy, which during the first four centuries of our era is known by the name of Gnosticism, had a most powerful influence on the old religions of the West, which seemed to dissolve under its touch. Everywhere in the art and literature of the period we find its prevalence in the West during the age of Augustus and his successors. It insensibly undermined the beauteous sensuous mythology of Greece and the harder, sterner religion of Rome, and substituted for them a religion in which, if fear was the prevailing emotion, worshippers still felt that there was more spirituality and greater claims to universality than their old national religions could give. And thus the gradual defacement of old religious outlines, the stimulation of strange cravings to know the mysteries of nature and of worship, and the longing for rest in a universal religion of deliverance prepared the world for the coming and spread of the religion of Jesus Christ.

The problem of Christianity.

The great problem Christianity had to face and to solve was one of no ordinary difficulty, and one involving a number of side issues which greatly perplexed the early church. The practical side of the problem as it met the early Christians may be put thus:—How could Christianity, which was rooted in Judaism, be at the same time a religion equally open to Jew and Gentile; how could the exclusiveness of Judaism and the utter want of exclusiveness in Christianity be reconciled with each other? And the solution of this problem brought the early Christians into conflicts of a special kind with the government and philosophy of the times.

The kingdom of God.

When Jesus proclaimed His mission, and when He sent forth His disciples on preaching tours to make known himself and His work, we find the phrase "kingdom of heaven" perpetually occurring; and it was this phrase and what it suggested that brought the early Christians face to face with the great problem they had to solve. When Jesus announced that the kingdom of God was at hand, His message was quite intelligible to His Jewish audiences. The phrase was sacred and familiar, and their thoughts went back at once to the old theocracy of Israel. And when after the death and ascension of our Lord, His Jewish believers got a truer and deeper insight into the meaning of the expression, still the idea it conveyed bound Christianity, with bands that could not be untied, to Judaism, the Old Testament Scriptures, the miraculous life of the Jewish nation, and the ideal Israel long expected and long announced. Throughout the Old Testament Scriptures we find three ideas connected with the thought of the kingdom of God. It implied first and primarily the share in the inheritance in the land which the Lord gave to His people and to their children; and then it implied security in this possession, deliverance from Egypt and a succession of enemies, and, lastly, the possession of an inward spring of covenant life, which guaranteed them both salvation and possession. These three things were the historical and material basis on which rested the whole spiritual and prophetic superstructure of the ideal kingdom of God, which lay enshrined in the heart of every devout Hebrew. When our Lord by His preaching, by His life, death, and rising again, and by His mission of the Holy Spirit, gave new meanings to these thoughts, He only widened, deepened, spiritualized, and gave personal point and application to what the prophets and holy men of old had already declared. And when He and His apostles guided by His Spirit taught His early followers that His kingdom of God meant possession of the spiritual blessings of God's grace, and deliverance from sin, death, and Satan, and a life of adopted sonship which guaranteed them in all these blessings, devout Jews could feel that now they were only learning what the prophets had taught, and they rejoiced in the thoroughgoing oneness which existed between the kingdom of God as proclaimed in the Old Testament and the kingdom of heaven which Jesus preached. But if it was a *sine qua non* that Christianity should spring out of the Old Testament Scriptures and be identical in all essentials with the Old Testament church, it was no less necessary that it should be now a religion for Gentiles as well as Jews, and here the difficulty emerged. Could the old Jewish church be carried over into the Christian church if all that outwardly distinguished it were abolished? Could the continuity be preserved if the ceremonies and restrictions which made up the visible life of the Old Testament worship were no longer to be observed? Would not the Old Testament church be entirely destroyed and the continuity between it and the New Testament church be done away with if the Old Testament ceremonial law was abandoned? So long as the members of the Christian church were Jews only or Gentiles who had become proselytes, the difficulty was not felt. The Christians had not openly broken with Judaism, and were acknowledged even by their Jewish opponents to be a Jewish sect,—a sect everywhere spoken against it is true, but still a sect just as the Sadducees were a sect. But whenever Gentiles who were not proselytes became believers then a fierce struggle arose between those who thought that the continuity between the Old Testament and Christianity could not be kept up unless it were visibly perpetuated in those observances which distinguished the Jewish religion from all others, and those who were contented with a continuity which was more of the spirit than of the letter and the form. The practical shape which the struggle at first assumed was, whether Gentiles could be Christians without first becoming proselytes, and whether Jewish Christians must cease to be believers if they associated with Gentiles who had not been circumcised, and had not rendered themselves servants to the law of Moses. To understand the difficulty rightly it should be remembered that when the difficulty arose the New Testament canon was not in existence, and the church had to be guided mainly by the Old Testament Scriptures and the memory of Jesus preserved by the apostles. In spite of what has been advanced by critics of the Tübingen school, it seems evident that the apostles one and all in their letters to the church faithfully followed out the solution which Christ's discourses gave. In these discourses our Lord carefully distinguished between the permanent and the temporary elements in the Old Testament dispensation, and assumed that His office as Messiah gave him full authority to abolish or alter the latter. He also pointed out that the permanent parts of the Mosaic economy were the various modes of expressing that love to God and to man which He declared to be the sum of the law and the prophets. These were unalterable, but any change might be made in the subordinate and temporary elements, if only this great principle was more fully and better expressed by the change. This leading thought Christ used

[1] [For the Zoroastrian origin of Gnosticism, see Vol. X. p. 625.—Am. Ed.]

as much to detect and condemn false developments of the Mosaic economy (*e.g.*, Pharisaism) as to test its true development in Christianity. The apostles of Jesus carried out the principles of their Master. There is not a trace in the epistles of Peter, James, and John of the idea that salvation and entrance into the kingdom of God could only be obtained by those who were first Jews and then Christians. There is no statement, for example, that Gentiles must be circumcised before they can be baptized. On the contrary, James speaks of the perfect law of liberty, and Peter and John have expressions equally strong. Within the writings of the apostolic circle everything goes to show that the church was taught from the beginning that Christianity was not to be confined within the limits of natural or adopted Jewish nationality.

The influence of Judaism.

But when we turn to the Acts of the Apostles, and to the epistles of Paul, especially to the Epistle to the Galatians, we find that the apostolic solution of the difficulty was not acceptable to the early Jewish Christians, and was not accepted by many of them. We even find that the practice of members of the apostolic circle was not always in accordance with the principles which they had enounced in accordance with the guidance of the Holy Spirit. There was a strong ultra-Jewish party in the early Christian church, which was able in some measure to control the conduct of the apostles themselves. And this was what was to be expected. Men who had been trained in Judaism, where the connection between religion and politics was so very close, whose religious thoughts were always expressed in outward ordinances, could scarcely avoid insisting upon some visible connection between Judaism and Christianity. They could not see that Christianity was the completion of Judaism if the practices of the Mosaic economy were not kept up. Thus we find at least two parties, a Judaizing and a Gentile party, in the early church. At first the Jewish party was so strong as to force a compromise upon the leaders of the Gentile church, and require that every Gentile Christian should at least become a proselyte of the gate by abstaining from things offered to idols, from things strangled, from blood, and from *πορνεία* or a breach of the Old Testament regulation about marriage; and it is probable that Jewish Christians were required to keep up all the practices of the Jewish religion and more especially to share in the sacrificial worship of the temple. Afterwards this Jewish party grew weaker, and it became the universal belief in the early church that Christians born Jews did not need to observe the ceremonial law of Moses or to share in the temple-worship, and that Christians born Gentiles did not require to show, by keeping certain Jewish regulations, that they were believers in a creed which was a development of Old Testament ideas. The capture of Jerusalem and the destruction of the temple separated the Christian Jews who were of the sect of the Pharisees from their fellow-Christians, and the severe persecution of Jewish religion and rites which followed the revolt under Bar Cochba sent most of them over into the ranks of the Essenes, and thus the Christian church was left in peace to reconcile its intimate connection with Judaism with its abandonment of Jewish ritual on the principles of Christian liberty. But in solving the problem the early Christian church was scarcely true to the principles of its Master. In order to defend more strenuously their separation from Judaism, it was customary for the fathers of the church to look at Christianity as supplying in detail all that Judaism possessed, and this led them almost as far from the fundamental principles of continuity laid down by Christ as the old Judaizers had gone. They required a new law to set over against the old law of Moses, a new service to take the place of the temple service of the Old Testament, a new daily sacrifice, "the new law's new oblation" instead of the sacrifices of Moses, a new ritual which after it had gradually grown complex enough was found to correspond bit by bit with the ritual of Jerusalem, and a new priesthood whose functions were to be not unlike the duties of the sons of Aaron. In church traditions, a ritual of worship, and a service of priests, they found the proof of their relation to the religion of the Old Testament, and forgetting the unseen continuity of sameness of spiritual principle, found a consolation in a fancied similarity in external routine of worship. In this way early Christianity succeeded and failed in realizing to herself the real continuity between the Old Testament and the New Testament kingdoms of God.

The influence of Rome.

But if early Christianity found it difficult to reconcile the New Testament idea of the kingdom of God with the Old Testament conception, it was no less troubled when it came to work out this New Testament thought on the broad basis prepared for it by the existence and character of the Roman empire. There were difficulties without as well as difficulties within. Christians are men with bodies as well as souls, and Christian ideas tend to take sensible shape, sometimes false and sometimes true. No sooner had Christianity shaken off its Jewish thraldom than it seemed eager to betake itself to a new slavery—eager to lay down the kingdom of God on lines already furnished by the government of pagan Rome, or the creeds of pagan philosophy. At all events we can trace in early Christianity the workings of two subtle influences, the one of which strove to reduce the kingdom of God to a material and earthly empire, while the other would have dissolved it into a system of philosophy. The ecclesiastical empire of the Middle Ages and the scholastic theology overthrown at the Great Reformation were slowly built up by principles which Christianity almost unconsciously assumed during her long struggle with pagan Rome and with pagan philosophy.

The relation of Rome to Christianity was very peculiar. Both aimed at world-wide dominion, and the one was the very incarnation of polytheism, while the other forbade in the sternest terms all idolatrous worship. The Christians, while citizens of the great empire which ruled the world, found the idolatry which they hated and denounced interwoven inextricably with the law of the land, possession of property, social observances, and public ceremonies. And Christianity had scarcely emerged from Palestine when it found itself engaged in a hand to hand struggle with the imperial power of Rome herself.

Roman treatment of Christianity.

The uniform policy of Rome was to respect the laws and the religion of the conquered peoples who came under her dominion. The Roman system of jurisprudence, it is true, was extended to all parts of the empire, and capital offences were generally tried according to Roman law before Roman tribunals; but, generally speaking, conquered nations lived under their own laws and were allowed to practise their own religions. By this wise policy Rome not only avoided stirring up religious wars, but contrived to be the religious and legal as well as political centre of all the conquered tribes. In one way only was the religion of the conquered interfered with, when the worship of the emperor was forced upon all his subjects. Whatever motives of policy urged this haughty indifference to all creeds, and this easy toleration of every form of pagan faith, they were in reality founded on an intense belief in the eternity and almost divinity of Rome itself. Rome had remained for ages and seemed likely to endure the Eternal City, and when all other feelings of reverence had fled, the heart of the genuine Roman was full of awe for the majesty and might of perenduring Rome. It was no mere servile adulation which led to the deification of the emperors. The emperor was God, and divine honors were paid to him because he was the visible symbol of imperial Rome making manifest its power and permanence. And it was a real feeling of worship that raised in every house the altar to the *divus imperator*, and spread over the whole of the Roman empire, jostling aside its myriad creeds, the one faith in Rome, in its power, its eternity, and its mysterious strength. It was in this way that paganism and Rome became almost synonymous, and that Christianity and Rome were foes from the first.

Rome never treated Christianity as other religions were treated. Gibbon tells us that the Romans were already somewhat intolerant of Judaism and extended their intolerance to the new Jewish sect, somewhat more intractable than their neighbors, which Christians were supposed to be. He also shows that Christians who had neither temples nor synagogues were supposed to be atheists, and so beyond the pale of toleration, and that the secret assemblies of Christians were supposed to have a hostile political meaning. But something more is required to explain the uncompromising hostility of Rome, especially when we find that latterly that hostility was strongest under the

greatest and noblest emperors. Since Roman toleration was founded on public policy, there was an end of it with regard to a religion which was of no use in curbing a conquered people. The Christian religion was *nova* and *illicita;* it was not a national religion nor a recognized faith, and was a new and unaccountable phenomenon which might be, and most probably was, fraught with danger to the sacred state. We find, too, in many of Rome's ablest statesmen a strange instinctive dread of Christianity. They made inquiries about it and were watchful of it, and yet could get no real insight into it. They could not help noticing how in spite of edicts and persecutions Christianity was rapidly increasing; they saw how, with a daring which to them was simply inexplicable, it was nothing loath to match itself against the power of Rome. To the ears of these dark and jealous emperors came tidings of Christianity copying the jurisdiction of Rome in its ecclesiastical divisions of the land, of its success in the large towns in the empire, and of its entrance into the army. They saw, too, what Constantine was the first to make use of, that Christianity acted in such a way upon the physical frame that Christian soldiers were stronger and braver than their fellows, and man for man and battalion for battalion were more than a match for the pagans. Above all, they heard rumors of a new kingdom which the Christians were to establish, of confidently expressed hopes that the kingdom would soon come, and of openly asserted resolutions and prophecies that it would be established on the ruins of Rome itself. And, on the side of the Christians, Tertullian was ready to boast that in a few years the Christian empire had more extensive boundaries than the Roman, and that Christian soldiers had penetrated and triumphed in regions where the Roman arms were unknown or defied. Christian martyrs marching to the arena confidently predicted the speedy overthrow of the cruel paganism which sent them there. As the struggle deepened, too, there entered a distinctly new element on the Christian side, and the contest became not merely one of the true religion against a false paganism and a pagan and persecuting state; it became a battle between two kingdoms. The Christian bishop and the Roman governor were two rival authorities, viceroys in two warring empires; and the saints would inherit the earth, when the church ruled instead of Rome as the mistress of the world. During the long struggle between Rome and Christianity we see this subtle influence entering into and withering the true spiritual conception of the kingdom of God, until at last it is almost transformed into an earthly empire. St. Augustine has seized on and represented this idea with sublime dramatic power in his *Civitas Dei in peregrinatione per terras,* where the *Civitas Dei,* or the church, is set over against the *Civitas Terrena,* or state; and where the kingdom of God, however grandly pictured, is almost as material, earthly, and sensible as the empire of pagan Rome. From this fatal influence have come all the attempts to realize the universality and catholicity of the church in a purely external or visible way, and the failure to understand how Christianity may be all embracing without *visibly* covering and controlling the earth.

In her contest with Rome Christianity succeeded in realizing and giving expression to her claim to universal dominion, but in Rome's overthrow she inflicted an almost fatal wound on herself when she was unconsciously induced to take the government of a pagan empire as her model for the organization of a spiritual kingdom.

The influence of pagan philosophy.

In the contest which Christianity had to maintain with pagan philosophy the early Christians were compelled to work out another side of the great problem with confronted the early church —the relation of the Old Testament to the New Testament kingdom of God. Philosophy when engaged upon topics which belong to Christianity is always easily distinguished by the way in which it puts its questions. The question with philosophy, for example, is, What is sin? How can its existence be explained? But the Christian question is: How can I get rid of sin? To the philosopher sin is food for meditation, but to the Christian it is something to be escaped from. Outside Christianity there were many schools of thinkers who busied themselves with speculations about the origin and nature of sin, death, God, judgment, holiness, and so on, and there were many philosophers who were quite willing to take help from the Hebrew Scriptures in their difficulties. It was always a matter of earnest endeavor on the part of Christian theologians to make it clear that Christianity was not a philosophy to be discussed but a life to be lived; but when they were called, by the views of some of the Gnostics, to explain their relation to the Old Testament Scriptures and to the New Testament canon, we find them unable to realize the full significance of the problem. To the early Christians the Old Testament was pre-eminently the scripture, it was in their possession before the New Testament, and the New Testament canon was gradually formed as one after another of the writings which compose it were found worthy of a place beside the Old Testament Scriptures. Certain of the Gnostic sects made use of the facts, statements, and truths contained in the Scriptures in their theories of creation and redemption, of man, sin, and salvation; and Christian theologians were compelled to refute the Gnostics by setting forth over against the false doctrines what they held to be the truths concerning the matters taught. In this way and gradually there grew up an intellectual system of Christian truth, embodied in the creeds of the church and in the writings of her theologians. The necessity was laid upon Christian theologians to present Christianity intellectually in this way, and oppose a true to the false γνῶσις; but just as in her contest with Judaism and Rome Christianity insensibly adopted part of the error contended against, so here the struggle against intellectual evil had the result of tending to dissociate Christian life from the Holy Scriptures, and of creating two kingdoms of God—one of life which was to be lived on the lines of the old Roman empire, and one of doctrine which was to be based on the foundations of Greek philosophy. This latter tendency did not appear in the church until the early Jewish element had almost died out. To the Jew Judaism was an historical past which it was not to the Gentile, who could with difficulty think of the church of the Old Testament as a spiritual organization into which he was actually brought by regeneration. To the Jew the Mosaic Law and the Old Testament Scriptures generally did not so much mean a series of commandments or prescriptions as a mode of life. No doubt when they thought of the Old Testament their minds were full of laws and commandments, but still the most prominent idea was that their fathers had *lived,* and had been enjoined to live a particular mode of life. To the Jew the Old Testament was the past covenant life of his fathers in which he might share, and it showed him God much more as the covenant God with whom Israel had lived in communion than as a mere Lawgiver. But it was more difficult for the Gentile to feel this. He could not easily feel that the covenant life described in the Old Testament was the life into which Christ had brought him, and he felt as much outside of it as the Jew felt within it. And so to him the Old Testament was not so much a haven of religious fellowship as a series of commandments which he might understand and at least could obey. When the Gnostics drew false inferences from statements in the Old Testament, and when the church theologians corrected these in creeds, this forced making of creeds intensified the tendency to look at the Bible—Old Testament and New Testament—rather as a storehouse of theological weapons, than as the medium of personal intercourse between a covenant God and His people. One of the main characteristics of the Biblical idea of the kingdom of God was lost—the thought of personal intercourse with the King through His word realized in an act of personal trust, and the idea of faith lost its sense of trust with personal communion and took the character of assent to intellectual truths. But as the life can never be fed upon abstract truths and their comprehension, and must have some support, Christian life became gradually divorced from any relation to the Word, and became rooted on a system of observances, of which the Sacrament of the Supper became the centre. The efforts of the church to realize its relation to the Scriptures were in this way partly successful, because it recognized its duty to set forth the truth of God; but from the way taken the result was to displace Christianity from its position of rest upon the Old Testament church and the Scriptures, and to send it to its own machinery for life and strength.

The influence of pietism.

One other phase of early Christianity ought to be referred to, as it illustrates another side of the same great problem which was presented for solution. Both in the Old Testament and in the New Testament conceptions of the kingdom of heaven

the idea of a new life, or at least of a separate consecrated life, is a conspicuous element. The kingdom of God implies that those who are within the kingdom live a life different from those without. In all ages of Christianity this new and separate life has been an object of speculation, and many various ideas of its true nature have been promulgated. The very conception of a life which is new is sufficient of itself to produce strange conjectures respecting its nature, and in the epistles of St. Paul we find evidence that many of the Gentile Christians were disposed to think of the new life of Christianity as one entirely outside of the realm of ordinary moral law. This lawless or immoral tendency was sternly checked in the Christian church, and only gained head in sects outside of it; but traces of the tendency were not infrequent. The function of the Holy Spirit in the church was always made a ground of conjecture concerning the real nature of the new Christian life, and it was from mistaken views of the character of the Spirit's influence and work that disturbing pietist theories perplexed early Christianity. These pietist theories gained distinctive form and acquired great power in what has been called Montanism, and the church's efforts to rid herself of this incubus, while well intentioned, led to permanent results by no means satisfactory. One of the chief characteristics of this early pietism was the idea that the abiding presence of the Holy Spirit rendered possible a continuous revelation, and it was believed that the prophetic gift was permanent in the Church. The Montanist prophets presumed to add to revelation, and to overturn ecclesiastical laws and jurisdiction by means of infallible utterances disclosed to them. The practical effect would have been to reduce the organization of Christianity and the intercourse between Christians to a precarious dependence upon the dictates of self-constituted prophets, whose ideas of revelation resembled the heathen soothsaying much more closely than the Old Testament prophecy or the New Testament inspiration, and this led the church to adopt a severer discipline and more monarchical constitution. But this must be afterwards referred to.

To sum up, then, early Christianity, in working out the problem of its connection with Judaism and the Old Testament Scriptures, achieved success in four great directions, but at the same time made four great mistakes. It insisted rightly on the fact that in order to be a development of Judaism Christians did not require to become Jews first, but it erred in attempting to make Christianity the exact counterpart and rival of Judaism. It insisted rightly that the kingdom of heaven was a kingdom to be set up on earth and so all-embracing as to include the whole earth within its boundaries, but it erred when it conceived it to be a kingdom which in any way could be compared with the Roman empire, and when it began to translate spiritual power and possession into physical and temporal dominion. It insisted, rightly, that the church was the custodian of truth, but it erred when it made faith intellectual assent, when it gave to the Bible an entirely intellectual aspect, and laid the foundations for infallible creeds. It rightly expelled from its midst a false pietist prophecy, which in course of time would have undermined alike scriptural and ecclesiastical authority, but it erred when it conferred on a consecrated privileged caste the sole authority to interpret scripture and regulate ecclesiastical discipline. These attempts and failures in early Christianity have been so often repeated that they may be looked upon as true and false principles of development inherent in it.

Early progress of Christianity.

The history of the world presents no phenomenon so striking as the rise and early progress of Christianity. Originating in a country not remarkable for any political, commercial, or literary influence, emanating from One who occupied an humble sphere in the community amidst which He appeared, and announced in the first instance by men of mean extraction, of no literary culture, and not endowed with any surpassing gifts of intellect,—it nevertheless spread so rapidly that in an incredibly short period of time it had been diffused throughout the whole civilized world, and in the fourth century of its existence became the recognized and established religion of the Roman empire. When it is remembered that this result was achieved not only without the aid of any worldly influence, but in the face of the keenest opposition on the part of all the learning, wealth, wit, and power of the most enlightened and mightiest nations of the earth, the conclusion is strongly forced upon us that a power beyond that of man was concerned in its success, and that its early and unexampled triumphs afford an incontestable proof of its inherent truth and its divine origin. Nor has the rapid advance of Christianity been confined to its earlier years. "After a revolution of fourteen or fifteen centuries that religion is still professed by the nations of Europe, the most distinguished portion of human kind in art and learning as well as in arms. By the industry and zeal of Europeans, it has been widely diffused to the most distant shores of Asia and Africa, and by means of their colonies has been firmly established from Canada to Chili in a land unknown to the ancients." And when we turn to the results of modern missionary enterprise we find a success no less remarkable.

Causes of its progress.

Historical critics who have no sympathy with the supernatural elements in Christianity have attempted to account for this wonderful success by natural causes, and have pointed out various circumstances which go far to account for the rapidity of its spread. Skeptical critics of a past generation contented themselves with enumerating various distinct causes combining to produce the effect, while naturalist writers of our own day try rather to show that Christianity was the natural outcome of the intellect of the age which produced it. The great disadvantage attached to the one mode of criticism is that no parade of causes or conditions of success can ever get rid of the supernatural character of Christianity, for it is always impossible to show that these are the only causes at work, and the retort can be made that these causes are themselves part of the supernatural plan for the introduction and furtherance of Christianity, while the other labors under the necessity either of getting rid of the Christ of history and putting in his place an elaborate poem—an attempt not yet successful—or of reducing the character and work of Jesus to the level of those of Confucius, Buddha, Mahomet, or other founder of a purely naturalist religion. The celebrated five causes of Gibbon are perhaps the best specimen of the one mode of argument, while the elaborate theories of the Tübingen school are certainly the most noteworthy instance of the other. Gibbon thinks that the Christian faith obtained so remarkable a victory over the established religions of the earth because it was effectually favored and assisted by the five following causes:—1. The inflexible, and if we may use the expression the intolerant, zeal of the Christians, derived, it is true, from the Jewish religion, but purified from the narrow and unsocial spirit, which instead of inviting had deterred the Gentiles from embracing the law of Moses; 2. The doctrine of a future life improved by every additional circumstance which could give weight and efficacy to that important truth; 3. The miraculous powers ascribed to the primitive church; 4. The pure and austere morals of the Christians; 5. The union and discipline of the Christian republic, which gradually formed an independent and increasing state in the heart of the Roman empire. It does not need the possession of an anti-Christian spirit to admit that these causes of Gibbon's may have helped greatly to spread the Christian religion, and indeed the Christian critic has to object not so much to this statement of causes as to the covert insinuation which lurks in the historian's exposition of their influence. For the question still remains to be put, why it was that Christianity possessed so many characteristics which made it adapted as no other religion was to the needs and capacities of mankind. Still it ought to be observed that when we turn to the pages of the early Christian Apologists, especially to the writings of those of them who were converted to Christianity after having spent many years as intelligent pagans, we find them almost unanimous in declaring that they themselves were attracted to Christianity chiefly by these three reasons:—1. The sublimity and simplicity of the Christian doctrines of God, sin, and salvation; 2. The noble purity of the Christian life, more especially of the life of a Christian woman; and 3. The grandeur of the doctrine of creation contained in the Old Testament Scriptures. The inefficiency of the theories of modern critics who would explain the origin and success of Christianity on purely naturalist grounds has already been discussed under the head of APOLOGETICS.

The influence of Christianity.

The strong and deep influence which Christianity soon began to have even over the lives and opinions of those who were not Christians,

is even a more striking testimony to its paramount claims than the rapidity of its spread. The struggle of Christianity with Rome has already been alluded to, but even before Rome gave up the struggle in despair, before the last persecution, and before the triumph under Constantine, the influence of Christianity was making itself felt morally, socially, and politically, while its influence on intellect and science was no less remarkable.

Pagan immorality.

It is almost impossible for us to realize how powerfully paganism acted upon the general morality of the great peoples of antiquity and encouraged all manner of lawlessness and indecency. In the time of the later republic and of the early empire we have the spectacle of Roman law and philosophy powerless to restrain the brutal and obscene passions of the people excited by the influence of the popular religion, even when they had ceased to regard it as an intelligible creed. All paganism is at bottom a worship of Nature in some form or other. and in all pagan religions the deepest and most awe-inspiring attribute of nature was its power of reproduction. The mystery of birth and becoming was the deepest mystery of nature; it lay at the root of all thoughtful paganism and appeared in various forms, some of a more innocent, others of a most debasing type. To ancient pagan thinkers, as well as to modern men of science, the key to the hidden secret of the origin and preservation of the universe lay in the mystery of sex. Two energies or agents, one an active and generative, the other a feminine, passive, or susceptible one, were everywhere thought to combine for creative purpose, and heaven and earth, sun and moon, day and night, were believed to co-operate to the production of being. Upon some such basis as this rested almost all the polytheistic worship of the old civilization, and to it may be traced back, stage by stage, the separation of divinity into male and female gods, the deification of distinct powers of nature, and the idealization of man's own faculties, desires, and lusts, where every power of his understanding was embodied as an object of adoration, and every impulse of his will became an incarnation of deity. But in each and every form of polytheism we find the slime-track of the deification of sex; "there is not a single one of the ancient religions which has not consecrated by some ceremonial rite even the grossest forms of sensual indulgence, while many of them actually elevated prostitution into a solemn service of religion." The corrupting influence of paganism entered into the very essence of the social life of the Roman at the time when Christianity began its career. The thoughtful reader of contemporary literature cannot fail to observe how day by day the poison instilled itself into every nook and cranny of the social life of the people. "It met him in every incident of life, in business, in pleasure, in literature, in politics, in arms, in the theatres, in the streets, in the baths, at the games, in the decorations of his house, in the ornaments and service of his table, in the very conditions of the weather and the physical phenomena of nature. It is not easy to call up as a reality the intending sinner addressing to the deified vice which he contemplates a prayer for the success of his design; the adulteress imploring of Venus the favors of her paramour; the harlot praying for an increase of her sinful gains; the pander begging the protection of the goddess on her shameful trade; the thief praying to Hermes Dolios for aid in his enterprises, or offering up to him the first-fruits of his plunder; young maidens dedicating their girdles to Athene Apaturia; youths entreating Hercules to expedite the death of a rich uncle. And yet these things and far worse than these meet us over and over again in every writer who has left a picture of Roman manners in the later republic and under the beginning of the empire" (*North Brit. Rev.*, vol. 47). When we turn to the writings of the early Christian Apologists we find them exposing in a scathing way this whole state of things and contrasting it with that moral law which is written by nature on the heart of men; and the pure lives of the Christians in the midst of this sea of iniquity had a wonderful effect. There is no contrast more wonderful than that which may be drawn between the grandeur of Roman law and the debasement of the ordinary social life of the Roman people; but Roman law was founded much more on economic than on moral foundations.

The social influence of Christianity.

But when Christianity entered into the Roman empire, and when it at last had made head against paganism, the imperial law found an ally in Christian ethics which it had been without during the reign of paganism, and discovered, too, a higher sanction for its precepts than mere economic interests. From the time of Constantine onwards the influence of Christianity on Roman law is remarkable, and always on the side of morality in the highest sense of the term. We find from the Acts of the Apostles that the first organization of Christians was for the better distribution of charity to those in need of it, and one of the earliest results of the political triumph of Christianity in the empire was the promulgation of laws ensuring the protection of the feeble and the helpless. The nineteen years of civil war which preceded the final victory of Constantine had produced the usual scenes of misery, and great numbers of orphan children were thrown upon the world without protection. The influence of the celebrated Lactantius, to whose care Constantine had committed the education of his son Crispus, was able to secure the publication of a law declaring that the emperor was the father of all these children, and that the expense of their upbringing was to be defrayed by the state. At the same time the exposure for sale of unfortunate children was sternly forbidden, and those who so exposed them were condemned to the amphitheatre. The condition of slaves was also greatly ameliorated by the new spirit of Christianity which was then working in society. Slavery was not abolished, but various laws were made restricting the power of slave-holders. The master was deprived of the arbitrary power of life and death. It was ordained that when royal estates were divided the families of slaves of the soil were not to be separated. New laws breathing a more Christian spirit regulated the relation of the sexes. Divorce was made a much more difficult matter. The laws against rape and seduction were made more severe, and adultery became a capital offence. The nameless crime, which was the disgrace of Greek and Roman civilization, was made punishable by death. The making of eunuchs was forbidden, and it was enacted that slaves who had suffered this mutilation might claim their freedom. But the silent revolution which Christianity wrought in social morality cannot be measured by legislation. It is to be traced in a purer literature, a higher moral life, a better public spirit, and, above all, in the establishment of buildings for the reception of strangers (ξενῶνες), alms-houses for the poor (πτωχοτροφεῖα), hospitals and orphan-houses for the sick and the forsaken, and houses of refuge for the support of helpless old men and women. All these were due to the church, and the bishops vied with each other in the proper exercise of a munificent charity. One of the most celebrated of these establishments was the Basilias of Basil of Cæsarea, where strangers were hospitably entertained, and medical attendance and nursing were provided for those sick of whatever disease. In the Basilias everything was on the most magnificent scale. The physicians of the establishment resided within the walls, and workshops were provided for all the artisans and laborers whose services were needed. The presence of such institutions, and the Christian charity to which they bore witness, must have had a wonderfully restorative influence on the corrupt pagan society in which they were set up. Law and religion became allied, not opposing forces.

The influence of Christianity on politics.

The political influence of Christianity is as marked as its moral power, and had as great an effect upon the paganism into which it was thrown. It was Christianity which gave to the world those two great factors in civil liberty,—a consolidated public opinion and an efficient system of representative government. Gibbon has gone out of his way to sneer at the passive resistance of the early Christians, and has lent the weight of his authority to the idea that a struggle for civil liberty is opposed to the whole tenets of primitive Christianity; but whatever the views of the Christians were on these points, it is plain that Christianity put a new public life into the Roman empire which greatly retarded its final fall. It has been frequently remarked that Christianity did as much for Constantine as he did for it, and the history of the time amply justifies the observation. Whatever be the truth about the sincerity of his conversion, it is undoubted that he, from first to last, looked at the church from a political point of view, and made use of it accordingly for his own political aggrandizement. It should be remembered that the Roman empire hung badly together, and that apart from the sentiment

which may be called belief in the genius of Rome there was no common life and no common nationality. There was no popular life, such as we are accustomed to in modern Europe. From the beginning the empire had been a military tyranny. The emperor was imperator, and ruled because he commanded the state as an army, and the rule in the provinces was really military. It was imposed on the people from without and did not spring from themselves. There was not even that solidarity in it which an hereditary absolutism begets. Of course such an empire had very little cohesion, and was only kept together by the feeling of the genius of Rome and by the grand system of Roman law. But there was within the empire a new corporated life, a new kingdom, which subsisted in virtue of the life which was in it, held together by the inward power of growth. When Constantius and Constantine looked at the Christian church with the eyes of statesmen, they saw before them a great self-regulating organization which had a common life, a cohesion, and a corporate character quite unlike anything else in the empire. It was impossible to touch the church anywhere without the whole body being thrilled throughout from end to end, so thoroughly was it one. If the emperor could bring any influence to bear on the Christian organization, he might hope to move these hidden spiritual springs of action which are so much more powerful than anything lying at the command of a mere military government. The organization of Christianity was such that all over the empire and beyond it there was, without undue centralization, a confederation of local churches whose government was thoroughly democratic and based on the principle of representation by means of office-bearers elected by the people, which produced a unity of sympathy and action. Besides all this the common life was kept up by active sympathy between the various churches. If there was a famine in Africa, the churches in Spain and Gaul sent grain. If Christian Gauls had been carried off into captivity by the pagan Germans, the wealthy African and Roman churches sent money for their redemption. The military roads, the system of posts, the relays of ships which Rome kept up to bring intelligence and produce from the provinces, were all used by the church for the purpose of keeping up a lively communication between all the various parts of the Christian world. In this way Christianity within the empire was the one organization for creating, stimulating, and guiding public opinion. It was that one part of the Roman empire which, scattered over all its extent, had common feelings and all those various common instincts which go to make up a commonwealth. This was the force that Constantine sought to put himself at the head of, and because he succeeded he was the first Roman emperor who ruled with something like what we should call "public opinion" at his back. The victory of Constantine was the first instance of the triumph of that mysterious popular force which has given organized freedom to the civilized nations of Europe, and which is equally removed from the civic freedom of the ancient democracy and from the military tyranny of the great empires of antiquity. It is to Christianity that modern Europe owes organized public opinion and representative government.

Christianity and science.

The silent influence which Christianity has exercised upon the human intellect, and especially upon its scientific researches, is too important to be passed over. Anti-Christian writers have combined to show the hostility which they think exists between religion and science, and have painted in glowing colors the hindrances which Christianity places before the advance of scientific ideas; but such attempts resemble the efforts of a man to kick down the ladder which has enabled him to reach the elevation on which he stands. Christianity did not create philosophy nor science, and many of the early Christian theologians denounced in no measured terms the philosophies of Greece and Rome because of their connection with paganism, while philosophy on its side was the last remnant of the old pagan civilization which withstood the Christian conquest. Soon, however, philosophy and Christianity came to terms, and in the writings of St. Augustine we find the noblest Platonism allied with the loftiest Christian theology. The science of paganism has never been on a par with its philosophical speculations, and whether we examine the ancient civilizations of Greece and Rome which have passed away, or those of India and China which remain, we seek in vain science and scientific knowledge in the modern sense of the term. The truth seems to be that science requires to build on a foundation supplied by Christianity, and which paganism is unable to furnish, or at least has never yet furnished. Science presupposes and rests on the idea of the oneness and uniformity of the universe, and this idea is, strictly speaking, a Christian conception. Aristotle, the most scientific of the ancients, was unable to conceive the uniformity of nature or the totality of things in anything like the sense which these phrases have to modern thinkers. His conceptions of matter and form, of potentiality and actuality, and so on, implied a subtle duality which effectually stood in the way of such a thought. The uniformity of nature, the capacity of the ideal to realize itself in actual things, was always apt to be thwarted by an inward stubbornness of matter which declined on occasions to submit itself to law. It was this idea which stood in the way of the modern thoughts of the uniformity of nature and of the totality of things which are so essential to science. But such a stubborn, formless matter as pagan philosophy and science delighted to speculate about was quite foreign to Christian speculation and was opposed to the deepest instincts of the Christian life—of trust in the Father who is in Heaven. Christianity did not propose to itself the solution or even the statement of scientific problems, but its yearning to get near God enabled it to see deeper into the problem of the basis of science than the whole of pagan thought had been able to do. The Christian doctrine of creation and the Christian doctrine of providence furnish the foundations on which modern science rests. The Christian doctrine of creation states the absolute dependence of all things on God. He made them out of nothing; and the religious nerve of the doctrine consists in the feeling of absolute dependence on God which this implies. We and all things have our birth and being from God, and from nothing else. Practically God is all in all to us, for on Him all things depend for their origin, and they depend on Him alone. The Christian doctrine of providence presents the same thought in another form. The nerve of this doctrine is that God can and does make all things work together for the good of His people. Here again is the idea of the absolute dependence of all things on God, not merely for their origin but also for their existence and endurance. In this way the thought of God as the creator and preserver of all things gives a complete unity to the universe which pagan thought never reached, and gave that basis for the thought of the uniformity of nature which science demands. It was long ere Christianity could force this thought on the human intelligence, but until it had permeated the whole round of man's intellectual work it was vain to look for advances in science. It was the task of the scholastic theology and philosophy to knead into human thought Christian ideas, and among the rest this idea of the unity and uniformity of nature. Anti-Christian critics have spoken of the deadness and uselessness of scholasticism, but its value for science and scientific inquiry can scarcely be over-estimated; for it was scholasticism which worked Christianity into every department of human and intellectual activity, and so leavened them with it, that when its work was done, the intelligence of man was so thoroughly saturated with the Christian view of nature that it could never again forget it When scholasticism had accomplished its task modern science sprang into being dependent for its very foundation on that Christianity to which it is supposed to be so bitterly hostile.

The constitution of the Christian community.

The organization of Christianity belongs more properly to the description of the church, but it is impossible to pass the subject without any allusion. Christianity, which has been described to be a new life which takes an organic form and grows like other living things, cannot help taking to itself an external form or organization which approaches perfection in the proportion in which it is adapted to express the life which it contains. On the one hand, the external form of Christianity must not be confounded with Christianity itself, and on the other it must be remembered that Christianity does, and must from its very nature, embody itself in an external organization. And a two-fold danger arises from the neglect of this principle, when on the one hand the machinery of Christian worship and discipline is mistaken for Christianity itself, and when on the other it is mischievously imagined that the purity of Christianity depends on the realization of an impossible invisibility or absence of organization.

The synagogue system.

All the various modes of Christian organization or church government profess to imitate the apostolic model, and to be founded on and agreeable to the New Testament Scriptures, and the comparative scantiness of information therein supplied has led to violent controversies upon the subject into which we need not now enter. Many have supposed with great probability that the New Testament contains so few positive instructions on this subject, because the apostles did not invent a new organization for Christianity, but simply took over from Judaism that organization for worship and discipline which had no connection with the temple service—the synagogue system—and that the early Christian worship was simply a reproduction of the synagogue service. We may at all events believe that the early Christian organization, if not exactly the same, was modelled upon that of the synagogue, and that the reason why we have so few descriptions and instructions in the New Testament is that the apostles did not require to describe what was so very well known to the Jewish Christians who composed the apostolic church. At first the Christians seem to have shared in the common worship of the Jews and to have engaged at the same time in services which were peculiarly Christian (Acts ii. 46), and in this way they appeared to be and were called a sect (*αἵρεσις*) of the Jews. They do not seem to have had any ecclesiastical organization distinctive enough to separate them from the Jews. Founding on these and other facts Vitringa has derived the whole of the Christian machinery of worship and discipline from the Jewish synagogue. But this is going too far. Two influences, so far as we can gather, seem to have combined to modify the early state of matters which we see existing in the first chapters of the Acts of the Apostles, and these were the hatred of the Jews and the entrance of Gentile Christians. These two circumstances led to the introduction of a new church organization distinct from the Jewish and more suited to the requirements of Christianity. This early Christian organization, whose growth can be obscurely traced in the New Testament, is characterized by two special features. It was evidently founded on and in many respects analogous to the Jewish religious community, and the constitution was thoroughly democratic.

When Christianity arose, Palestine, and indeed the whole of the civilized world where Jews had penetrated and settled, was covered with a network of synagogues in constant correspondence with each other. The synagogue system was an organization for public worship, but also had to do with the lives and conduct of the worshippers, and possessed quasi-judicial functions. The worship of the synagogue was not sacrificial, like that of the temple. It was simply devotional, consisting in prayer, praise, reading, and preaching, and was regulated by a fixed liturgy. The synagogues were ruled by a variety of office-bearers. In the first place, there was commonly a college of elders, with the chief of the synagogue at their head. These elders had a variety of names—almost all of the designations given in the New Testament to the Christian office-bearers are used to denote these Jewish Z'Kenim. These elders were the real rulers; they had the power of excommunication, and superintended the worship and charities of the synagogue. Besides these elders there was an officiating minister who was the delegate of the congregation; the rules which Paul laid down to be observed in the choice of a bishop almost exactly correspond to the conditions to be satisfied in the election of the Sheliaeh. The lowest class of office-bearers were the ordained servants or ministers of the synagogue, who are sometimes called the young men, and who like the Sheliaeh and the Z'Kenim were ordained by laying on of hands. In this synagogue system, with its simple devotional worship, its office-bearers to preserve discipline and encourage the exercise of charity, the early Christians found an organization ready to hand which they could at once take advantage of and either adopt or at least copy in important details.

Christian office-bearers.

All throughout the New Testament we are reminded that the office-bearers exist for the community and not the community for the office-bearers, and this truth is enforced with emphasis when the diversity of office in the Christian church is made to depend upon diversity of gifts (Eph. iv. 4–16), and upon the appreciation of those gifts by the Christian community testified to in the process of election.

We get these two primary ideas therefore about the early Christian community, that possession of office meant the possession of gifts suitable for the edification of the community, and the recognition of this fact by the people. In the New Testament the ordinary office-bearers in the Christian community have a variety of designations. They are called *προϊσταμένοι*, *πρεσβύτεροι*, *ἐπίσκοποι*, *ποιμένες*, and *ἡγούμενοι*; but all these names are used evidently to express the same kind of officers, for they are continually used interchangeably the one for the other. In the earlier times of Christianity the service was probably very simple, and the meetings were held in the houses of the first converts or of the officers of the little Christian community. In an old liturgy we find a rubric enjoining the deacons to order all mothers to take up their infants at a peculiarly solemn part of the worship, which shows us a picture of an early Christian assembly with the babies crawling peacefully over the floor during the greater part of the service.

Many controversies have arisen about the relation of these office-bearers to the community on the one hand, and to the apostles on the other. As the New Testament writings do not give us more than passing allusions to the mode in which the government of the Christian community was carried on, and describe it in action rather than give a detailed account of the principles on which it was founded and the way to apply them in practice, we may be expected to find there descriptions of the Christian organization at various stages of early development. Some have believed, not without great probability, that we have in the account of the choice and consecration of the seven men (Acts vi. 1–6) the beginning of the Christian organization on a distinct and separate basis of its own, and that these seven men were the first regularly chosen office-bearers in the early Christian community. These seven men were chosen to take charge of the charities of the small Christian community, and it is not difficult to see now from this how they came to rule the community. We find no trace of a distinct and separate election of elders or pastors; and it is worthy of note that the special service to which these men were appointed, viz., to take charge of the poor, is the work which we find the elders engaged in on the first occasion on which they are mentioned (Acts xi. 29, 30). Habitual almsgiving was regarded as a religious service of no ordinary significance, and was especially enjoined on all true believers, and the men appointed to take charge of this must have held a very high position in the church. It is evident, besides, that the superintendence of the charities involved a certain amount of disciplinary control, and so the other duties of the office-bearers in the Christian church naturally clustered around this one. The recipients of charity were to be suitable persons (1 Thess. v. 12–15, 1 Tim. v. 9–16); and we can easily see how gradually the benevolent oversight passed over into the rule of discipline, until men originally elected to regulate the benevolence of the community became the rulers of the church.

But whatever the earliest office-bearers were, and however they were chosen, it seems evident that their special function was to rule or to exercise discipline rather than to teach. In the apostolic church there seem to have been two kinds of teaching recognized, the apostolic announcement of the evangel and the preaching of the word. The latter was evidently at first open to all and sundry who had or who thought that they had the gift, and the only restriction placed upon indiscriminate exhortation was the command forbidding women to speak in public. The gift of preaching or exhortation was looked upon as a gift of the Spirit independent of office; and the earliest office-bearers were men who ruled rather than men who taught. Open preaching continued for a long time in the post-apostolic church, and is distinctly recognized in the so-called Apostolic Constitutions; but there are evidences in the New Testament that the practice had its inconveniences and was discouraged by the apostles. James warns heedless preachers that they take great responsibility upon them, and shall receive the greater condemnation (Jas. iii. 1), and Paul in several passages takes notice of the irregularities and unedifying confusion attending the practice. Hence we find the function of instruction at an early period engrafted on that of rule, just as the function of rule had grown out of that of oversight of the distribution of charity; and one of the special qualifications of

elders of the church was aptness to teach. In the Epistles to Timothy we even find traces of a plan for giving a special education and training to young men who were set apart to prepare themselves for the office of elders who were to teach. In the post-apostolic Church we find another office quite distinct from the eldership, the office of deacon. The deacons in the post-apostolic church were officers who waited upon the bishop, and many have thought that the election of the seven men was really the election not of elders but of deacons; but there seems no reason to suppose this. The real warrant for the existence of the diaconate consists in the fact that the office and duties of the deacon correspond very nearly to those of the "ministers" of the synagogue, and also in the many scattered references in the New Testament to the existence of "young men" (one of the technical terms for the synagogue deacons), who waited upon the apostles. To sum up then, the office-bearers in the early Christian community were men selected by the voice of the congregation, and confirmed by the apostles to administer the charities of the community; and to this primitive function there was added soon after the duty of over-sight, leadership, or rule, and somewhat later the duty of providing for the proper teaching of the people.

The apostles.

The relation of the apostles to these office-bearers and to the Christian community is a problem not without difficulties. Apostle primarily denotes one who is sent on a special mission, and in the Septuagint is used to translate the Hebrew Shaluaeh, meaning one who has a special commandment from God. The word was in common use among the Jews to denote a special messenger and more especially messengers sent on foreign missions. Thus the Jews who were sent from Palestine to stir up the foreign synagogues against the Christians are called apostles. All these ideas help to show us what the Christian apostles were. It should be remembered, however, that the term apostle is used in its Christian sense in two ways at least, in a wider and in a narrower sense. In the narrower and more strictly technical sense the apostles were the eleven whom Christ chose to be special witnesses for Him because they had been with Him from the beginning, together with Matthias, selected by the apostles to fill the place of Judas before the descent of the Holy Spirit, or as some with more probability think, Paul, who was selected for this place by Christ Himself. On the other hand, many others are called apostles who did not belong to this company,—Barnabas, for example (Acts xiv. 14), Andronicus and Junius (Rom. xvi. 7), and others (2 Cor. viii. 23; Phil. ii. 25). This vagueness in the New Testament use of the term makes it somewhat difficult to speak with anything like precision of the relation in which the apostles stood to the office-bearers and members of the early Christian community. But one or two statements enable us to see what were the functions of the apostles strictly so called. It is said, for example, that Christians are built upon the foundation of the apostles and prophets, Jesus Christ Himself being the chief corner-stone (Eph. ii. 20), and the capacity of the apostles to act in this way as a foundation is explained by passages which seem to say that the qualifications for apostleship were—to have been with the Lord from the beginning, to have seen and recognized Christ after the resurrection, to have been witnesses of the ascension, and to have been gifted with peculiar spiritual gifts. And we may say generally, that just as the prophets of the Old Testament were the links between their own generation by their speech, and between future generations by their writings, and the Saviour that was to come, so the apostles were the links between the first generation of Christians by their presence and influence, and between all succeeding generations of Christians by their writings, and the Saviour who had come. They were to serve as the connection between the first generation of Christians and Jesus, and were to have no successors but the writings of the New Testament canon, which has taken their place and done their work for all succeeding generations.

The relation of the apostles, therefore, to the primitive church was altogether unique, as indeed is implied in their name; and when they act or give official advice apart from their apostolic office, which they did in certain cases, they do so as the elders chosen to act along with the other elders who did not possess apostolic gifts. If these views are correct the autonomy of the early Christian communities was complete during the lifetime of the apostles, and was quite independent of the apostolic office and authority.

The growth of the episcopate.

This thought has an important bearing on the history of the growth of the Christian government. In the 5th and 6th centuries we find that the government was episcopal, and that the principles on which it rested were very different from those which lay at the basis of the government of the Christian community during the apostolic times. The identity of the terms bishop and presbyter within the apostolic church is now so universally admitted by scholars that the sole question really is, When did bishops begin to exist as separate and superior officers? and the dispute becomes one of historical facts rather than dogmatic theories. According to one account the episcopate became the form of the government about the year 70 A.D., to meet and supply in a legitimate way a want which, if not supplied, might have caused the ruin of Christianity; and according to another and more probable theory, the episcopate in the strict sense of the word was not established until the 3d or 4th century. It arose during a panic, and was really a false development of the primitive government, and sanctioned neither by scripture nor by the necessities of the times. Of course the discussion is very much mixed up with the question whether the apostolic office was or was not a permanent one in the Christian church.

According to the one theory, the year 70 A.D. may be taken as the turning point. In that year Jerusalem was destroyed and the Jewish church of Jerusalem rudely shaken, and by this time John only of the apostles remained alive, and he had already left Jerusalem. It was at this time, according to several scholars, that the episcopate arose to take the place of the apostolate and preserve the church from breaking up into several small sects when no longer governed by the apostles and not yet in full possession of the New Testament canon. Apart from the historical evidence to be urged in support of this theory, its chief strength lies in the mere assumption that the presbyterian rule of the apostolic church was unfit to carry on the government when unsupported by the authority of the apostles, and had to be supplemented by an episcopate. When examined, the historical proofs for this state of affairs are not very satisfactory. We certainly soon find men who are called bishops distinct from the other elders, and are superior to them; but the name and the duties which belong to them appear to be not so much those which pertain to a bishop in the episcopal sense of the term, but rather those which are performed by a minister or preaching elder in the modern Presbyterian organizations. In the early church the first convert, the best speaker, he whom the apostle had made his friend during his brief stay, would naturally be elected to preside at the meetings of the college of the elders who ruled the affairs of the community, and to represent it at conferences with other communities, and would naturally be invested with the name which denoted special oversight. And the extension of the church would naturally involve a further development of this process. When one church became too small, another was built, and a presbyter sent from the first congregation to work there under the superintendence of his bishop, and so on until the minister or presiding elder of the earliest planted or mother church became the perpetual president or overseer of various dependent congregations. But this is very different from the theory which afterwards became dominant in the church, and fails to account for the origin and almost universal supremacy of episcopacy. Perhaps of all the accounts which have been given of its origin, that which connects it with the disturbances engendered by Montanism is the most satisfactory. While the church was governed in the manner described above, a wave of religious excitement passed over it, connected doubtless in some way with the striking phenomena of Montanism and the new prophecy, and characterized by an overstrained zeal for enforcing discipline in all cases of departure from a high standard of Christian life. It was the peculiar characteristic of Montanism to set forward its prophets as successors of the apostles, having the same gifts from the Holy Spirit, and sent on a similar message of instruction to the Christian church. They uttered prophecies which were deemed supplementary to the revelation contained in the Old and New Testaments, and they

Montanism and the Episcopate.

did not scruple to set aside the authority of the regularly ordained officials of the church in order to execute the behests of a supposed spirit of prophecy. And thus the Christian communities were everywhere burdened by the presence of ignorant intolerant fanatics, who insisted that all their fellows should follow the dictates of their narrow and ignorant conscience, and who backed up this unwarranted interference with Christian liberty and responsibility by claiming to hold the place and exercise the powers of inspired successors to the apostles. It was at this juncture, according to a not improbable theory, that Cyprian of Carthage was able to popularize and gain acceptance for a theory of Christian organization which had been slowly growing up within the church, and which is now known as Episcopacy. Cyprian, bishop of a church which more than any other had suffered from the consequences of Montanist excesses, was the founder of a revolution of a kind which has been frequently repeated in the political world. Montanism and its after wave had influenced in an especial way the minor clergy and the more fanatical laity. Cyprian, like many a succeeding absolutist, seems to have subverted the aristocracy of a presbyterate infected with Montanism by persuading the people to make common cause with the bishop. He promised deliverance from arbitrary and unofficial successors of the apostles by boldly setting forth the episcopate as the true successors of the apostles. He transferred, in all sincerity, to the episcopate all the powers and gifts laid claim to by the Montanist prophets, and at the same time showed the people how easy the yoke of a legitimate monarchy was when compared with the lawless rule of a mob of self-anointed tyrants. From Cyprian's time onwards the whole constitution of the church became changed, and the foundations of what ultimately became Ultramontanism were laid. The episcopate claimed and exercised as part of its official duties all those gifts of rule and special inspiration which the Montanist prophets had laid claim to. The bishops laid claim to powers of rule over the Christian community not as chosen representatives of the Christian people, but as the official representatives of the apostles.

The corruptions of Christianity.

It only remains to allude briefly to the corruptions of Christianity. It has been already stated that Christianity had a fourfold conflict to maintain with Judaism, Rome, Gnosticism, and an enthusiastic and sometimes immoral pietism. If we add to these pagan superstition, we shall have the chief heads of the opposition which Christianity had to encounter. After its triumph these sources of anti-Christian action still remained to be contended against, and became the chief springs of its corruption. The spirit of Judaism, of Roman worldly policy, of pagan superstition, of pagan philosophy, and of immorality entered into Christianity and tended to corrupt it.

One of the earliest causes of the corruption of Christianity was the attempt to translate the Christian kingdom of God into a visible monarchy in which the saints inherited the earth in a literal way. The Church was the more tempted to enter into this course during the period of the decay of the Roman empire, when civil authority became very weak and the real rulers were in many cases the principal clergy of the place. The consciousness of power inspired a desire for its insignia, and soon the bishop and superior clergy adorned themselves in the official robes of Rome's municipal and provincial officers. This whole tendency received a great impulse during the period that Rome was abandoned by her emperors, and when the chief citizen in the imperial city was undoubtedly the Christian bishop. How all this tended to corrupt Christianity is very apparent. In the first place it generated the idea that the Christian kingdom is a visible monarchy and that its marks are such as can be seen; and it led Christians to postpone everything to the earthly aggrandizement of the church. It translated spiritual forces into mechanical and physical equivalents. The very term spiritual, which belongs to the affections and emotions and thoughts and will, to the whole inward life, was used to denote whatever belonged to the church or the clergy. Land became spiritual when it passed into the hands of the bishops; men were spiritual if they were servants of the church; things were spiritual if they were church property. There resulted, in short, a gradual coarsening of ideas, and all that was most inward, hidden, and sacred was forgotten in the strife for worldly position and power and wealth. On the other hand, this tendency worked a good deal deeper. Worldly men who found their way into the ministry were tempted to favor any kind of superstitious error that tended to bring them profit and power. The people were often disposed to fancy that the priests could serve God in their stead, and that there were mysteries in religion which the priests understood, but which the laity need not know anything of and ought not to inquire into. Hence they were ready to follow blindly the guidance of the priests in religious matters, just as a man trusts his legal concerns to his lawyer, doing what he directs and not considering it necessary himself to study law. Ambitious and worldly-minded rulers, too, are generally glad to make use of religion as an instrument for securing the submission of the people to tyrannical oppression, and for aiding their ambitious views when they seek to subdue their neighbors under the pretext of propagating the true faith. Then again, this idea tends to breed false views of Christian unity. It leads men to think that they cannot be true Christians unless they belong to one community which is visible and universal. And this idea tends to keep up and intensify other errors. For if a man is convinced that all Christians are bound to belong to some one community on earth, he will dread nothing so much as separation from that church, whatever it may be, which he considers as having the best claim to be that one community.

Many corruptions of Christianity have been either introduced or favored and kept up by moral corruption in the members of a Christian Church. For it belongs to the true gospel to purify and also to elevate the moral character. Hence there is a complete and constant opposition between genuine Christianity and all the evil and base propensities of man's nature. Every kind of depravity or moral defect therefore predisposes men either to reject Christianity altogether, or else to introduce or to accept some erroneous view of it. And there is no kind of religious corruption against which men are usually less on their guard. They are well aware, indeed, that there is a danger of men's falling into sin in violation of the precepts of religion, but they are too apt to think that a man who has embraced a true faith will therefore be made a good moral man. This erroneous idea appears in its most extreme form in the views of those who have been called Antinomians, and who have appeared in all ages of the church from apostolic times down to our own day. They appear to believe that whoever has faith is thereby lifted into a new life to which the moral laws of the old life are inapplicable, and are therefore privileged to do without censure or danger what others would be condemned for.

Nothing perhaps has tended more thoroughly to corrupt Christianity than the introduction into it of superstitions which are really pagan themselves, or have been suggested by pagan practices. Paganism, unable to oppose Christianity successfully, has done much to corrupt it, and in numberless ways has made inroads upon its purity.

The corruptions which entered into Christianity from Judaism have already been noticed, and the corrupting effects of the reproduction of the symbolic temple worship and the Jewish idea of priesthood need not be again referred to. It only remains to speak of those corruptions which have arisen from the contact of Christianity with pagan philosophy. The special corruptions which have arisen from this contact have been called heresies, and have been of various kinds and degrees, but of these we need not speak. A more subtle influence, and one to be even more jealously guarded against, is the transformation of Christianity itself into an intellectual system or philosophy, or the supposition that it is the intellectual side of Christianity which is the only one or the chief. The inevitable tendency of such an impulse is to remove Christianity as a system to be apprehended from the Christian people, and to reduce their relation to it to a submissive assent to Christian doctrine as that is manufactured for them by the dogmatic machinery of the church. And thus, in place of that whole-hearted trust which waits for personal illumination, there is on the side of the people a blindfold assent, and on the other side the claim to an infallible system of intellectual truth.

The continual and steady growth of Christianity, its vigorous life in spite of various seasons of unavoidable ebb and notwithstanding the presence of all these and other sources of corruption, and its continual rejuvenescence, are no ordinary proof of its divine origin as well as of its

supreme fitness for the position in the world which it claims to occupy.

See the various hand-books of church history, especially those of Gieseler, Neander, and Döllinger; Dean Milman's *History of Christianity*, and *History of Latin Christianity;* Döllinger's *Heidenthum und Judenthum;* Ritschl's *Entstehung der Alt-Katholischen Kirche;* Rothe's *Anfäng. d. Christl. Kirche.* (T. M. L.)

CHRISTIANSAND, a fortified seaport town of South Norway, capital of the stift of the same name, on a fiord of the Skagerrack, in 58° 8′ N. lat. and 8° 3′ E. long. The town, which is surrounded on three sides by water, is defended by the fort of Frederickshold, at the mouth of a deep and well sheltered harbor. The houses, mostly of painted wood, are regularly built, and the streets are wide. Christiansand has a fine cathedral, and a cathedral school; it is a naval station, and the seat of a bishop, and of a stiftsamtmand or governor of the province. The principal branches of industry are tanning, tobacco-manufacture, ship-building, dyeing, and brewing, and the exportation of timber, pitch, skins, copper and iron, fish, and lobsters. The mackerel and salmon brought to the harbor are packed in ice on their arrival, and shipped mostly to England. The number of fresh mackerel exported in 1874 was 897,110, value £5441, inclusive of the expense of ice and packing; of salmon, 209,131 lb, value £9273; of lobsters the number exported was 201,980. The number of British ships in cargo and in ballast at Christiansand in 1873 was 203. The town was founded in 1641 by Christian IV., after whom it was named. In 1807 it was held for a time by the British. Population (1870), 11,468.

CHRISTIANSTAD, a town in the south of Sweden in 56° 2′ N. lat. and 14° 9′ E. long., the capital of the laen of the same name, stands on a lake formed by the widening out of the Helge River, in a swampy situation, about ten miles from the shores of the Baltic. At the mouth of the river is the village of Ahus, the port of Christianstad. The town of Christianstad, which consists chiefly of wooden structures, contains a fine church, a high school, and an arsenal, and is the residence of the chief governor of the laen. The manufactures are leather, woollen goods, gloves, and tobacco; and there is some trade in corn. Christianstad was founded and strongly fortified in 1614 by Christian IV. of Denmark; in 1658 it was ceded to Sweden at the peace of Röskilde; in 1676 it was taken by Christian V.; but in 1678 it was again acquired by Sweden. Here began the revolution that was the means of establishing the power of Gustavus III. in Sweden. Population, 6599.

CHRISTIANSUND, a seaport town on the west coast of Norway, in the amt of Romsdal, 85 miles W.S.W. of Trondhjem, in 63° 3′ N. lat. and 7° 40′ E. long. It is built on three small islands, by which its harbor is enclosed. The chief exports are wood, fish, and fish products. Till 1742 Christiansund was called Lille-Fosen. Population, 5709.

CHRISTINA (1626–1689), queen of Sweden, was the second daughter of Gustavus Adolphus and Mary Eleanor of Brandenburg. Disappointed in his hopes of male offspring, her great father reared her in virile fashion, and left her, on his departure for Germany (1630), in the hands of Axel Oxenstiern, the famous chancellor, and of Johannes Matthiæ, his own almoner, who was to ground her in sciences and in Latin and Greek.

The battle of Lützen placed Christina on the throne in her sixth year. She was proclaimed queen without delay, but the government was vested in a council of regency, composed of the five chief dignitaries of the kingdom, with Oxenstiern at their head. Placed under the care of her aunt Catharine, the countess-palatine, the little queen made rapid progress in the direction indicated by Gustavus. At ten years old she dressed usually in boy's clothes, and was wont to hunt and to go long journeys on foot and on horseback; and she found means, in the midst of these occupations, to acquire several sciences and modern languages, in addition to the classical tongues. In 1636 Oxenstiern returned from Germany, and again assumed the direction of affairs; and from him, her father's friend and minister, Christina received the ablest lessons in state-craft and the art of government that the age could furnish. At sixteen, the confidence reposed in her was such, that she was generally solicited to enter on the exercise of her functions as queen regnant. This proposal she declined, however, nor would she listen to any renewal of it till two years later (1644), when the conduct of the state was placed in her hands. For a time all went well. The members of the council of regency were confirmed in their places; the kingdom was flourishing within and without; the war with Denmark and Germany promised to bear good fruits. Christina, however, had determined on peace; in this she was opposed by Oxenstiern; but during the following year a treaty was signed with Denmark exceedingly advantageous to Sweden. Germany was not so easily dealt with; Christina was compelled to form a secret conspiracy against her own ministers; and by her efforts, ably seconded by those of Adler Salvius, a young diplomatist to whom she had entrusted the affair, the peace of Westphalia was concluded (1648), and the Thirty Years' War was brought to an end.

The eyes of Europe were now fixed on the young queen. Offers of alliance came to her from all quarters—from Holland and Spain, from England and France. She continued for some time to deserve the esteem with which she was regarded, reforming abuses, filling the treasury, and encouraging arts and commerce to the utmost in her power. It was the general wish that she should marry, and many suitors were proposed. Christina excused herself in an epigram; and to rid herself of further importunities she named her cousin Charles Gustavus her successor, presenting him in that capacity to the assembled estates in 1649, and in 1650 she solemnly took to herself the title of king.

At this time the change would seem to have come upon Christina's conduct that was to determine so much of her subsequent career, induced apparently by the maxims of a certain Bourdelot, a French physician in her employ. The practice of a cynical epicureanism became her only occupation. The reign of favorites began; and with it the welfare of the kingdom commenced to decline. Honors, dignities, and treasure were lavished on the most worthless of men; and discontent grew rife everywhere beyond the palace. Christina was alarmed, and had thoughts of abdication (1651); but her designs were vigorously opposed by Oxenstiern, and for a while she yielded to the pressure brought to bear on her by the chancellor and his party. The favorites (among whom were Whitelock, Cromwell's envoy, Pimentelli, the Spanish ambassador, and Chanut, the representative of France) were kept in the background, and Bourdelot, the master cynic, was sent out of Sweden. Christina encouraged the presence of artists and men of science; Descartes, an exile from his native land, was received by her with great consideration; she made large purchases for the Swedish museums; she corresponded with Vossius and Salmasius, with Puffendorf and Grotius, with Naudé and Bochard; she did her best to rule and to be respectable. But she was weary of the roughness and coarseness of the land of her birth; she longed for freedom and change; she was conscious, moreover, of her own gradual degradation in the eyes of the subjects she despised. The conspiracy of Messenius, the chiefs of which perished on the scaffold, gave her an excuse and the opportunity she had long desired. In 1654 the estates were convoked at Upsala, and she resigned the crown to her cousin Charles Gustavus.

She had reserved to herself her own independence, an absolute authority over such of her subjects as should accompany her, and the revenues of Pomerania and Mecklenburg, with those of several Swedish provinces. Quitting the habit of her sex, and taking the words *Fata viam invenient* as a device, she left her kingdom, traversed Denmark and Germany, and established herself at Brussels. Here she remained for nearly a year, signalizing her sojourn by the private renunciation of Lutheranism, which she afterwards solemnly and publicly abjured at Innsbruck. From Innsbruck she went to Italy. She entered Rome on horseback, was received, confirmed, and baptized Alexandra by Alexander VII., and was lodged in the Palazzo Farnese, where she surrounded herself with artists and amorists, with philosophers and scientific mountebanks. In 1656, having quarrelled with some of the College of Cardinals, she made her first trip to France, where she had much success as a spectacle, called on the king at Compiègne, was lodged at Fontainebleau, and stayed for some time in Paris. She was most gracious with the men of letters and science, but she outraged all the women by her expressions of contempt for their sex and themselves (which called forth many illiberal remarks concerning her spare figure and humped shoulder), and declared that

Ninon de l'Enclos was the only one of them worth her regard. She also attempted to instil a few of her own political theories into the bosom of Mazarin; but that subtle diplomatist resisted, and when in the following year, after a journey to Italy, she attempted to renew her visit, he found means to have her detained at Fontainebleau. It was here that, after writing to Cromwell, who would none of her, she caused her favorite, Monaldeschi, in revenge for the betrayal of her secrets, to be put to death by the captain of her guard. The public indignation was great, and she was ordered to leave France. Leibnitz, however, apologized for the crime, and she took no notice of her expulsion till 1658, consoling herself meanwhile with the society of a kindred spirit, Madame de la Suze. In that year she returned to Rome; and the Swedish revenues coming slowly in, Alexander allowed her a pension. In 1660 Charles Gustavus died, and Christina returned to Sweden to claim the throne she had quitted so lightly and regretted so bitterly. But the Swedes had lost their old reverence for the daughter of Gustavus; her new religion and her treatment of Monaldeschi had made them wary of her; and she was compelled to sign another and more binding deed of abdication, and once more to retreat to Rome. She reappeared in Sweden some six years afterwards; but the exercise of her faith was denied her, and she withdrew to Hamburg, where she begged in vain the empty crown of Poland, and whence she made for Rome once more. In that city she lived for some twenty years, quarrelling, intriguing, and collecting, corresponding with men of letters and founding academies, active in the Molinist controversy and in the cause of the Venetians besieged by the Turks, consumed by the desire of that political power which she had thrown away, and endeavoring to assert her vanished influence to the last. She died, with great composure, in 1689, and was buried, under a sonorous epitaph, in St. Peter's. Her magnificent library was purchased by Alexander VIII., her collection of antiques and part of her paintings by Odescalchi, a nephew of the Pope, and the remainder of her pictures by the regent Orléans.

Christina left many MSS., which were collected and published by Archenholtz, librarian to the landgrave of Hesse Cassel, in his memoirs of her life, 4 vols. 4to, 1751. Her life was also written by Jacques Lacombe, a translation of whose work, said to be superior to the original, appeared in London in 1776. See also D'Alembert, *Mémoires et Réflexiones sur Christine, Reine de Suède.*

CHRISTINE DE PISAN (1363–1431), though French by education and renown, was of Italian stock, and was born at Venice. When she was five years old she went to her father, a councillor of the Venetian Republic, at Paris, where he held office as astrologer to Charles V. Educated at that prince's court as completely as the age would allow, at fifteen Christine married Étienne du Castel, Charles's notary and secretary. After the king's death, her father lost his appointment, and died soon after of grief and infirmity; and his decease being presently followed by that of her husband, she found herself at five and twenty without a protector, and with three children depending on her for bread. The vexations and discomforts attendant on several suits at law determined her to have recourse to letters as a means of livelihood. Between 1399 and 1405, as she herself declares, without reckoning minor pieces, she composed some fifteen important works. Neither fame nor protection failed her. The earl of Salisbury, in Paris on the occasion of the marriage of Richard II. with Isabella of France (1396), took her eldest son, and reared him as his own; the boy, after Salisbury's death (1400), being received and nurtured by Philip of Burgundy, at whose solicitation Christine wrote *Le Livre des Faitz et bonnes Mœurs du Sage Roy Charles.* Henry IV. of England desired her to make his court her home, and she received a like invitation from Galeazzo Visconti tyrant of Milan. She preferred, however, to sojourn in France, where she enjoyed the favor of Charles VI., the dukes of Berry and Burgundy, the prince of Guienne, and others. Of the circumstances of her death nothing is known. A son of hers, however, Jean du Castel, is said to have attained distinction as a poet under Charles VII. Christine de Pisan wrote voluminously in prose and verse. Her works are by no means devoid of merit, nor altogether without interest even at the present time, though the language in which they are written is crude and imperfect, and they sin too often on the side of diffuseness. They are principally of a moral character, Christine seldom interfering in the political questions of her age save to clamor for peace and unity. There is no complete edition of her works. One of them, *Le Livre des Faitz d'Armes et de Chevalerie,* was translated into English and printed by order of Henry VII.

CHRISTMAS DAY (French, *Noël* from *Dies natalis;* German, *Weihnachtsfest;* Old Eng. and Scand., *Yule;* Ang.-Sax., *Geol*), a festival of the Christian church, observed on the 25th of December, in memory of the birth of Jesus Christ. There is, however, a difficulty in accepting this as the date of the Nativity, December being the height of the rainy season in Judea, when neither flocks nor shepherds could have been at night in the fields of Bethlehem.

The Christian communities which keep Christmas (as the Roman Catholic, Greek, Armenian, and indeed all Episcopalian churches, and the Lutherans) would probably agree in laying more stress on keeping a day in memory of the Nativity, than on success in selection of the actual and precise date of the event. Indeed in the parallel case it does not appear that Good Friday and Easter lose anything of their respective associations from their variableness in different years. Although as regards Christmas an ingenious case on behalf of the month of October has been made out from what is known concerning the course of Abia (Luke i. 5), it does not seem possible to arrive at any certain conclusion. By the 5th century, however, whether from the influence of some tradition, or from the desire to supplant heathen festivals of that period of the year, such as the *Saturnalia,* the 25th of December had been generally agreed upon. Augustine expressly mentions this date (*De Trin.* iv. 5); and Chrysostom seems to speak of it as a custom imported from the West within ten years. Before that time it appears to have been kept conjointly with the feast of the Epiphany on the 6th of January. It is generally considered to rank third among the festivals of the church (Easter and Whitsuntide alone being placed above it) and to have a joy peculiarly its own.

In all civilized countries the annual recurrence of Christmas has been celebrated with festivities of various kinds. In none, however, was it more joyfully welcomed than in England, where even still the "old honor" has not altogether fled. In that country it was the custom on Christmas eve, after the usual devotions were over, to light large candles and throw on the hearth a huge log, called the Yule Log or Christmas Block. At court, and in the houses of the wealthy, an officer, named the Lord of Misrule, was appointed to superintend the revels; and in Scotland a similar functionary used to be appointed under the title of the Abbot of Unreason, till the year 1555, when the office was abolished by Act of Parliament. The reign of the Lord of Misrule began on All-Hallow eve, and lasted till Candlemas day. The favorite pastimes over which he presided were gaming, music, conjuring, dipping for nuts and apples, dancing, fool plough, hot cockles, blind-man's buff, &c.; and various Christian preachers (as, for instance, St. Bernard) have taken occasion to remonstrate with their flocks for paying too great attention to the festive character of the season, and too little to its more solemn aspects. The favorite dishes for breakfast and supper at this season were the boar's head with an apple or orange in the mouth, and set off with rosemary, plum-pudding, and mince pies. The houses and churches were decked with evergreens, especially with mistletoe, to which a traditionary sacredness has attached since the days of the Druids.

As might be expected, this festival has been illustrated by many fine and admirable outpourings of devotion in the way of services, and of Christian oratory, hymnology, and art. The services must be sought in the liturgies and office-books of different communities. Among preachers who have dwelt with striking impressiveness on the ideas and associations of this sacred season may be specially named St. Leo, St. Chrysostom, St. Bernard, Matthias Faber, Bourdaloue, Bishop Andrewes, Dr. Mill, Dr. Newman. Mediæval Latin hymns may be found in Archbishop Trench's *Sacred Latin Poetry* (London, 1849) and in Daniel's *Thesaurus Hymnologicus.* Many of these have been paraphrased with great effect by German Lutherans, and of late years, with considerable success, by English compilers of hymn-books. Among the most popular original contributions to the English hymns of the season must be mentioned those of Charles Wesley, Tate, Byrom, Heber, and Keble. The Nativity has been represented by a host of great painters; and it is

the inspiring theme of a large part of Handel's greatest triumph, the *Messiah*.

Discussions of the questions concerning the actual date of the Nativity and other matters respecting Christmas may be found in Tillemont, *Histoire de l'Église* (tome i.); Martigny, *Dictionnaire des Antiquités Chrétiennes* (Paris, 1865); Caspari, *Chronological and Geographical Introduction to the Life of Christ* (Engl. Transl. 1876); Wordsworth's *Greek Testament* (1872); Greswell, *Dissertations* (1840); Pearson, *Minor Works*, vol. ii. (1844); Ellicott, *Lectures on the Life of Christ* (1861); Smith and Cheetham, *Dictionary of Christian Antiquities* (1876); A. Macmillan's *Greek Testament* (1876.)

CHRISTOPHER, Saint, according to the legend, was a Christian martyr of the 3d century, and a native of Palestine or of Syria. Glorying in his gigantic strength and stature, he resolved to serve none who owned a superior. His first master was more powerful than any man, but it soon appeared that he was exceedingly afraid of the devil. The devil therefore became the master of the future saint. But even he was found not to be superior to fear; for he trembled before the image of Christ. His servant consequently deserted him, and, meeting a hermit who told him of the Saviour, was baptized, and undertook as penance to carry Christian pilgrims over a bridgeless stream. At length a little child requested his aid, but the burden proved more than the giant could support. The child was Christ; and thus is explained the name Christopher (Christ-bearer). As a sign, Christopher's staff, being planted, grew into a palm-tree covered with fruit and foliage—a miracle which effected the conversion of thousands. In consequence, the prefect Dagnus seized him, and after cruelly torturing him commanded him to be shot with poisoned arrows. These, however, instead of harming him, rebounded and wounded his persecutors. One entered the eye of the prefect; and in pity Christopher sacrificed himself to save his enemy. He was decapitated, and his blood healed the wound. The festival of St. Christopher is celebrated by the Roman Catholic church on the 25th July, by the Greek Church on the 9th May. St. Christopher was invoked as a defence against pestilence, and in order to frighten away the spirits who watch over hidden treasure.

CHRISTOPOULOUS, Athanasius (1772–1847), a modern Greek poet, was the son of a Greek priest settled in Wallachia. He studied at Buda and Padua, and became teacher of the children of the Wallachian prince Mourousi. After the fall of that prince in 1811, he was employed by Prince Caradja, who had been appointed hospodar of Moldavia and Wallachia, in drawing up a code of laws for that country. On the removal of Caradja, he retired into private life and gave himself to literature. He wrote drinking songs and love dittics which are very popular among the Greeks. He is also the author of a tragedy, of *Parallela* (a comparison of various systems of government), of translations of Homer and Herodotus, and of some philological works on the connection between ancient and modern Greek.

CHROMIUM, one of the metallic chemical elements, so called from the Greek *χρῶμα*, color, in allusion to the fine colors of its compounds; symbol Cr, atomic weight 52·4. It does not occur in the free state or very abundantly in nature. It is a constituent of the minerals chrome ironstone, Cr_2FeO_4; chrome-ochre, Cr_2O_3; ouvarovite, or chrome garnet, $Si_3CaCr_2O_{10}$; crocoisite, $PbCrO_4$, in which it was discovered by Vauquelin in 1797; of Vauquelinite, a chromate of lead and copper; and of some iron-ores and meteoric irons; and it is the cause of the color of green serpentine, pyrope, and the emerald. The properties of chromium vary much according to the method of its preparation. By Wöhler's process of reducing the sesquioxide with zinc, it is obtained as a shining green powder, of specific gravity 6·81, which tarnishes in the air, and dissolves in hydrochloric and warm dilute sulphuric acid, but it is not acted on by strong nitric acid. Deville, by intensely igniting chromic oxide with sugar-charcoal in a lime crucible, procured chromium of a bright steel-grey color, very hard, capable of a high polish, less fusible than platinum, and of specific gravity 6. Crystallized chromium obtained by Frémy was unaffected by the strongest acids.

Chromium forms three series of compounds:—the *chromous*, typified by the chloride, Cr_2Cl_6, in which chromium is a dyad; the *chromic* or *sesqui*-compounds, such as the oxide, Cr_2O_3, and chromic chloride, Cr_2Cl_6, in which the metal plays the part of a tetrad, or pseudo-triad; and *chromate* compounds, in which it is a hexad, exemplified by the hexafluoride, CrF_6, the oxychloride, CrO_2Cl_2, the anhydride, CrO_3, and potassium chromate, K_2CrO_4. In the hypothetical perchromic anhydride, Cr_2O_7, chromium may be regarded as an octad.

Chromous salts resemble the ferrous, in forming a dark-brown compound when nitric oxide is added to their solutions. The anhydrous protoxide, CrO, has not been obtained; and the hydrate $2CrO.H_2O$, precipitated of a brown color from solutions by potassium hydrate, is a very unstable body. The dichloride $CrCl_2$ is a powerful deoxidizer; it forms with water a blue solution, which turns green on exposure to the air.

The salts of the sesquioxide, or chromic salts, have an acid reaction. They are green, or from red to violet in color. Ammonia precipitates from solutions of the violet salts a grey-blue hydrate, and from solutions of the green salts, a grey-green hydrate,—the former precipitate giving a red, the latter a green solution with acids. Potash or soda throws down from solutions of the violet or green salts a bluish-green hydrate, soluble in excess of the precipitant, but reprecipitated on boiling. According to Löwel there are four modifications of the hydrate of chrome, two green, one violet-carmine, and a violet-blue. The hydrate can be economically made by boiling two parts by weight of potassium chromate with one of sulphur; the presence of a little potash assists the operation. Sesquioxide of chromium, Cr_2O_3, occurs native in argillaceous deposits. It may be obtained in the amorphous state by the ignition of the hydrate, and crystallized by decomposing potassium chromate with chlorine at a red heat. It can be melted at a high temperature into a greenish-black mass, and is with difficulty reduced by charcoal at an intense heat. A mixture of nitric acid and potassium chlorate converts it into chromic acid. The *chromites* are a class of bodies in which chromic oxide Cr_2O_3 is united with protoxides, as in the compound Cr_3O_4, and in chrome ironstone, Cr_2FeO_4. The latter, the most abundant ore of chromium, contains besides iron and chromium variable proportions of magnesium and aluminium, and is isomorphous with magnetic iron ore, Fe_3O_4, and spinel, $MgAl_2O_4$. It is a massive and compact, granular, rarely crystallized, black-colored mineral, of specific gravity about 4·4, and hardness 5·5. It occurs usually in serpentine, and is found in the Shetland Isles, the department of Var in France, Volterra in Tuscany, Silesia, Bohemia, Rörass in Norway, the Urals, near Baltimore in the United States, and in many other localities. In 1869 the exports of chrome ore from Norway amounted to 210 tons. Chrome ironstone can be decomposed in the dry way for analysis by fusion with potassium bisulphate, to which sodium carbonate and then a little nitre are subsequently added. Chromic chloride, Cr_2Cl_6, can be obtained either in the anhydrous insoluble condition, or as the green hydrated salt, soluble in water. Similar compounds are the fluoride, Cr_2F_6, the bromide, Cr_2Br_6, and the iodide, Cr_2I_6. The sesquisulphates of chromium are the anhydrous salt, $Cr_2(SO_4)_3$, the hydrated salts with 5 and 15 molecules of water, a basic sulphate, $Cr_2O_3.2SO_3$, and the chrome alums, of the general constitution $Cr_2M'_2(SO_4)_4$, $24H_2O$, isomorphous with common alum. Certain oxides intermediate between the sesquioxide and trioxide have been termed *chromates of chromium*.

The trioxide or anhydride of chromium, CrO_3, comparable with sulphuric anhydride, SO_3, can be prepared by the action of strong sulphuric acid upon potassium bichromate; as the liquid cools, the anhydride separates from it in crimson acicular crystals. It can also be obtained by decomposing barium chromate with nitric acid. Chromic anhydride deliquesces in air, and dissolves in water, forming a solution which contains chromic acid; it is a powerful oxidizer, and acts violently on organic substances, such as alcohol and ether, becoming reduced to the sesquioxide. Dry ammonia gas is converted by it into nitrogen and aqueous vapor. When peroxide of hydrogen, H_2O_2, is added to a solution of chromium trioxide, an unstable blue compound of probable constitution $H_2Cr_2O_8$, or *perchromic acid*, is formed, which dissolves in ether, and is decomposed by potash and soda, but forms stable compounds with ammonia, quinine, and other bodies. Chromic acid, H_2CrO_4, has not been isolated, and hydrated salts of the type $HM'CrO_4$ are unknown. The *chromates* are a large class of bodies, isomorphous with the sulphates.

They are bitter and poisonous salts, mostly of a yellow or red color, and except those of the alkali metals, and of calcium, strontium, and magnesium, are more or less insoluble in water. Most of the insoluble chromates are basic. The chromates of the alkali metals are the neutral or normal yellow salts, M'_2CrO_4, or $M'_2O.CrO_3$, and the orange-red bichromates, or acid salts, $M'_2O.2CrO_3$. Potassium trichromate, $K_2O.3CrO_3$, represents a third series of chromates. With salts of lead, bismuth, and barium, the alkaline chromates give yellow precipitates; with silver salts, a purplish red; and with mercurous salts, a brick-red precipitate. Boiled with hydrochloric acid they give a green solution of sesquichloride of chromium; and with sulphurous acid, or with sulphuric acid and alcohol, sugar, and other reducing agents, they yield chrome alum. When a chromate is heated with sulphuric acid and common salt, vapors of oxychloride of chromium, or chlorochromic acid, are produced. Insoluble chromates fused with nitre yield soluble yellow potassium chromate, K_2CrO_4. This salt is prepared on a large scale by oxidizing chrome-iron ore in a furnace, in the presence of carbonate, sulphate, or chloride of potassium, and chalk or lime. The red bichromate or acid chromate of potassium, $K_2Cr_2O_7$, is made by acidifying a solution of the neutral salt, or by Jacquelin's process, in which chrome-iron ore is ignited with chalk to obtain the neutral chromate of calcium; this is then converted by sulphuric acid into calcium bichromate, which by double decomposition with potassium carbonate yields the potassium bichromate. It melts at a red heat, and at a white heat evolves oxygen, as also when warmed with sulphuric acid. Heated with sulphur or charcoal it deflagrates. The solution gives with sulphydric acid a precipitate of mixed chromic oxide and sulphur. Ammonium bichromate is decomposed on the application of heat into nitrogen, water, and chromic oxide. The oxides and salts of chromium give, in both the inner and outer blowpipe flames, a green bead with borax. Chromium unites with iron and aluminium; and can be obtained combined with mercury by treating a solution of a chromic salt with sodium amalgam. Chromium is estimated gravimetrically in the form of the sesquioxide, or of a lead or barium salt; volumetrically, by the oxidizing effect of a chromate on oxalic acid, hydriodic acid, or potassium ferrocyanide.

The alloy termed *chromeisen*, containing about three parts by weight of chromium to one of iron, is hard enough to serve for cutting glass. An extremely soft steel can be made by employing it instead of *spiegeleisen* in Siemens's steel process. Chromium compounds are in request for a great diversity of purposes. Free chromic acid and potassium bichromate are used in calico-printing, and in bleaching tallow and palm oil. The bichromate is also employed for the volumetric estimation of ferrous salts, in the printing of photographs, and in galvanic batteries; it has even been used with lead chromate for the adulteration of snuff. It is itself sometimes adulterated with a mixture of sulphate and chloride of sodium, colored with a strong solution of bichromate. Potassium bichromate in contact with the skin produces dangerous ulcers, and internally it acts as a violent poison. Fused lead chromate is of value in organic chemistry as an oxidizer, and the unfused salt is the well-known pigment *chrome-yellow*. *Chrome-red* is a basic lead chromate, Pb_2CrO_5. Other pigments are the sesquioxide of chromium, or *chrome-green*, used in glass-staining, porcelain-painting, and in the printing of bank-notes; *Pannetier's emerald green*, a hydrate of the composition $H_4Cr_2O_5$; *Leune and Castelhaz's green*, another hydrate; *Guignet's pigment vert*, a basic chromic borate; and *Plessy's green*, which is a phosphate of chromium. Casali (*Gazzetta Chimica Italiana*, 1874) recommends for the preparation of an intense green pigment to calcine an intimate mixture of 1 part of potassium bichromate and 3 parts of baked gypsum; the mass obtained is boiled with water, or treated with hydrochloric acid. The pigment used to produce a pink color on earthenware is made by heating to redness a mixture of 30 parts of peroxide of tin, 10 of chalk, and 1 of potassium chromate,—the product being powdered and washed with hydrochloric acid. (F. H. B.)

CHRONICLES, Books of. In the Hebrew Canon the Chronicles form a single book, entitled דִּבְרֵי הַיָּמִים, *Events of the Times*. The full title would be ספר דברי הימים, *Book of Events of the Times;* and this again appears to have been a designation commonly applied to special histories in the more definite shape—*Events of the Times of King David*, or the like (1 Chron. xxvii. 24; Esth. x. 2, &c.). The Greek translators divided the long book into two, and adopted the title Παραλειπόμενα, *Things omitted* [*scil.* in the other historical books]. Jerome, following the sense of the Hebrew title, suggested the name of *Chronicon* instead of *Paralipomenon primus et secundus*. Hence the English *Chronicles*.

The book of Chronicles begins with Adam and ends abruptly in the middle of Cyrus's decree of restoration. The continuation of the narrative is found in the book of Ezra, which begins by repeating 2 Chron. xxxvi. 22, 23, and filling up the fragment of the decree of Cyrus. A closer examination of those parts of Ezra and Nehemiah which are not extracted word for word from earlier documents or original memoirs, leads to the conclusion that Chronicles-Ezra-Nehemiah was originally one work, displaying throughout the peculiarities of language and thought of a single editor, who, however, cannot be Ezra himself as tradition would have it. Thus the fragmentary close of 2 Chronicles marks the disruption of a previously-existing continuity,—due, presumably, to the fact that in the gradual compilation of the Canon the necessity for incorporating in the Holy Writings an account of the establishment of the post-Exile theocracy was felt, before it was thought desirable to supplement Samuel and Kings by adding a second history of the period before the Exile. Hence Chronicles is the last book of the Hebrew Bible, following the book of Ezra-Nehemiah, which properly is nothing else than the sequel of Chronicles.

While the original unity of this series of histories can hardly be questioned, it will be more convenient in the present article to deal with Chronicles alone, reserving the relation of the several books for the article Ezra and Nehemiah. The author used a different class of sources for the history before and after the Exile; and thus the critical questions affecting the Chronicles are for the most part quite distinct from those which meet us in the book of Ezra. Besides, the identity of authorship in the two histories cannot be conclusively demonstrated except by a comparison of results drawn from a separate consideration of each book.

Of the authorship of Chronicles we know only what can be determined by internal evidence. The color of the language stamps the book as one of the latest in the Old Testament, but leads to no exact determination of date. In 1 Chron. xxix. 7, which refers to the time of David, a sum of money is reckoned by *darics* [E. V., *drams*], which certainly implies that the author wrote after this Persian coin had been long current in Judea. But the chief passage appealed to by critics to fix the date is 1 Chron. iii. 19, *sqq.*, where the descendants of Zerubbabel seem to be reckoned to six generations (so Ewald, Bertheau, &c.). The passage is confused, and the Septuagint reads it so as to give as many as eleven generations (so Zunz, Nöldeke); while on the other hand those who plead for an early date are disposed to assume an interpolation or corruption of the text, or to separate all that follows the name of Jesaiah in ver. 21, from what precedes (Movers, Keil). But it seems impossible by any fair treatment of the text to obtain fewer than six generations, and this result agrees with the probability that Hattush, who, on the interpretation which we prefer, belongs to the fourth generation from Zerubbabel, was a contemporary of Ezra (Ezra viii. 2). Thus the Chronicler lived at least two generations after Ezra. With this it accords very well that in Nehemiah five generations of high priests are enumerated from Joshua (xii. 10, *sqq.*), and that the last name is that of Jaddua, who, as we know from Josephus, was a contemporary of Alexander the Great. That the chronicler wrote after the fall of the Persian monarchy has been argued by Ewald and others from the use of the title King of Persia (1 Chron. xxxvi. 23). What seems to be certain and important for a right estimate of the book is that the author lived a considerable time after Ezra, and stood entirely under the influence of the religious institutions of the new theocracy. This standpoint determined the nature of his interest in the early history of his people.

The true importance of Hebrew history had always centred in the fact that this petty nation was the people of Jehovah, the spiritual God. The tragic interest which distinguishes the annals of Israel from the forgotten history of Moab or Damascus lies wholly in that long contest which finally vindicated the reality of spiritual things and the supremacy of Jehovah's purpose, in the political ruin

of the nation which was the faithless depositary of these sacred truths. After the Captivity it was impossible to write the history of Israel's fortunes otherwise than in a spirit of religious pragmatism. But within the limits of the religious conception of the plan and purpose of the Hebrew history more than one point of view might be taken up. The book of Kings looks upon the history in the spirit of the prophets—in that spirit which is still echoed by Zechariah (i. 5, 6): "Your fathers, where are they? and the prophets, could they live for ever? But my words and my statutes, which I commanded my servants the prophets, did they not overtake your fathers? so that they turned and said, Like as Jehovah of hosts thought to do unto us . . . so hath he dealt with us." But long before the Chronicler wrote the last spark of propheey was extinct. The New Jerusalem of Ezra was organized as a municipality and a church, not as a nation. The centre of religious life was no longer the living prophetic word but the ordinances of the Pentateuch and the liturgical service of the sanctuary. The religious vocation of Israel was no longer national but ecclesiastical or municipal, and the historical continuity of the nation was vividly realized only within the walls of Jerusalem and the courts of the Temple, in the solemn assembly and stately ceremonial of a feast day. These influences naturally operated most strongly on those who were officially attached to the sanctuary. To a Levite, even more than to other Jews, the history of Israel meant above all things the history of Jerusalem, of the Temple, and of the Temple ordinances. Now the author of Chronicles betrays on every page his essentially Levitical habit of mind. It even seems possible from a close attention to his descriptions of sacred ordinances to conclude that his special interests are those of a common Levite rather than of a priest, and that of all Levitical functions he is most partial to those of the singers, a member of whose guild Ewald conjectures him to have been. To such a man the older delineation of the history of Israel, especially in the books of Samuel and Kings, could not but appear to be deficient in some directions, while in other respects its narrative seemed superfluous or open to misunderstanding, as for example by recording, and that without condemnation, things inconsistent with the Pentateuchal law. The history of the ordinances of worship holds a very small place in the older record. Jerusalem and the Temple have not that central place in the book of Kings which they occupied in the minds of the Jewish community after the Exile. Large sections of the old history are devoted to the religion and politics of the ten tribes, which are altogether unintelligible and uninteresting when measured by a strictly Levitical standard; and in general the whole problems and struggles of the prophetic period turn on points which had ceased to be cardinal in the life of the New Jerusalem, which was no longer called to decide between the claims of the Word of Jehovah and the exigencies of political affairs and social customs, and which could not comprehend that men absorbed in deeper spiritual contests had no leisure for the niceties of Levitical legislation. Thus there seemed to be room for a new history, which should confine itself to matters still interesting to the theocracy of Zion, keeping Jerusalem and the Temple in the foreground, and developing the divine pragmatism of the history, not so much with reference to the prophetic word as to the fixed legislation of the Pentateuch, so that the whole narrative might be made to teach that the glory of Israel lies in the observance of the divine law and ritual.

For the sake of systematic completeness the author begins with Adam, as is the custom with later Oriental writers. But he had nothing to add to the Pentateuch, and the period from Moses to David contained little that served his purpose. He, therefore, contracts the early history into a series of genealogies, which were doubtless by no means the least interesting part of his work at a time when every Israelite was concerned to prove the purity of his Hebrew descent (*cf.* Ezra ii. 59, 63). From the death of Saul the history becomes fuller and runs parallel with the books of Samuel and Kings. The limitations of the author's interest in past times appear in the omission, among other particulars, of David's reign in Hebron, of the disorders in his family and the revolt of Absalom, of the circumstances of Solomon's accession, and of many details as to the wisdom and splendor of that sovereign, as well as of his fall into idolatry. In the later history the ten tribes are quite neglected, and political affairs in Judah receive attention, not in proportion to their intrinsic importance, but according as they serve to exemplify God's help to the obedient and His chastisement of the rebellious. That the author is always unwilling to speak of the misfortunes of good rulers is not to be ascribed with some critics to a deliberate suppression of truth, but shows that the book was throughout composed not in purely historical interests, but with a view to inculcate a single practical lesson. The more important additions which the Chronicler makes to the old narrative consist partly of statistical lists (1 Chron. xii.), partly of full details on points connected with the history of the sanctuary and the great feasts or the archæology of the Levitical ministry (1 Chron. xiii., xv., xvi., xxii.–xxix.; 2 Chron. xxix.–xxxi., &c.), and partly of narratives of victories and defeats, of sins and punishments, of obedience and its reward, which could be made to point a plain religious lesson in favor of faithful observance of the law (2 Chron. xiii., xiv. 9, *sqq.*; xx., xxi. 11, *sqq.*, &c.). The minor variations of Chronicles from the books of Samuel and Kings are analogous in principle to the larger additions and omissions, so that the whole work has a consistent and well-marked character, presenting the history in quite a different perspective from that of the old narrative.

Here, then, a critical question arises. Is the change of perspective wholly due to a different selection of items from authentic historical tradition? May we assume that everything which is new in the Chronicles has been taken exactly from older sources, or must we judge that the standpoint of the author has not only governed the selection, but colored the statement of historical facts? Are all his novelties new data, or are some of them inferences of his own from the same data as lie before us in other books of the Bible? To answer these questions we must first inquire what were the historical materials at his command. The Chronicler makes frequent reference to earlier histories which he cites by a great variety of names. That the names "Book of the Kings of Israel and Judah," "Book of the Kings of Judah and Israel," "Book of the Kings of Israel," and "Affairs of the Kings of Israel" (2 Chron. xxxiii. 18, *Heb.*) refer to a single work is not disputed. Under one or other title this book is cited some ten times. Whether it is identical with the Midrash [E.V., *story*] of the Book of the Kings (2 Chron. xxiv. 27) is not certain. According to later usage the term Midrash would mean a commentary on the book of the Kings. But it is perhaps as plausible to suppose with Ewald that the book of the Kings was itself called a Midrash or learned compilation. That the work so often cited by the Chronicler is not the Biblical book of the same name is manifest from what is said of its contents. It must have been quite an extensive work, for among other things it contains genealogical statistics (1 Chron. ix. 1), and it incorporated certain older prophetic writings—in particular, the *debarim* [*words* or *history*] of Jehu the son of Hanani (2 Chron. xx. 34, where for "who is mentioned in" read "which was copied into") and the vision of Isaiah (2 Chron. xxxii. 32). Now it is noticeable that where the Chronicler does not cite this comprehensive work at the close of a king's reign he generally refers to some special authority which bears the name of a prophet (2 Chron. ix. 29; xii. 15, &c.). But the book of the Kings and a special prophetic writing are not cited for the same reign. It is therefore highly probable that in other cases than those of Isaiah and Jehu the writings of or about prophets which are cited in Chronicles were known to the author only as parts of the great book of Kings. Even 2 Chron. xxxiii. 18, 19, where the English version departs from the received Hebrew text, but probably expresses the correct reading,[1] seems rather to confirm than to oppose this conclusion, which is now disputed by very few scholars except in the case of Isaiah's history of Uzziah, 2 Chron. xxvi. 22.[2] The general conclusion is that it is very doubtful whether the Chronicler used any historical work now lost with the exception of the book of Kings. Even his genealogical lists may have been wholly derived from that work (1 Chron. ix. 1), though for these he may also have had other materials at command.

Now we know that the two chief sources of the canonical book of Kings were entitled *Annals* ["events of the times"] *of the Kings of Israel* and *Judah* respectively. That the

[1] Others, following the Massoretic text, find in verse 19 an unknown prophet Chozai. So E.V. margin has Hosai.

[2] Zöckler and Keil still dissent from the current view.

lost source of the Chronicles was not independent of these works at once appears probable both from the nature of the case and from the close and often verbal parallelism between many sections of the two Biblical narratives. But while the canonical book of Kings had separate sources for the northern and southern kingdoms, the source of Chronicles was a history of the two kingdoms combined, and so, no doubt, was a more recent work in great measure extracted from the older annals. Yet it contained also matter not derived from these works, for it is pretty clear from 2 Kings xxi. 17, that the Annals of the Kings of Judah gave no account of Manasseh's repentance, which, according to 2 Chron. xxxiii. 18, 19, was narrated in the great book of the Kings of Israel. It was formerly the opinion of Bertheau, and is still maintained by Keil, that the parallelisms of Chronicles with Samuel and Kings are sufficiently explained by the ultimate common source from which both narratives drew. But most critics hold that the Chronicler also drew directly from the canonical books of Samuel and Kings as he unquestionably did from the Pentateuch. This opinion is probable in itself, as the earlier books of the Old Testament cannot have been unknown to the author; and perhaps the critical analysis of the canonical book of Kings is already far enough advanced to enable us to say that in some of the parallel passages the Chronicler uses words which were not written in the annals but by the author of Kings himself. In particular Chronicles agrees with Kings in those short notes of the moral character of individual monarchs which can hardly be ascribed to an earlier hand than that of the final author of the latter book. It is, of course, possible, as Bertheau points out, that the author of the chief source of Chronicles already used our canonical book of Kings; and in general the connections of the successive historical books which preceded the present canonical histories are sufficiently complex to make it very unwise to indulge in positive assertions on a matter in which so many possibilities may be suggested. Those critics who have a low opinion of the historical value of the Chronicles, and especially Graf, are ready to regard the earlier canonical books as the chief source of the work, and to suppose that the author seldom had authority for his additions to Samuel and Kings; while Keil, on the other hand, is anxious to prove that the earlier canonical histories were not used at all, and so makes the most of the value of the special sources open to the Chronicler. The truth probably lies between these two extremes.

The close and frequently verbal coincidence of the text of so many passages of Chronicles and the earlier books raises a presumption that in general the later author copied his sources with great fidelity. In other cases diversities of statement occur from which inferences unfavorable to the Chronicler have often been drawn. It must, however, be remembered that even copyists at that time were allowed a degree of freedom which modern writers would not venture to exercise, and that different recensions of the same book —for example the extant Hebrew text of Samuel and that which lay before the Greek translators—frequently varied not only in points of expression but in names and numbers, in the addition or omission of details and explanatory remarks, and even in larger matters. Of course such variations must be more numerous and important in the case of parallel narratives which are derived only in an indirect way from the same original sources. If proper weight is allowed to these considerations we must agree with Bertheau that "critics ought not to have charged our author with intentional distortions of the narrative or with inventing false statements; evidence to justify such charges cannot be adduced." Full proof of the soundness of this observation cannot be given without a long discussion of details. As an example it may suffice to take the tendency to exaggerate which has been traced in the larger numbers of Chronicles (1 Chron. xxi. 5 compared with 2 Sam. xxiv. 9; 1 Chron. xxi. 25 compared with 2 Sam. xxiv. 24, and so forth). It may fairly be said that such larger numbers are in general characteristic of a later record. But they prove little as to the idiosyncrasy of the Chronicler, and cannot with any certainty be laid to his charge as an individual, when we find that in the Massoretic text of 1 Sam. vi. 19 the original number 70 has increased to 50,000. The tendency of numbers to grow in successive transcriptions is one which criticism must always keep in view, and which, doubtless, was at work before as well as after the time of the Chronicler.

Variations which can be distinctly connected with demonstrable personal peculiarities of the writer or with the specific object of his work belong to a different category. But here also great caution must be exercised. For example, no part of the narrative has been more suspected than the captivity and repentance of Manasseh. It is argued that the author's theory of Divine retribution made it incredible to him that a wicked and unrepentant king could enjoy the long reign granted to Manasseh. But it is quite plain from 2 Chron. xxxiii. 18, that this narrative existed in the sources which lay before the writer, and the Assyrian inscriptions have shown that what is said of the captivity of the Judæan king is in perfect accordance with the state of affairs in the Assyrian empire at the time (Schrader, *Keilinschriften und A. T.*, p. 238, *sqq.*).

In general, then, it seems safe to conclude with Ewald, Bertheau, and other cautious critics that there is no foundation for the accusation that the Chronicler invented history in the interest of his parenetic and practical purposes. But on the other hand it is not to be doubted that in shaping his narrative he allowed himself the same freedoms as were taken by other ancient historians, and even by early copyists, and it is the business of historical criticism to form a clear conception of the nature and limits of these freedoms, with a view to distinguish in individual passages between the facts devised by the Chronicler from his written sources and the literary additions, explanations, and influences which are his own. In particular:—

1. His explanations of verbal or material difficulties must be critically considered. Thus even Keil admits an error in 2 Chron. xx. 36, 37, where the Tharshish-ships, that is ships fit for a long voyage, which Jehoshaphat built on the Red Sea (1 Kings xxii. 48), are explained as ships voyaging to Tartessus in Spain. Such criticism is especially necessary where remarks are introduced tending to explain away the differences in religious observances between early times and the period of the Chronicler. Thus in 1 Chron. xxi. 28, *sqq.*, an explanation is given of the reasons which led David to sacrifice on the threshing-floor of Ornan instead of going to the brazen altar at Gibeon. But it is certain that at the time of David the principle of a single altar was not acknowledged, and therefore no explanation was required. In 1 Kings iii. 3, 4, Gibeon appears only as the chief of many high-places, and it is difficult to avoid the conclusion that the Chronicler has simply *inferred* from the importance of this sanctuary that it must have possessed a special legitimation, which could only consist in the presence of the old brazen altar.

2. A certain freedom of literary form was always allowed to ancient historians, and need not perplex any one who does not apply a false standard to the narrative. To this head belongs especially the introduction of speeches like that of Abijah in 2 Chron. xiii. This speech is no doubt a free composition, and would be so understood by the author's contemporaries. By such literary devices the author is enabled to point a lesson without interrupting the thread of his narrative by reflections of his own. Similar remarks apply to the Psalm in 1 Chron. xvi., which is made up of extracts from Psalms cv., xcvi., cvi.

3. A usage not peculiar to the Chronicler among Old Testament writers, and which must be carefully taken into account by the historical critic, is that of giving statistical information in a narrative form. This is the principle which underlies many genealogical lists of the Bible, and which alone explains the variations between different accounts of the genealogy proceeding from a single ancestor. Information as to the subdivisions of clans, the intermingling of populations, and the like, is thrown into a genealogical form. Thus the different sons of a father often stand merely for the branches of a family as they existed at some one time. Of course lists made out at different times when the divisions of clans had varied produce an apparent discrepancy in the names of the sons. The union of two clans is expressed as marriage, or the territory is the wife, and her several husbands are successive populations, and so forth.[1] A different application of the same principle seems to lie in the account of the institutions of Levitical service which is introduced in connection with the transference of the ark to Jerusalem by David. The author is not concerned to distinguish the

[1] On the application of this style of expression to the genealogies of Chronicles, the reader may consult Wellhausen, *De Gentibus et Familiis Judæis quæ* 1 Chr. ii. iv. *enumerantur*, Göttingen, 1870.

gradual steps by which the Levitical organization attained its full development. But he wishes to describe the system in its complete form, especially as regards the service of the singers, and he does this under the reign of David, who was the father of Hebrew psalmody, and the restorer of the sanctuary of the ark.

This account of some of the leading points of view which criticism of the Chronicles has to take up makes no pretence at completeness, but may suffice to indicate the nature of the problems which arise in a detailed study of the narrative, and to show that much is to be learned from the book not only in the way of supplement to the earlier history, but for the better understanding of the religious spirit and ordinances of the theocracy as it was after Ezra.

Literature.—Many parts of the Chronicles offer a very hard task to the expositor, especially the genealogies, where to other troubles is added the extreme corruption and many variations of the proper names in the versions. Jerome already complains of this difficulty in the Greek and Old Latin, and tells us what pains he himself took to secure right readings with the aid of a learned Jew. Commentators have rather shrunk from approaching the book. The best exposition is the very careful work of Bertheau (1st ed. 1854, Eng. Trans. 1857, 2d ed. 1860). There are also commentaries by Keil[1] (Leipsic, 1870, Eng. Trans. 1872) and Zöckler (in Lange's *Bibelwerk*, 1874). Bertheau is cautiously critical, Keil conservative and apologetic, Zöckler not quite so conservative. Valuable contributions to the exegesis of the book are to be found in Ewald's *History of Israel*. Rawlinson's notes in the *Speaker's Commentary* are not very important. There is a large literature on isagogic questions, and especially upon the credibility of the narratives peculiar to Chronicles. Besides the full discussions in books of O. T. introduction (especially De Wette, Schrader, and Keil), the student must refer to the very valuable discussion in the introductory part of Ewald's history, and to the separate treatises of Movers, *Kritische Untersuchungen über die Biblische Chronik*, Bonn, 1834 (in answer to the assaults of De Wette and Gramberg), and Graf, *Die Geschichtlichen Bücher des A. T.*, Leipsic, 1866. Graf concludes that the Chronicles have almost no value as a documentary source for the ancient history; but in private correspondence with Bertheau he subsequently admitted that this statement is too strong (see the preface to Bertheau's 2d edition). The older works are enumerated by Carpzov, and in other books of introduction. Lagarde's edition of the *Targum*, which is not in the Rabbinical Bibles, deserves special mention (*Hagiographa Chaldaice*, Leipsic, 1873). (W. R. S.)

CHRONOLOGY (from the Greek *χρονολογία*, computation of time) is the science which treats of time. Its object is to arrange and exhibit the various events which have occurred in the history of the world in the order of their succession, and to ascertain the intervals of time between them.

The preservation of any record, however rude, of the lapse of time implies some knowledge of the celestial motions, by which alone time can be accurately measured, and some advancement in the arts of civilized life, which could only be attained by the accumulated experience of many generations. Before the invention of letters the memory of past transactions could not be preserved beyond a few years with any tolerable degree of accuracy. Events which greatly affected the physical condition of the human race, or were of a nature to make a deep impression on the minds of the rude inhabitants of the earth, might be vaguely transmitted through several ages by traditional narrative; but intervals of time, expressed by abstract numbers, and these constantly varying besides, would soon escape the memory. The invention of the art of writing afforded the means of substituting precise and permanent records for vague and evanescent tradition; but in the infancy of the world, mankind had learned neither to estimate accurately the duration of time, nor to refer passing events to any fixed epoch. Writing was practised many centuries before historians began to assign dates to the events they narrated. The masterpieces of Herodotus and Thucydides, while setting forth, each in the manner suited to the author's aim, events in the order of their succession, are stories without dates.

For these reasons the history of the early ages of the world is involved in almost impenetrable obscurity, and chronology, comparatively speaking, is only of recent origin. After political relations began to be established, the necessity of preserving a register of passing seasons and years would soon be felt, and the practice of recording important transactions must have grown up as a necessary consequence of social life. But of these early records a very small portion only has escaped the ravages of time and barbarism.

The earliest written annals of the Greeks, Etruscans, and Romans are irretrievably lost. The traditions of the Druids perished with them. A Chinese emperor has the credit of burning "the books" extant in his day (about 220 B.C.), and of burying alive the scholars who were acquainted with them. And a Spanish adventurer destroyed the picture records which were found in the *pueblo* of Montezuma.

Of the more formal historical writings in which the first ineffectual attempts were made in the direction of systematic chronology we have no knowledge at first-hand. Of Hellanicus, the Greek logographer, who appears to have lived through the greater part of the fifth century B.C., and who drew up a chronological list of the priestesses of Here at Argos; of Ephorus, who lived in the 4th century B.C., and is distinguished as the first Greek who attempted the composition of a universal history; and of Timæus, who in the following century wrote an elaborate history of Sicily, in which he set the example of using the Olympiads as the basis of chronology, the works have perished, and our meagre knowledge of their contents is derived only from fragmentary citations in later writers. The same fate has befallen the works of Berosus and Manetho, Eratosthenes and Apollodorus. Berosus, a priest of Belus living at Babylon in the 3d century B.C., added to his historical account of Babylonia a chronological list of its kings, which he claimed to have compiled from genuine archives preserved in the temple. Manetho, likewise a priest, living at Sebennytus in Lower Egypt in the 3d century B.C., wrote in Greek a history of Egypt, with an account of its thirty dynasties of sovereigns, which he professed to have drawn from genuine archives in the keeping of the priests. Of these works fragments only, more or less copious and accurate, have been preserved. Eratosthenes, who in the latter half of the 2d century B.C. was keeper of the famous Alexandrian Library, not only made himself a great name by his important work on Geography, but by his treatise entitled *Chronographia*, one of the first attempts to establish an exact scheme of general chronology, earned for himself the title of "father of chronology." His method of procedure, however, was usually conjectural; and guess-work, however careful, acute, and plausible, is still guess-work and not testimony. Apollodorus, an Athenian who flourished in the middle of the 2d century B.C., wrote a metrical chronicle of events, ranging from the supposed period of the fall of Troy to his own day. These writers were followed by other investigators and systematizers in the same field, but their works are lost. Of the principal later writers whose works are extant, and to whom we owe what little knowledge we possess of the labors of their predecessors, mention will be made hereafter.

The absence or incompleteness of authentic records, however, is not the only source of obscurity and confusion in the chronology of remote ages. There can be no exact computation of time or placing of events without a fixed point or epoch from which the reckoning takes its start. It was long before this was apprehended. When it began to be seen, various epochs were selected by various writers; and at first each small separate community had its own epoch and method of time-reckoning. Thus in one city the reckoning was by succession of kings, in another by archons or annual magistrates, in a third by succession of priests. It seems now surprising that vague counting by generations should so long have prevailed and satisfied the wants of inquiring men, and that so simple, precise, and seemingly obvious a plan as counting by years, the largest natural division of time, did not occur to any investigator before Eratosthenes.

Precision, which was at first unattainable for want of an epoch, was afterwards no less unattainable from the multiplicity, and sometimes the variation, of epochs. But by a natural process the mischief was gradually and partially remedied. The extension of intercourse between the various small groups or societies of men, and still more their union in larger groups, made a common epoch necessary, and led to the adoption of such a starting point by each larger group. These leading epochs continued in use for many centuries. The task of the chronologer was thus simplified and reduced to a study and comparison of dates in a few leading systems.

[1] [Karl August G. (1754–1818), a Saxon, a Leipsic professor and Master of Biblical Hermeneutics.—Am. Ed.]

The most important of these systems in what we call ancient times were the Babylonian, the Greek, and the Roman. The Jews had no general era, properly so-called. In the history of Babylonia, the fixed point from which time was reckoned was the era of Nabonassar, 747 B.C. Among the Greeks the reckoning was by Olympiads, the point of departure being the year in which Corœbus was victor in the Olympic Games, 776 B.C. The Roman chronology started from the foundation of the city, the year of which, however, was variously given by different authors. The most generally adopted was that assigned by Varro, 753 B.C. It is noteworthy how nearly these three great epochs approach each other,—all lying near the middle of the 8th century B.C. But it is to be remembered that the beginning of an era and its adoption and use as such are not the same thing, nor are they necessarily synchronous. Of the three ancient eras above spoken of, the earliest is that of the Olympiads, next that of the foundation of Rome, and the latest the era of Nabonassar. But in order of adoption and actual usage the last is first. It is believed to have been in use from the year of its origin. It is not known when the Romans began to use their era. The Olympiads were not in current use till about the middle of the 3d century B.C., when Timæus, as already mentioned, set the example of reckoning by them. Of these and other ancient and modern eras a full account is given in the following pages.

Even after the adoption in Europe of the Christian era, a great variety of methods of dating—national, provincial, and ecclesiastical—grew up and prevailed for a long time in different countries, thus renewing in modern times the difficulties experienced in ancient times from diversities of reckoning. An acquaintance with these various methods is indispensable to the student of the charters, chronicles, and legal instruments of the Middle Ages.

In reckoning years from any fixed epoch in constant succession, the number denoting the years is necessarily always on the increase. But rude nations and illiterate people seldom attach any definite idea to large numbers. Hence it has been a practice, very extensively followed, to employ cycles or periods, consisting of a moderate number of years, and to distinguish and reckon the years by their number in the cycle. The Chinese and other nations of Asia reckon, not only the years, but also the months and days, by cycles of sixty. The Saros of the Chaldeans, the Olympiad of the Greeks, and the Roman Indiction are instances of this mode of reckoning time. Several cycles were formerly known in Europe; but most of them were invented for the purpose of adjusting the solar and lunar divisions of time, and were rather employed in the regulation of the calendar than as chronological eras. They are frequently, however, of very great use in fixing dates that have been otherwise imperfectly expressed, and consequently form important elements of chronology.

Chronology has shared with history the fruits of the novel researches and remarkable discoveries in the field of antiquity which have especially distinguished the present century. The *memorabilia* of early peoples and ages were set down not only in written records but in monumental inscriptions. The latter, graven on stone or metal, could resist the touch of time and the hand of the barbarian better than the former; and although at various times terrible havoc has been made among them, immense numbers are in existence to this day. In Assyria, Egypt, Persia, Greece, and Italy, the practice of monumental inscription was very general. These inscriptions have attracted the attention of learned men from very remote ages. But as contributions to history and chronology, they have within the present century risen into new and surprising importance. By Grotefend's decipherment of the cuneiform characters, the language of the Babylonian and Persian inscriptions, and by Young's decipherment of hieroglyphics, the language of the Egyptian monuments, two discoveries made within a few years of each other, new fields of vast extent and unknown richness have been opened to historical explorers. These fields are now being diligently worked by some of the greatest living scholars; and from granite block and fragile papyrus roll results are already obtained of rare value and of rarer promise. The Assyrian inscribed cylinders, disinterred but thirty years ago, are yielding up the secrets of a long-buried past, enlarging the horizon of history, and even furnishing the means of giving a precise chronology to periods where all was vague. The publication of the Assyrian Canon by Sir Henry Rawlinson in 1862, verified as it was by the subsequent discovery of a record of a solar eclipse, must mark an epoch in chronological science. Egyptian researches and interpretations have been of similar service, and have strongly tended, if not to establish the complete accuracy, at least to indicate the credibility, of Manetho's account of the Egyptian dynasties. The period through which these dynasties apparently reached was so vast, stretching so far beyond the traditionally accepted limits of man's existence on the earth, that modern chronologers, when they grew critical, could for a long time only shake their heads in profound doubt over Manetho and his vistas of shadowy kings. For Egyptian chronology the discovery by Mariette, in 1864, of the *Apis Stelæ* is one of the highest importance. A flood of light has been poured on some obscure pages of early Persian history by the great cuneiform inscription of Behistun, discovered in 1835 by Colonel Rawlinson, who subsequently copied and translated it.

In the article CALENDAR (*q.v.*), that part of chronology has been already treated of which relates to the measurement of time, and the principal methods explained with sufficient detail that have been employed, or are still in use, for adjusting the lunar months of the solar year, as well as the intercalations necessary for regulating the civil year according to the celestial motions. In the present article it is our purpose to give an account (without repeating what has been discussed in full in the article just named) of the different *Eras* and *Periods* that have been employed by historians, and by the different nations of the world, in recording the succession of time and events, to fix the epochs at which the eras respectively commenced, to ascertain the form and the initial day of the year made use of, and to establish their correspondence with the years of the Christian era. These elements will enable us to convert, by a simple arithmetical operation, any historical date, of which the chronological characters are given according to any era whatever, into the corresponding date in our common era of the Incarnation.

Julian Period.

Although the Julian Period (the invention of Joseph Scaliger, in 1582) is not, properly speaking, a chronological era, yet, on account of its affording considerable facilities in the comparison of different eras with one another, and in marking without ambiguity the years before Christ, it is very generally employed by chronologers. It consists of 7980 Julian years; and the first year of the Christian era corresponded with the year 4714 of the Julian period. (See vol. iv. p. 595.)

Olympiads.

The Olympic games, so famous in Greek history, were celebrated once every four years, between the new and full moon first following the summer solstice, on the small plain named Olympia in Elis, which was bounded on one side by the River Alpheus, on another by the small tributary stream the Cladeus, and on the other two sides by mountains. The games lasted five days. Their origin, lost in the dimness of remote antiquity, was invested by priestly legends with a sacred character. They were said to have been instituted by the Idæan Heracles, to commemorate his victory over his four brothers in a foot race. According to a tradition, possibly more authentic, they were re-established by Iphitus, king of Elis, in concert with the Spartan Lycurgus and Cleosthenes of Pisa. The practice was long after adopted of designating the Olympiad, or period of four years, by the name of the victor in the contests of the stadium, and of inscribing his name in the gymnasium of Olympia. The first who received this honor was Corœbus. The games in which Corœbus was victor, and which form the principal epoch of Greek history, were celebrated about the time of the summer solstice 776 years before the common era of the Incarnation, in the 3938th year of the Julian period, and twenty-three years, according to the account of Varro, before the foundation of Rome.

Before the introduction of the Metonic cycle, the Olympic year began sometimes with the full moon which followed, at other times with that which preceded the summer solstice, because the year sometimes contained 384 days instead of 354. But subsequently to its adoption, the year always commenced with the eleventh day of the

moon which followed the solstice. In order to avoid troublesome computations, which it would be necessary to recommence for every year, and of which the results differ only by a few days, chronologers generally regard the 1st of July as the commencement of the Olympic year. Some authors, however, among whom are Eusebius, Jerome, and the historian Socrates, place its commencement at the 1st of September; these, however, appear to have confounded the Olympic year with the civil year of the Greeks, or the era of the Seleucidæ.

It is material to observe, that as the Olympic years and periods begin with the 1st of July, the first six months of a year of our era correspond to one Olympic year, and the last six months to another. Thus, when it is said that the first year of the Incarnation corresponds to the first of the 195th Olympiad, we are to understand that it is only with respect to the last six months of that year that the correspondence takes place. The first six months belonged to the fourth year of the 194th Olympiad. In referring dates expressed by Olympiads to our era, on the contrary, we must therefore distinguish two cases.

1*st*, When the event in question happened between the 1st of January and the 1st of the following July, the sum of the Olympic year and of the year before Christ is always equal to 776. The year of the era, therefore, will be found by subtracting the number of the Olympic year from 776. For example, Varro refers the foundation of Rome to the 21st of April of the third year of the sixth Olympiad, and it is required to find the year before our era. Since five Olympic periods have elapsed, the third year of the sixth Olympiad is $5\times4+3=23$; therefore, subtracting 23 from 776, we have 753, which is the year before Christ to which the foundation of Rome is referred by Varro.

2*d*, When the event took place between the summer solstice and the first of January following, the sum of the Olympic year and of the year before Christ is equal to 777. The difference therefore between 777 and the year in one of the dates will give the year in the other date. Thus, the moon was eclipsed on the 27th of August, a little before midnight, in the year 413 before our era; and it is required to find the corresponding year in the Olympic era. Subtract 413 from 777, the remainder is 364; and 364 divided by four gives 91 without a remainder; consequently the eclipse happened in the fourth year of the ninety-first Olympiad, which is the date to which it is referred by Thucydides.

If the year is after Christ, and the event took place in one of the first six months of the Olympic year, that is to say, between July and January, we must subtract 776 from the number of the Olympic year to find the corresponding year of our era; but if it took place in one of the last six months of the Olympic year, or between January and July, we must deduct 777. The computation by Olympiads seldom occurs in historical records after the middle of the 5th century of our era.

The names of the months were different in the different Grecian states. The Attic months, of which we possess the most certain knowledge, were named as follows:—

Hecatombæon.	Gamelion.
Metageitnion.	Anthesterion.
Boedromion.	Elaphebolion.
Pyanepsion.	Munychion.
Mæmacterion.	Thargelion.
Poseideon.	Scirophorion.

Era of the Foundation of Rome.

After the Olympiads, the era most frequently met with in ancient history is that of the foundation of Rome, which is the chronological epoch adopted by all the Roman historians. There are various opinions respecting the year of the foundation of Rome.

1*st*, Fabius Pictor places this event in the latter half of the first year of the eighth Olympiad, which corresponds with the 3967th of the Julian period, and with the year 747 B.C.

2*d*, Polybius places it in the second year of the seventh Olympiad, corresponding with 3964 of the Julian period, and 750 B.C.

3*d*, M. Porcius Cato places it in the first year of the seventh Olympiad, that is, in 3963 of the Julian period, and 751 B.C.

4*th*, Verrius Flaccus places it in the fourth year of the sixth Olympiad, that is, in the year 3962 of the Julian period, and 752 B.C.

5*th*, Terentius Varro places it in the third year of the sixth Olympiad, that is, in the year 3961 of the Julian period, and 753 B.C.

A knowledge of these different computations is necessary, in order to reconcile the Roman historians with one another, and even any one writer with himself. Livy in general adheres to the epoch of Cato, though he sometimes follows that of Fabius Pictor. Cicero follows the account of Varro, which is also in general adopted by Pliny. Dionysius of Halicarnassus follows Cato. Modern chronologers for the most part adopt the account of Varro, which is supported by a passage in Censorinus, where it is stated that the 991st year of Rome commenced with the festival of the Palilia, in the consulship of Ulpius and Pontianus. Now this consulship corresponded with the 238th year of our era; therefore, deducting 238 from 991, we have 753 to denote the year before Christ. The Palilia commenced on the 21st of April; and all the accounts agree in regarding that day as the epoch of the foundation of Rome.

The Romans employed two sorts of years, the civil year, which was used in the transaction of public and private affairs, and the consular year, according to which the annals of their history have been composed. The civil year commenced with the calends of January, but this did not hold a fixed place in the solar year till the time of Julius Cæsar (see vol. iv. p. 591). The installation of the consuls regulated the commencement of the consular year. The initial day of the consulate was never fixed, at least before the 7th century of Rome, but varied with the different accidents which in times of political commotion so frequently occurred to accelerate or retard the elections. Hence it happens that a consular year, generally speaking, comprehends a part not only of two Julian years, but also of two civil years. The consulate is the date employed by the Latin historians generally, and by many of the Greeks, down to the 6th century of our era.

In the era of Rome the commencement of the year is placed at the 21st of April; an event therefore which happened in the months of January, February, March, or during the first twenty days of April, in the year (for example) 500 of Rome, belongs to the civil year 501. Before the time of the Decemvirs, however, February was the last month of the year. Many authors confound the year of Rome with the civil year, supposing them both to begin on the 1st of January. Others again confound both the year of Rome and the civil year with the Julian year, which in fact became the civil year after the regulation of the calendar by Julius Cæsar. Through a like want of attention, many writers also, particularly among the moderns, have confounded the Julian and Olympic years, by making an entire Julian year correspond to an entire Olympic year, as if both had commenced at the same epoch. Much attention to these particulars is required in the comparison of ancient dates.

The Christian Era.

The Christian or vulgar era, called also the era of the Incarnation, is now almost universally employed in Christian countries, and is even used by some Eastern nations. Its epoch or commencement is the 1st of January in the fourth year of the 194th Olympiad, the 753d from the foundation of Rome, and the 4714th of the Julian period. It is usually supposed to begin with the year of the birth of Christ, but there are various opinions with regard to the year in which that event took place. This epoch was introduced in Italy in the 6th century, by Dionysius the Little, a Roman abbot, and began to be used in Gaul in the 8th, though it was not generally followed in that country till a century later. From extant charters it is known to have been in use in England before the close of the 8th century. Before its adoption the usual practice in Latin countries was to distinguish the years by their number in the cycle of Indiction.

In the Christian era the years are simply distinguished by the cardinal numbers; those before Christ being marked B.C. (Before Christ), or A.C. (Ante Christum), and those after Christ A.D. (Anno Domini). This method of reckoning time is more convenient than those which employ cycles or periods of any length whatever; but it still fails

to satisfy in the simplest manner possible all the conditions that are necessary for registering the succession of events. For, since the commencement of the era is placed at an intermediate period of history, we are compelled to resort to a double manner of reckoning, backward as well as forward. Some ambiguity is also occasioned by the want of uniformity in the method of numbering the preceding years. Astronomers denote the year which preceded the first of our era by 0, and the year previous to that by 1 B.C.; but chronologers, in conformity with common notions, call the year preceding the era 1 B.C., the previous year 2 B.C., and so on. By reckoning in this manner, there is an interruption in the regular succession of the numbers; and in the years preceding the era, the leap years, instead of falling on the fourth, eighth, twelfth, &c., fall, or ought to fall, on the first, fifth, ninth, &c.

In the chronicles of the Middle Ages much uncertainty frequently arises respecting dates on account of the different epochs assumed for the commencement of the Christian year. Dionysius, the author of the era, adopted the day of the *Annunciation*, or the 25th of March, which preceded the birth of Christ by nine months, as the commencement of the first year of the era. This epoch therefore precedes that of the vulgar era by nine months and seven days. This manner of dating was followed in some of the Italian states, and continued to be used at Pisa even down to the year 1745. It was also adopted in some of the Papal bulls; and there are proofs of its having been employed in France about the middle of the 11th century. Some chroniclers, who adhere to the day of the Annunciation as the commencement of the year, reckon from the 25th of March following our epoch, as the Florentines in the 10th century. Gregory of Tours, and some writers of the 6th and 7th centuries, make the year commence sometimes with the 1st of March, and sometimes with the 1st of January. In France, under the third race of kings, it was usual to begin the year with Easter; and this practice continued at least till the middle of the 16th century, for an edict was issued by Charles IX. in the month of January, 1663, ordaining that the commencement of the year should thenceforth be considered as taking place on the 1st of January. An instance is given, in *L'Art de Vérifier les Dates*, of a date in which the year is reckoned from the 18th of March; but it is probable that this refers to the astronomical year, and that the 18th of March was taken for the day of the vernal equinox. In Germany, about the 11th century, it was usual to commence the year at Christmas; and this practice also prevailed at Milan, Rome, and other Italian cities, in the 13th, 14th, and 15th centuries.

In England, the practice of placing the beginning of the year at Christmas was introduced in the 7th century, and traces of it are found even in the 13th. Gervase of Canterbury, who lived in the 13th century, mentions that almost all writers of his country agreed in regarding Christmas day as the first of the year, because it forms, as it were, the term at which the sun finishes and recommences his annual course. In the 12th century, however, the custom of beginning the civil year with the day of the Annunciation, or the 25th of March, began to prevail, and continued to be generally followed from that time till the reformation of the calendar in 1752. The historical year has always been reckoned by English authors to begin with the 1st of January. The liturgic year of the Church of England commences with the first Sunday of Advent.

A knowledge of the different epochs which have been chosen for the commencement of the year in different countries is indispensably necessary to the right interpretation of ancient chronicles, charters, and other documents in which the dates often appear contradictory. We may cite an example or two. It is well known that Charles the Great was crowned emperor at Rome on Christmas day in the year 800, and that he died in the year 814, according to our present manner of reckoning. But in the annals of Metz and Moissac, the coronation is stated to have taken place in the year 801, and his death in 813. In the first case the annalist supposes the year to begin with Christmas, and accordingly reckons the 25th of December and all the following days of that month to belong to 801, whereas in the common reckoning they would be referred to the year 800. In the second case the year has been supposed to begin with the 25th of March, or perhaps with Easter; consequently the first three months of the year 814, reckoning from the 1st of January, would be referred to the end of the year 813. The English Revolution is popularly called the Revolution of 1688. Had the year then begun, as it now does, with the 1st of January, it would have been the revolution of 1689, William and Mary being received as king and queen in February in the year 1689; but at that time the year was considered in England as beginning on the 25th of March. Another circumstance to which it is often necessary to pay attention in the comparison of dates, is the alteration of style which took place on the adoption of the Gregorian Calendar (see vol. iv. pp. 595 *sqq.*).

Era of the Creation of the World.

As the Greek and Roman methods of computing time were connected with certain pagan rites and observances, which the Christians held in abhorrence, the latter began at an early period to imitate the Jews in reckoning their years from the supposed period of the creation of the world. The chronological elements on which both Jews and Christians founded their computations for determining this period were derived from the Old Testament narratives, which have been transmitted to us through three distinct channels. These are the Hebrew text of the Scriptures, the Samaritan text, and the Greek version known as the Septuagint. In respect of chronology, the three accounts are totally irreconcilable with each other; and no conclusive reason can be given for preferring any one of them to another. We have no concurrent testimony with which to compare them; nor is it even known which of them was regarded as the most probable by the Jews themselves, when the books of the Old Testament were revised and transcribed by Ezra. The ordinary rules of probability cannot be applied to a state of things in which the duration of human life is represented as extending to nearly a thousand years.

From computations founded on loose and conflicting data it would be vain to look for knowledge or even for concord of opinion. From the very nature of the case discussion is hopeless labor. The subject is one to which the saying *Quot homines tot sententiæ* applies with almost literal truth. Des Vignoles, in the preface to his *Chronology of Sacred History*, asserts that he collected upwards of two hundred different calculations, the shortest of which reckons only 3483 years between the creation of the world and the commencement of the vulgar era, and the longest 6984. The difference amounts to thirty-five centuries. It suffices, therefore, to point out that the so-called era of the creation of the world is a purely conventional and arbitrary epoch; that, practically, it means the year 4004 B.C.—this being the date which, under the sanction of Archbishop Ussher's opinion, has won its way, among its hundreds of competitors, into most general acceptance. The reader who is desirous of more detailed information on this subject may consult the first volume of the *Universal History*, or *L'Art de Vérifier les Dates, avant J. C.*, p. 9.

Jewish Year and Eras.

Before the departure of the Israelites from Egypt their year commenced at the autumnal equinox; but in order to solemnize the memory of their deliverance, the month of *Nisan* or *Abib*, in which that event took place, and which falls about the time of the vernal equinox, was afterwards regarded as the beginning of the ecclesiastical or legal year. In civil affairs, and in the regulation of the jubilees and sabbatical years, the Jews still adhere to the ancient year, which begins with the month Tisri, about the time of the autumnal equinox. (On the regulation of the Jewish year, see vol. iv. p. 601.)

After their dispersion, the Jews were constrained to have recourse to the astronomical rules and cycles of the more enlightened heathen, in order that their religious festivals might be observed on the same days in all the countries through which they were scattered. For this purpose they adopted a cycle of eighty-four years, which is mentioned by several of the ancient fathers of the church, and which the early Christians borrowed from them for the regulation of Easter. This cycle seems to be neither more nor less than the Calippic period of seventy-six years, with the addition of a Greek octaeteris, in order to disguise its true source, and give it an appearance of originality.

In fact, the period of Calippus containing 27,759 days, and the octaeteris 2922 days (see vol. iv. p. 593), the sum, which is 30,681, is exactly the number of days in the eighty-four Julian years. But the addition was very far from being an improvement on the work of Calippus; for instead of a difference of only five hours and fifty-three minutes between the places of the sun and moon, which was the whole error of the Calippic period, this difference, in the period of eighty-four years, amounted to one day, six hours, and forty-one minutes. Buccherius places the commencement of this cycle in the year 162 B.C.; Prideaux in the year 291 B.C. According to the account of Prideaux, the fifth cycle must have commenced in the year 46 of our era; and it was in this year, according to St. Prosperus, that the Christians began to employ the Jewish cycle of eighty-four years, which they followed, though not uniformly, for the regulation of Easter, till the time of the Council of Nice.

Soon after the Nicene council, the Jews, in imitation of the Christians, abandoned the cycle of eighty-four years, and adopted that of Meton, by which their lunisolar year is regulated at the present day. This improvement was first proposed by Rabbi Samuel, rector of the Jewish school of Sora in Mesopotamia, and was finally accomplished in the year 360 of our era by Rabbi Hillel, who introduced that form of the year which the Jews at present follow, and which, they say, is to endure till the coming of the Messiah.

Till the 15th century the Jews usually followed the era of the Seleucidæ or of Contracts. Since that time they have generally employed a mundane era, and dated from the creation of the world, which, according to their computation, took place 3760 years and about three months before the commencement of our era. No rule can be given for determining with certainty the day on which any given Jewish year begins, without entering into the minutiæ of their irregular and complicated calendar. A table comprising twelve cycles of Jewish years will be found at p. 602 of vol. iv.

Era of Constantinople.

This era, which is still used in the Greek Church, and was followed by the Russians till the time of Peter the Great, dates from the creation of the world. The Incarnation falls in the year 5509, and corresponds, as in our era, with the fourth year of the 194th Olympiad. The civil year commences with the 1st of September; the ecclesiastical year sometimes with the 21st of March, sometimes with the 1st of April. It is not certain whether the year was considered at Constantinople as beginning with September before the separation of the Eastern and Western empires.

At the commencement of our era there had elapsed 5508 years and four months of the era of Constantinople. Hence the first eight months of the Christian year 1 coincide with the Constantinopolitan year 5509, while the last four months belong to the year 5510. In order, therefore, to find the year of Christ corresponding to any given year in the era of Constantinople, we have the following rule:—If the event took place between the 1st of January and the end of August, subtract 5508 from the given year; but if it happened between the 1st of September and the end of the year, subtract 5509.

Era of Alexandria.

The chronological computation of Julius Africanus was adopted by the Christians of Alexandria, who accordingly reckoned 5500 years from the creation of Adam to the birth of Christ. But in reducing Alexandrian dates to the common era, it must be observed that Julius Africanus placed the epoch of the Incarnation three years earlier than it is placed in the usual reckoning, so that the initial day of the Christian era fell in the year 5503 of the Alexandrian era. This correspondence, however, continued only from the introduction of the era till the accession of Diocletian, when an alteration was made by dropping ten years in the Alexandrian account. Diocletian ascended the imperial throne in the year of Christ 284. According to the Alexandrian computation, this was the year 5787 of the world, and 287 of the Incarnation; but on this occasion ten years were omitted, and that year was thenceforth called the year 5777 of the world, and 277 of the Incarnation. There are, consequently, two distinct eras of Alexandria, the one being used before and the other after the accession of Diocletian. It is not known for what reason the alteration was made; but it is conjectured that it was for the purpose of causing a new revolution of the cycle of nineteen years (which was introduced into the ecclesiastical computation about this time by Anatolius, bishop of Hierapolis) to commence with the first year of the reign of Diocletian. In fact, 5777 being divided by 19 leaves 1 for the year of the cycle. The Alexandrian era continued to be followed by the Copts in the 15th century, and is said to be still used in Abyssinia.

Dates expressed according to this era are reduced to the common era by subtracting 5502, up to the Alexandrian year 5786 inclusive, and after that year by subtracting 5492; but if the date belongs to one of the four last months of the Christian year, we must subtract 5503 till the year 5786, and 5493 after that year.

Mundane era of Antioch.

The chronological reckoning of Julius Africanus formed also the basis of the era of Antioch, which was adopted by the Christians of Syria, at the instance of Panodorus, an Egyptian monk, who flourished about the beginning of the 4th century. Panodorus struck off ten years from the account of Julius Africanus with regard to the years of the world, and he placed the Incarnation three years later, referring it to the fourth year of the 194th Olympiad, as in the common era. Hence the era of Antioch differed from the original era of Alexandria by ten years; but after the alteration of the latter at the accession of Diocletian, the two eras coincided. In reckoning from the Incarnation, however, there is a difference of seven years, that epoch being placed, in the reformed era of Alexandria, seven years later than in the mundane era of Antioch or in the Christian era.

As the Syrian year began in autumn, the year of Christ corresponding to any year in the mundane era of Antioch is found by subtracting 5492 or 5493 according as the event falls between January and September or from September to January.

Era of Nabonassar.

This era is famous in astronomy, having been generally followed by Hipparchus and Ptolemy. It is believed to have been in use from the very time of its origin; for the observations of eclipses which were collected in Chaldea by Callisthenes, the general of Alexander, and transmitted by him to Aristotle, were for the greater part referred to the commencement of the reign of Nabonassar, founder of the kingdom of the Babylonians. It is the basis of the famous Canon of Kings, also called the Mathematical Canon, preserved to us in the words of Ptolemy, which, before the recent astonishing discoveries at Nineveh, was the sole authentic monument of Assyrian and Babylonian history known to us. The epoch from which it is reckoned is precisely determined by numerous celestial phenomena recorded by Ptolemy, and corresponds to Wednesday at mid-day, the 26th of February of the year 747 before Christ. The year was in all respects the same as the ancient Egyptian year. On account of the difference in the length of the Julian and Babylonian years, the conversion of dates according to the era of Nabonassar into years before Christ is attended with considerable trouble. The surest way is to follow a comparative table. Frequently the year cannot be fixed with certainty, unless we know also the month and the day.

The Greeks of Alexandria formerly employed the era of Nabonassar, with a year of 365 days; but soon after the reformation of the calendar by Julius Cæsar, they adopted, like other Roman provincials, the Julian intercalation. At this time the first of Thoth had receded to the 29th of August. In the year 136 of our era, the first of Thoth in the ancient Egyptian year corresponded with the 20th of July, between which and the 29th of August there are forty days. The adoption of the Julian year must therefore have taken place about 160 years before the year 136 of our era (the difference between the Egyptian and Julian years being one day in four years), that is to say, about the year 25 B.C. In fact, the first of Thoth corresponded with the 29th of August in the Julian calendar, in the years 25, 24, 23, and 22 B.C.

Era of the Seleucidæ, or Macedonian Era.

The era of the Seleucidæ dates from the time of the occupation of Babylon by Seleucus Nicator, 311 years before Christ, in the year of Rome 442, and twelve years after the death of Alexander the Great. It was adopted not only in the monarchy of the Seleucidæ but in general in all the Greek countries bordering on the Levant, was followed by the Jews till the 15th century, and is said to be used by some Arabians even at the present day. By the Jews it was called the *Era of Contracts*, because the Syrian governors compelled them to make use of it in civil contracts; the writers of the books of Maccabees call it the *Era of Kings*. But notwithstanding its general prevalence in the East for many centuries, authors using it differ much with regard to their manner of expressing dates, in consequence of the different epochs adopted for the commencement of the year. Among the Syrian Greeks the year began with the month Elul, which corresponds to our September. The Nestorians and Jacobites at the present day suppose it to begin with the following month, or October. The author of the first book of Maccabees makes the era commence with the month Nisan, or April; and the author of the second book with the first Tishrin, or October. Albategni, a celebrated Arabian astronomer, dates from the 1st of October. Some of the Arabian writers, as Alfergani, date from the 1st of September. At Tyre the year was counted from the 19th of our October, at Gaza from the 28th of the same month, and at Damascus from the vernal equinox. These discrepancies render it extremely difficult to determine the exact correspondence of Macedonian dates with those of other eras; and the difficulty is rendered still greater by the want of uniformity in respect of the length of the year. Some authors who follow the Macedonian era, use the Egyptian or vague year of 365 days; Albategni adopts the Julian year of 365¼ days.

According to the computation most generally followed, the year 312 of the era of the Seleucidæ began on the 1st of September in the Julian year preceding the first of our era. Hence, to reduce a Macedonian date to the common era, subtract 311 years and four months.

The names of the Syrian and Macedonian months, and their correspondence with the Roman months, are as follows:—

Syrian.	Macedonian.	English.
Elul.	Gorpiæus.	September.
Tishrin I.	Hyperberetæus.	October.
Tishrin II.	Dius.	November.
Canun I.	Apellæus.	December.
Canun II.	Audynæus.	January.
Sabat.	Peritius.	February.
Adar.	Dystrus.	March.
Nisan.	Xanthicus.	April.
Ayar.	Artemisius.	May.
Haziran.	Dæsius.	June.
Tamus.	Panemus.	July.
Ab.	Loüs.	August.

Era of Alexander.

Some of the Greek historians have assumed as a chronological epoch the death of Alexander the Great, which took place in the year 325 B.C. The form of the year is the same as in the preceding era. This era has not been much followed; but it requires to be noticed in order that it may not be confounded with the era of the Seleucidæ.

Era of Tyre.

The era of Tyre is reckoned from the 19th of October, or the beginning of the Macedonian month Hyperberetæus, in the year 126 B.C. In order, therefore, to reduce it to the common era, subtract 125; and when the date is B.C., subtract it from 126. Dates expressed according to this era occur only on a few medals, and in the acts of certain councils.

Cæsarean Era of Antioch.

This era was established to commemorate the victory obtained by Julius Cæsar on the plains of Pharsalia, on the 9th of August in the year 48 B.C., and the 706th of Rome. The Syrians computed it from their month Tishrin I.; but the Greeks threw it back to the month Gorpiæus of the preceding year. Hence there is a difference of eleven months between the epochs assumed by the Syrians and the Greeks. According to the computation of the Greeks, the 49th year of the Cæsarean era began in the autumn of the year preceding the commencement of the Christian era; and, according to the Syrians, the 49th year began in the autumn of the first year of the Incarnation. It is followed by Evagrius in his *Ecclesiastical History*.

Julian Era.

The Julian era commences with the 1st of January, forty-five years B.C. It was designed to commemorate the reformation of the Roman calendar by Julius Cæsar.

Era of Spain, or of the Cæsars.

The conquest of Spain by Augustus, which was completed in the thirty-ninth year B.C., gave rise to this era, which began with the first day of the following year, and was long used in Spain and Portugal, and generally in all the Roman provinces subdued by the Visigoths, both in Africa and the South of France. Several of the councils of Carthage, and also that of Arles, are dated according to this era. After the 9th century it became usual to join with it in public acts the year of the Incarnation. It was followed in Catalonia till the year 1180, in the kingdom of Aragon till 1350, in Valencia till 1358, and in Castile till 1382. In Portugal it is said to have been in use so late as the year 1415, or 1422, though it would seem that after the establishment of the Portuguese monarchy, no other era was used in the public acts of that country than that of the Incarnation. As the era of Spain commenced with the 1st of January, and the months and days of the year are those of the Julian calendar, any date is reduced to the common era by subtracting thirty-eight from the number of the year.

Era of Actium, and Era of Augustus.

This era was established to commemorate the battle of Actium, which was fought on the 3d of September, in the year 31 B.C., and in the 15th of the Julian era. By the Romans the era of Actium was considered as commencing on the 1st of January of the 16th of the Julian era, which is the 30th B.C. The Egyptians, who used this era till the time of Diocletian, dated its commencement from the beginning of their month Thoth, or the 29th of August; and the Eastern Greeks from the 2d of September. By the latter it was also called the era of Antioch, and it continued to be used till the 9th century. It must not be confounded with the Cæsarean era of Antioch, which began seventeen years earlier. Many of the medals struck by the city of Antioch in honor of Augustus are dated according to this era.

Besides the era of Actium, there was also an Augustan era, which commenced four years later, or 27 B.C., the year in which Augustus prevailed on the senate and people of Rome to decree him the title of Augustus, and to confirm him in the supreme power of the empire.

Era of Diocletian, or Era of Martyrs.

It has been already stated that the Alexandrians, at the accession of the Emperor Diocletian, made an alteration in their mundane era, by striking off ten years from their reckoning. At the same time they established a new era, which is still followed by the Abyssinians and Copts. It commences with the 29th of August (the first day of the Egyptian year) of the year 284 of our era, which was the first of the reign of Diocletian. The denomination of *Era of Martyrs*, subsequently given to it in commemoration of the persecution of the Christians, would seem to imply that its commencement ought to be referred to the year 303 of our era, for it was in that year that Diocletian issued his famous edict; but the practice of dating from the accession of Diocletian has prevailed. The ancient Egyptian year consisted of 365 days; but after the introduction of the Julian calendar, the astronomers of Alexandria adopted an intercalary year, and added six additional days instead of five to the end of the last month of every fourth year. The year thus became exactly similar to the Julian year. The Egyptian intercalary year, however, does not correspond to the Julian leap year, but is the year immediately preceding; and the intercalation takes place at the end of the year, or on the 29th of August. Hence the first three years of the Egyptian intercalary

period commence on the 29th of our August, and the fourth commences on the 30th of that month. Before the end of that year the Julian intercalation takes place, and the beginning of the following Egyptian year is restored to the 29th of August. Hence to reduce a date according to this era to our own reckoning, it is necessary, for common years, to add 283 years and 240 days; but if the date belongs to the first three months of the year following the intercalation, or, which is the same thing, if in the third year of the Julian cycle it falls between the 30th of August and the end of the year, we must add 283 years and 241 days. The Ethiopians do not reckon the years from the beginning of the era in a consecutive series, but employ a period of 532 years, after the expiration of which they again begin with 1. This is the Dionysian or Great Paschal Period, and is formed by the multiplication of the numbers 28 and 19, that is, of the solar and lunar cycles, into each other.

The following are the names of the Ethiopian or Abyssinian months, with the days on which they begin in the Julian calendar, or old style:—

Mascaram ..29th August.	Magabit.....25th February.
Tikmith.....28th September.	Miazia .....27th March.
Hadar.....28th October.	Gimbot.....26th April.
Tacsam.....27th November.	Sene .....26th May.
Tir.....27th December.	Hamle.....25th June.
Yacatit .....26th January.	Nahasse.....25th July.

The additional or epagomenal days begin on the 24th of August. In intercalary years the first seven months commence one day later. The Egyptian months, followed by the modern Copts, agree with the above in every respect excepting the names.

Indiction.

The cycle of Indiction, already explained at p. 595 of vol. iv., was very generally followed in the Roman empire for some centuries before the adoption of the Christian era. Three Indictions may be distinguished; but they differ only in regard to the commencement of the year.

1. The *Constantinopolitan Indiction*, like the Greek year, commenced with the month of September. This was followed in the Eastern empire, and in some instances also in France.

2. The *Imperial* or *Constantinian Indiction* is so called because its establishment is attributed to Constantine. This was also called the *Cæsarean Indiction*. It commences on the 24th of September. It is not unfrequently met with in the ancient chronicles of France and England.

3. The *Roman* or *Pontifical Indiction* began on the 25th of December or 1st of January, according as the Christian year was held to commence on the one or other of these days. It is often employed in papal bulls, especially after the time of Gregory VII., and traces of its use are found in early French authors.

Era of the Armenians.

The epoch of the Armenian era is that of the Council of Tiben, in which the Armenians consummated their schism from the Greek Church by condemning the acts of the Council of Chalcedon; and it corresponds to Tuesday, the 9th of July of the year 552 of the Incarnation. In their civil affairs the Armenians follow the ancient vague year of the Egyptians; but their ecclesiastical year, which begins on the 11th of August, is regulated in the same manner as the Julian year, every fourth year consisting of 366 days, so that Easter and the other festivals are retained at the same place in the seasons as well as in the civil year. The Armenians also make use of the mundane era of Constantinople, and sometimes conjoin both methods of computation in the same documents. In their correspondence and transactions with Europeans, they generally follow the era of the Incarnation, and adopt the Julian year.

To reduce the civil dates of the Armenians to the Christian era, proceed as follows. Since the epoch is the 9th of July, there were 176 days from the beginning of the Armenian era to the end of the year 552 of our era; and since 552 was a leap year, the year 553 began a Julian intercalary period. Multiply, therefore, the number of Armenian years elapsed by 365; add the number of days from the commencement of the current year to the given date; subtract 176 from the sum, and the remainder will be the number of days from the 1st of January, 553, to the given date. This number of days being reduced to Julian years, add the result to 552, and the sum gives the day in the Julian year, or old style.

In the ecclesiastical reckoning the year begins on the 11th of August. To reduce a date expressed in this reckoning to the Julian date, add 551 years, and the days elapsed from the 1st of January to the 10th of August, both inclusive, of the year 552,—that is to say (since 552 is a leap year), 223 days. In leap years, one day must be subtracted if the date falls between the 1st of March and 10th of August.

The following are the Armenian ecclesiastical months with their correspondence with those of the Julian calendar:

1. Navazardi begins	11th August.
2. Hori	10th September.
3. Sahomi	10th October.
4. Dre Thari	9th November.
5. Kagoths	9th December.
6. Aracz	8th January.
7. Malegi	7th February.
8. Arcki	9th March.
9. Angi	8th April.
10. Mariri	8th May.
11. Marcacz	7th June.
12. Herodiez	7th July.

To complete the year, five complementary days are added in common years, and six in leap years.

The Mahometan Era, or Era of the Hegira.

The era in use among the Turks, Arabs, and other Mahometan nations is that of the *Hegira* or *Hejra*, the flight of the prophet from Mecca to Medina, 622 A.D. Its commencement, however, does not, as is sometimes stated, coincide with the very day of the flight, but precedes it by sixty-eight days. The prophet, after leaving Mecca, to escape the pursuit of his enemies, the Koreishites, hid himself with his friend Abubekr in a cave near Mecca, and there lay for three days. The departure from the cave and setting out on the way to Medina is assigned to the ninth day of the third month, Rabia I.—corresponding to the 22d of September of the year 622 A.D. The era begins from the first day of the month of Moharram preceding the flight, or first day of that Arabian year, which coincides with Friday, July 16, 622 A.D. It is necessary to remember that by astronomers and by some historians the era is assigned to the preceding day, July 15. It is stated by D'Herbelot that the era of the Hegira was instituted by Omar, the second caliph, in imitation of the Christian era of the martyrs. (For details of the Mahometan year, names and length of months, and for the method of reduction of Mahometan dates to Christian, see vol. iv. pp. 602–604).

Era of Yezdegird, or Persian or Gelalæan Era.

This era commences with the elevation of Yezdegird III. to the throne of Persia, on the 16th of June, in the year of our era 632. Till the year 1079 the Persian year resembled that of the ancient Egyptians, consisting of 365 days without intercalation; but at that time the Persian calendar was reformed by Gelal-ed-din Malek Shah, sultan of Khorassan, and a method of intercalation adopted which, though less convenient, is considerably more accurate than the Julian. The intercalary period is 33 years,—one day being added to the common year seven times successively at the end of four years, and the eighth intercalation being deferred till the end of the fifth year (see vol. iv. p. 592). This era was at one period universally adopted in Persia, and it still continues to be followed by the Parsees of India. The months consist of thirty days each, and each day is distinguished by a different name. According to Alfergani, the names of the Persian months are as follows:—

Afrudin-meh.	Merded-meh.	Adar-meh.
Ardisascht-meh.	Schaharir-meh.	Di-meh.
Cardi-meh.	Mahar-meh.	Behen-meh.
Tir-meh.	Aben-meh.	Affirer-meh.

The five additional days (in intercalary years six) are named *Musteraca*.

As it does not appear that the above-mentioned rule of intercalation was ever regularly followed, it is impossible to assign exactly the days on which the different years begin. In some provinces of India the Parsees begin the year with September, in others they begin it with October. We have stated that the era began with the 16th June, 632. But the vague year, which was followed till 1079, anticipated the Julian year by one day every four years. In 447 years the anticipation would amount to about 112 days, and the beginning of the year would in consequence be thrown back to near the beginning of the Julian year 632. To the year of the Persian era, therefore, add 631, and the sum will be the year of our era in which the Persian year begins.

Chinese Chronology.

From the time of the Emperor Yaou, upwards of 2000 years B.C., the Chinese had two different years,—a civil year, which was regulated by the moon, and an astronomical year, which was solar. The civil year consisted in general of twelve months of lunations, but occasionally a thirteenth was added, in order to preserve its correspondence with the solar year. Even at that early period the solar or astronomical year consisted of 365¼ days, like our Julian year; and it was arranged in the same manner, a day being intercalated every fourth year.

According to the missionary Gaubil, the Chinese divided the day into 100 *ke*, each *ke* into 100 minutes, and each minute into 100 seconds. This practice continued to prevail till the 17th century, when, at the instance of the Jesuit Schall, president of the tribunal of mathematics, they adopted the European method of dividing the day into twenty-four hours, each hour into sixty minutes, and each minute into sixty seconds. The civil day commences at midnight and ends at the midnight following.

Since the accession of the emperors of the Han dynasty, 206 B.C., the civil year of the Chinese has begun with the first day of that moon in the course of which the sun enters into the sign of the zodiac which corresponds with our sign Pisces. From the same period also, they have employed, in the adjustment of their solar and lunar years, a period of nineteen years, twelve of which are common, containing twelve lunations each, and the remaining seven intercalary, containing thirteen lunations. It is not, however, precisely known how they distributed their months of thirty and twenty-nine days, or, as they termed them, great and small moons. This, with other matters appertaining to the calendar, was probably left to be regulated from time to time by the mathematical tribunal.

The Chinese divide the time of a complete revolution of the sun with regard to the solstitial points into twelve equal portions, each corresponding to thirty days, ten hours, thirty minutes. Each of these periods, which is denominated a *tsëë*, is subdivided into two equal portions called *chung-ki* and *tsie-ki*, the *chung-ki* denoting the first half of the *tsëë*, and the *tsic-ki* the latter half. Though the *tsëë* are thus strictly portions of solar time, yet, what is remarkable, though not peculiar to China, they give their name to the lunar months, each month or lunation having the name of the *chung-ki* or sign at which the sun arrives during that month. As the *tsëë* is longer than a synodic revolution of the moon, the sun cannot arrive twice at a *chung-ki* during the same lunation; and as there are only twelve *tsëë*, the year can contain only twelve months having different names. It must happen sometimes that in the course of a lunation the sun enters into no new sign; in this case the month is intercalary, and is called by the same name as the preceding month.

For chronological purposes, the Chinese, in common with some other nations of the east of Asia, employ cycles of sixty, by means of which they reckon their days, moons, and years. The days are distributed in the calendar into cycles of sixty, in the same manner as ours are distributed into weeks, or cycles of seven. Each day of the cycle has a particular name, and as it is a usual practice, in mentioning dates, to give the name of the day along with that of the moon and the year, this arrangement affords great facilities in verifying the epochs of Chinese chronology. The order of the days in the cycle is never interrupted by any intercalation that may be necessary for adjusting the months or years. The moons of the civil year are also distinguished by their place in the cycle of sixty; and as the intercalary moons are not reckoned, for the reason before stated, namely, that during one of these lunations the sun enters into no new sign, there are only twelve regular moons in a year, so that the cycle is renewed every five years. Thus the first moon of the year 1873 being the first of a new cycle, the first moon of every sixth year, reckoned backwards or forwards from that date, as 1868, 1863, &c., or 1877, 1882, &c., will also commence a new lunar cycle of sixty moons. In regard to the years, the arrangement is exactly the same. Each has a distinct number or name which marks its place in the cycle, and as this is generally given in referring to dates, along with the other chronological characters of the year, the ambiguity which arises from following a fluctuating or uncertain epoch is entirely obviated. The present cycle began in the year 1864 of our era; the year 1876 is consequently the 13th of the current cycle.

The cycle of sixty is formed of two subordinate cycles or series of characters, one of ten and the other of twelve, which are joined together so as to afford sixty different combinations. The names of the characters in the cycle of ten, which are called *celestial* signs, are—

1. Keă; 2. Yĭh; 3. Ping; 4. Ting; 5. Woo; 6. Ke; 7. Kăng; 8. Sin; 9. Jin; 10. Kwei;

and in the series of 12, denominated *terrestrial* signs,

1. Tsze; 2. Chow; 3. Yin; 4. Maou; 5. Shin; 6. Sze; 7. Woo; 8. We; 9. Shin; 10. Yew; 11. Seŭh; 12. Hae.

The name of the first year, or of the first day, in the sexagenary cycle is formed by combining the first words in each of the above series; the second is formed by combining the second of each series, and so on to the tenth. For the next year the first word of the first series is combined with the eleventh of the second, then the second of the first series with the twelfth of the second, after this the third of the first series with the first of the second, and so on till the sixtieth combination, when the last of the first series concurs with the last of the second. Thus Keă-tsze is the name of the first year, Yĭh-Chow that of the second, Keă-seuh that of the eleventh, Yĭh-hae that of the twelfth, Ping-tsze that of the thirteenth, and so on. The order of proceeding is obvious.

In the Chinese history translated into the Tatar dialect by order of the emperor Kang-he, who died in 1721, the characters of the cycle begin to appear at the year 2357 B.C. From this it has been inferred that the Chinese empire was established previous to that epoch; but it is obviously so easy to extend the cycles backwards indefinitely that the inference can have very little weight. The characters given to that year 2357 B.C. are Keă-shin, which denote the 41st of the cycle. We must, therefore, suppose the cycle to have begun 2397 B.C., or forty years before the reign of Yaou. This is the epoch assumed by the authors of *L'Art de Vérifier les Dates*. The mathematical tribunal has, however, from time immemorial counted the first year of the first cycle from the eighty-first of Yaou, that is to say, from the year 2277 B.C.

Since the year 163 B.C. the Chinese writers have adopted the practice of dating the year from the accession of the reigning emperor. An emperor, on succeeding to the throne, gives a name to the years of his reign. He ordains, for example, that they shall be called Ta-te. In consequence of this edict, the following year is called the first of Ta-te, and the succeeding years the second, third, fourth, &c., of Ta-te, and so on, till it pleases the same emperor or his successor to ordain that the years shall be called by some other appellation. The periods thus formed are called by the Chinese Nien-hao. According to this method of dating the years a new era commences with every reign; and the year corresponding to a Chinese date can only be found when we have before us a catalogue of the Nien-hao, with their relation to the years of our era.

The Chinese chronology is discussed with ample detail by Freret, in the *Memoirs of the Academy of Inscriptions*, tom. xviii.; and an abridgment of his memoir is given in *L'Art de Vérifier les Dates* (tom. ii. p. 284, *et seq.*; ed. in 4to, 1818), from which the preceding account is principally taken.

Indian Chronology.

The method of dividing and reckoning time followed by the various nations of India resembles in its general features that of the Chinese, but is rendered still more complex by the intermixture of Mahometan with Hindu cus-

toms. Like the Chinese, the Hindus have a solar year, which is generally followed in the transaction of public business, especially since the introduction of European power; and they have also a lunar year, which regulates their religious festivals, and which they follow in their domestic arrangements. Their solar year, or rather sidereal year, is measured by the time in which the sun returns to the same star, and is consequently longer than our astronomical year, by the whole quantity of the precession of the equinoxes. It is reckoned by the Hindus at 365 days, 6 hours, 12 minutes, 30 seconds, and consequently exceeds a Gregorian year by one day in sixty years. The Indian zodiac is divided into twelve solar and twenty-eight lunar signs; and the year begins with the sun's arrival at the first degree of the first sign. The month is the time the sun takes to pass through one sign; and as each sign contains the same number of degrees, the months vary somewhat in length, according as the sun is nearer the apogee or the perigee. The longest month may contain 31 days, 14 hours, 39 minutes, and the shortest only 29 days, 8 hours, 21 minutes. The civil months, however, depend solely on the moon; though, with the same perversion of ingenuity which we have already remarked with regard to the Chinese, and of which it would be difficult to find an example except in the east of Asia, they derive their names from the solar signs of the zodiac. The first civil month commences with the day after the full moon of that lunation in the course of which the sun enters the first Hindu sign, and so on with the others. When the sun enters into no new sign during the course of a lunation, the month is intercalary, and is called by the name of that which precedes or follows it, which some prefix to distinguish it from the regular month. In some provinces of India, as in Bengal, the civil month commences with the day after the new moon; but in the upper or northern provinces, it begins, as we have stated, with the day after the full moon. From the manner in which they are reckoned, it is evident that the Hindu months, both solar and lunar, neither consist of an entire number of days, nor are regulated by any cycle, but depend solely on the motion of the sun and moon. The time of their commencement is different on every different meridian; and a Hindu has no means of knowing beforehand on what day any month begins, excepting by consulting his almanac. The civil day in all parts of India begins at sunrise.

The Hindu eras have been the subject of much controversy. According to the dreams of Indian mythology, the duration of the world is limited to four *yugs* or ages, three of which have already passed, and the fourth, which is the *kali-yug*, is the last and most deteriorated. It is this only which has any reference to authentic chronology. It forms the principal era of India, and comprehends several others in common use, as the era of Vicramaditya, the era of Salivahana, the Bengalee era, and the cycle of sixty years.

The *Kali-yug* commenced in the year 3101 B.C. The year is sidereal, and begins when the sun enters the first sign of the Hindu zodiac, which at present happens about the 11th of April. Owing to the precession of the equinoxes the beginning of the year advances in the seasons at the rate of about one day in sixty years.

The *Era of Vicramaditya* is reckoned from the year 57 B.C., which corresponds to 3044 of the Kali-yug. This era, the years of which are called *Samvat*, prevails chiefly in the higher or northern provinces of India, and in Guzerat. Its name is derived from that of a sovereign of Malwa, who, by defeating Saka, king of Delhi, acquired possession of the principal throne of India. Whether the year from which it was reckoned was that of the accession or death of this prince is uncertain. The years are reckoned in the same manner as those of the Kali-yug; and it may be remarked of the Indian eras in general that, though some of them profess to be counted from the deaths of their kings, or other historical events, they all commence at the time the sun reaches the same point in his annual course through the zodiac.

The *Era of Salivahana* is the year 78 A.D., which corresponds to 3179 of the Kali-yug, and 135 of the Vicramaditya. The name is derived from Salivahan, who is said to have reigned many years over the kingdom of Narsinga, and to have been a liberal encourager of the arts and sciences. It is generally used in records or writings of importance, but is most prevalent in the southern provinces of Hindustan. The years are called *Saka*.

The *Fuslee Era*, from the near coincidence of its dates with those of the Hegira, seems to have been imposed on the natives of India by their Mahometan conquerors. It is principally used in revenue transactions, and is pretty generally known over India. There are several eras of this name; but the most common is that which is reckoned from the year 590 A.D. At Madras the commencement of the Fuslee year is fixed on the 12th of July. In Bengal it begins in September, or with the full moon preceding the autumnal equinox.

The *Bengalee Era* is also supposed to be derived from the Hegira; but the year is measured by solar time, and therefore differs entirely from the Mahometan year, which is purely lunar. At the present time the Bengalee epoch is about nine years later than the Hegira,—the year 1245 of the Hegira having commenced in July, 1829, and the Bengalee year 1236 in April, 1829. The sidereal year exceeds the lunar year by 10 days 21½ hours nearly; consequently, by reckoning backwards, it will be found that the dates of the Bengalee era and of the Hegira coincided about the middle of the 16th century. History is silent on the subject; but it seems probable that though the epoch of the Hegira was partially adopted in India, the Hindus pertinaciously resisted all attempts to disturb their ancient methods of reckoning the subdivisions of the year.

Besides the Indian eras here enumerated, there are some others which are less generally known, or which are followed only in particular provinces. The cycle of sixty years is also sometimes used, particularly in connection with the era of Vicramaditya. According to the Bengal account, the first cycle began 3185 years B.C.; and the year 1876 of our era is consequently the twenty-first of the eighty-fifth cycle. In the Telinga account the first cycle began 3114 B.C.; and the year 1876 is the tenth of the eighty-fourth cycle.

Fuller information regarding Indian chronology will be found in Prinsep's *Essays on Indian Antiquities* (1858), vol. ii., Warren's *Kala Sankalita* (1825), and Burnett's *Elements of South Indian Palæography* (1874).

Principal Works on Chronology.

To meet the wants of those who may desire to enter more fully into chronological studies, we subjoin a list of the leading works on the subject. In addition to the early Greek writings already named, there are the forty books (some fifteen only extant in their entirety) of universal history compiled (about 8 B.C.) by Diodorus Siculus, and arranged in the form of annals; the *Pentabiblos* of Julius Africanus (about 220–230 A.D.); the treatise of Censorinus entitled *De die natali*, written 238 A.D.; the *Chronicon*, in two books, of Eusebius Pamphili, bishop of Cæsarea (about 325 A.D.), distinguished as the first book of a purely chronological character which has come down to us; and three important works forming parts of the *Corpus Scriptorum Historiæ Byzantinæ*, namely, the *Chronographia* of Georgius Syncellus (800 A.D.), the *Chronographia* of Johannes Malalas (9th century), and the *Chronicon Paschale*.

Among the very numerous modern works on Chronology, the most important are the following, which are arranged in the order of their publication:—

1583. *De Emendatione Temporum*, by Joseph Scaliger, in which were laid the foundations of modern chronological science.

1603. *Opus Chronologicum*, by Sethus Calvisius.

1627. *De Doctrina Temporum*, by Petavius (Denis Petau), with its continuation published in 1630, and an abridgment entitled *Rationarium Temporum*, in 1633–1634.

1650. *Annales Veteris et Novi Testamenti*, by Archbishop Ussher, whose dates have by some means gained a place in the authorized version of the Bible.

1651. *Regia Epitome Historiæ Sacræ et Profanæ*, by Philippe Labbe, of which a French version was also published.

1669. *Institutionum Chronologicarum libri duo*, by Bishop Beveridge.

1672. *Chronicus Canon Ægyptiacus, Ebraicus, et Græcus*, by Sir John Marsham.

1687. *L'Antiquité des Temps rétablie et défendue*, by Paul Pezron, with its *Défense*, 1691.

1701. *De Veteribus Græcorum Romanorumque Cyclis*, by Henry Dodwell.

1728. *The Chronology of Ancient Kingdoms amended*, by Sir Isaac Newton, remarkable as an attempt to construct a system on new bases, independent of the Greek chronologers.

1738. *Chronologie de l'histoire sainte*, by Alphonso des Vignolles.

1744. *Tablettes chronologiques de l'histoire universelle*, by N. Lenglet-Dufresnoy.

1750. The first edition in one vol. 4to of *L'Art de Vérifier les Dates*, which in its third edition (1818–1831) appeared in 38 vols. 8vo, a colossal monument of the learning and labors of various members of the Benedictine Congregation of Saint-Maur.

1752. *Chronological Antiquities*, by John Jackson.

1754. *Chronology and History of the World*, by John Blair; new edition, much enlarged, 1857.

1784. *A System of Chronology*, by Playfair.

1799. *Handbuch der Geschichte der Staaten des Alterthums*, by A. H. L. Heeren.

1803. *Handbuch der alten Geschichte, Geographie, und Chronologie*, by G. G. Bredow, with his *Historische Tabellen*.

1809–1814. *New Analysis of Chronology*, by William Hales.

1819. *Annales Veterum Regnorum*, by C. G. Zumpt.

1821. *Tableaux historiques, chronologiques, et géographiques*, by Buret de Longchamps.

1824–1834. *Fasti Hellenici*, and 1845–1850, *Fasti Romani*, by H. Fynes Clinton. Epitomes of these elaborate works were published, 1851–1853.

1825–1826. *Handbuch der mathematischen und technischen Chronologie*, by Christian Ludwig Ideler; and his *Lehrbuch der Chronologie*, 1831.

1833. *The Chronology of History*, by Sir Harris Nicolas.

1852. *Fasti Temporis Catholici*, by Edward Greswell; and by the same author, 1854, *Origines Kalendariæ Italicæ*; and 1862, *Origines Kalendariæ Hellenicæ*.

1865. *Fasti Sacri*, a key to the chronology of the New Testament, by Thomas Lewin.

1869. *Manual of Ancient History*, by G. Rawlinson.

1872. *Encyclopædia of Chronology*, by B. B. Woodward and W. L. R. Cates.

1875. *Handbook of Rules and Tables for verifying dates with the Christian Era*, by E. A. Bond.

1875. *The Assyrian Eponym Canon*, by George Smith.

Chronological Table

Of the principal events of political and military history, with notices of great men and famous books, and of the most important inventions and discoveries, from the earliest times to the close of the year 1875.

Chronological tables, however unattractive to minds whose inclinations or occupations do not lie in the direction of them, are of much value and real interest for those who have knowledge and occasion to make a right use of them. To the historical student they not only serve as a storehouse of individual facts with dates, but by the orderly juxtaposition and sequence of these they indicate relations. They are maps on which are delineated or suggested the lines of the main currents in the ocean of human history. When the student, engaged on any special series of events, desires to find their place and surroundings in world-history, he has but to turn to such tables, and a glance or two will inform him.

In the preparation of the subjoined table great pains have been taken to bring it as closely as possible into agreement with the results of recent historical and chronological determinations. Events and dates of purely legendary character, once accepted as historical facts with unquestioning acquiescence, have no place in it; and the whole has been subjected to a searching examination and comparison with the best sources of information. The conflict of the authorities makes absolute certainty in many cases unattainable. The reader will therefore remember, in using the table, that, as differences and authorities cannot be given, the dates are necessarily in some cases approximate or probable only.

2234 B.C. Alleged beginning of Chaldæan astronomical observations sent by Callisthenes to Aristotle; the earliest extant is of 720 B.C.

2200 (*circa*). The Hia dynasty in China founded.

2000 (*circa*). Cuneiform writing probably in use (deciphered by Grotefend, 1802 A.D.).

1582 B.C. Beginning of chronology of Arundelian (Parian) marbles. (Brought to England, 1627 A.D.)

1500 (*circa*). Date of the oldest papyri extant.

1273. Rise of Assyrian empire, according to Rawlinson.

1150 (*circa*). Cylinder inscription of Tiglath-Pileser, king of Assyria (deciphered, 1857 A.D.).

1100 (*circa*). The Chow dynasty in China founded.

1055. David king of Israel.

1012. Building of Solomon's Temple.

989–959. Capture of Jerusalem by Shishank (Shishak), king of Egypt in this period.

909. Commencement of Assyrian canon, which terminates 640 B.C. (Discovered and published by Rawlinson, 1862 A.D.)

900. Erection of North-West Palace of Nimroud, according to Layard.

884 (?). Legislation of Lycurgus at Sparta.

776. Olympiad of Corœbus. The first authentic date in Greek history.

770. Invasion of Palestine by Pul, king of Assyria.

753. Foundation of Rome, according to Varro.

747. Babylon independent under Nabonassar.

743–723. First Messenian war.

727. Religious reformation under Hezekiah, king of Judah.

721. Samaria taken by Sargon, king of Assyria. Overthrow of the kingdom of Israel. Captivity of the ten tribes.

711 (*circa*). Invasion of Judah by Sennacherib.

685–668. Second Messenian war, under Aristomenes.

684. Archonship at Athens made annual.

667–625. Reign of Assur-bani-pal, king of Assyria.

659. Foundation of Byzantium by Megarians.

640. Religious reformation under Josiah, king of Judah.

632. Invasion of Assyria by Scyths.

625 (606?). Fall of Nineveh. Babylon independent under Nabopolassar.

624. Legislation of Draco, archon at Athens.

610. Battle of Megiddo. Death of Josiah.

598. Siege and capture of Jerusalem by Nebuchadnezzar. Second captivity.

594. Legislation of Solon, archon at Athens.

588. The Pythian games begin to be celebrated every five years.

585. Death of Periander, tyrant of Corinth forty years. Eclipse of the sun, predicted by Thales (?).

579. Tyre taken by Nebuchadnezzar.

569. Nebuchadnezzar's conquest of Egypt.

560. Pisistratus tyrant of Athens (died, 527).

559. Anacreon begins to be known (still living in 529).

556. Birth of Simonides (died, 467).

554 (?). Conquest of Lydia and capture of Crœsus by Cyrus, king of Persia.

549. Death of Phalaris tyrant of Agrigentum.

540–510 (?). Pythagoras flourished.

538. Babylon taken by Cyrus. The Jews soon after return to Judea.

536. The Jews, under Zerubbabel, begin to rebuild the Temple.

535. Thespis first exhibits tragedy.

532. Polycrates tyrant of Samos (put to death, 522).

529. Death of Cyrus. Accession of Cambyses.

525. Battle of Pelusium. Conquest of Egypt by Cambyses. Birth of Æschylus (died, 456).

521–485. Reign of Darius Hystaspis, king of Persia. Inscription of Behistun (translated by Rawlinson, 1846 A.D.).

520. Decree of Darius for rebuilding the Temple at Jerusalem.

518. Birth of Pindar (died, 439).

510. The Pisistratidæ expelled from Athens. Democratic Government restored.

508. First treaty between Rome and Carthage.

507, 506. Conquest of Thrace, Pæonia, and Macedonia by Darius.

500. Burning of Sardis by the Ionians and Athenians.

497. Battle of Lake Regillus. First authentic date in Roman history.

495. Birth of Sophocles (died, 406).

492. First Persian expedition, under Mardonius, against Greece.

490. Second Persian expedition, under Datis and Artaphernes. Victory of Miltiades at Marathon.

485. Accession of Xerxes, king of Persia. Gelon, tyrant of Syracuse.

484. Recovery of Egypt by the Persians. Birth of Herodotus (died, after 409).

483. Ostracism of Aristides the Just by the Athenians.

481. Expedition of Xerxes to Greece.

480. Battle of Thermopylæ,—fall of Leonidas. Battle of Salamis,—victory of Themistocles. Occupation of Athens by Xerxes. First Carthaginian invasion of Sicily. Defeat of Carthaginians by Gelon at Himera. Birth of Euripides (died, 406).

480–450. Anaxagoras teaches philosophy at Athens.

479 B.C. Occupation of Athens by Mardonius. Battles of Platæa and Mycale. Siege of Sestos. Departure of Xerxes from Greece.
477. Beginning of Athenian supremacy.
471. Ostracism of Themistocles. Birth of Thucydides (died, after 403 ?).
470. Victory of Cimon over the Persians at the Eurymedon.
469. Pericles begins to take part in public affairs at Athens.
468. Birth of Socrates. Destruction of Mycenæ by the Argives.
466. Flight of Themistocles to Persia. Siege of Naxos. Battles at the Eurymedon.
465. Death of Xerxes.
464. Revolt of the Helots at Sparta. Third (fourth?) Messenian war, which lasts ten years.
460. Revolt of Egypt (suppressed, 455). Births of Democritus and Hippocrates (both died, 357).
459. Gorgias flourished.
458. Birth of Lysias the orator (died, 378).
457. Battles of Tanagra. Return of the Jews under Ezra.
456. The long walls of Athens completed.
451. The first Decemvirate at Rome. Laws of the Twelve Tables.
448. Tyranny of the second Decemvirate. Secession of the Plebs. Abdication of the Decemvirs. Cirrhæan (first Sacred) war about the temple of Delphi.
447. Battle of Coronea.
445. Thirty years' truce between Athens and Sparta concluded.
444. Pericles becomes supreme at Athens. Birth of Xenophon about this time (died, 359).
443–438. The Parthenon at Athens built by Phidias.
442. New constitution at Rome,—censors and military tribunes appointed instead of consuls.
440–439. Siege and reduction of Samos by Pericles.
436. Birth of Isocrates (died, 338).
431. Peloponnesian war began; lasting twenty-seven years. Potidæa besieged by Athenians (reduced, 429). Death of Pericles. Influence of Cleon. Birth of Plato (died, 347).
430. The Plague at Athens.
428. Revolt of Mytilene.
427. Reduction of Mytilene. First Athenian expedition to Sicily. First comedy of Aristophanes exhibited. Siege of Platæa.
423. Alcibiades begins to act in public affairs.
418. Battle of Mantinea.
415. Expedition to Sicily under Nicias:—Siege of Syracuse, 414; surrender of Nicias, 413.
412. First treaties between Sparta and Persia. Constitution of the Four Hundred at Athens. Intrigues of Alcibiades with the Persians.
409. Second invasion of Sicily by the Carthaginians.
407. Foundation of Rhodes.
406. Battle of Arginusæ. Condemnation of the ten generals. Dionysius, tyrant of Syracuse; reigns thirty-eight years.
405. Battle of Ægospotami.
404. Athens taken by Lysander. End of Peloponnesian war. Government of the Thirty Tyrants. Spartan supremacy. Death of Alcibiades.
403. Restoration of democratic government at Athens by Thrasybulus.
402. Birth of Phocion (died, 317).
401. Expedition of Cyrus the younger. Battle of Cunaxa. Death of Cyrus. Retreat of the ten thousand Greeks.
401–384. Ctesias flourished.
399. Prosecution and death of Socrates.
398. Campaign and peace of Dercyllidas.
396. First campaign of Agesilaus in Asia.
394. Corinthian war begins.
393. The long walls of Athens restored.
392. Veii stormed by Camillus.
389 (*circa*). Birth of Æschines (died, 314).
387. Peace of Antalcidas. Greek cities in Asia subjected to Persia. End of Corinthian war. Rome burnt by the Gauls.
384. Birth of Aristotle (died, 322).
382. Seizure of the Cadmea at Thebes by Phœbidas. Olynthian war (ends, 379). Birth of Demosthenes (died, 322).
380 (*circa*). Death of Aristophanes.
379. Recovery of the Cadmea by Pelopidas.
376. Victory of Chabrias over the Spartans in sea-fight off Naxos.
372. Peace between Athens and Sparta.
371. Victory of Epaminondas over the Spartans at Leuctra. Foundation of Megalopolis.
370. Jason of Pheræ assassinated.
367. Embassy of Pelopidas to Persia. Aristotle goes to Athens, and remains with Plato twenty years.
364. Licinian laws passed at Rome. Institution of prætorship and curule ædileship. Plebeian consul elected, 363.
362. Battle of Mantinea,—victory and death of Epaminondas.
359. Philip, king of Macedonia.
358 B.C. Beginning of Social war. Sieges of Chios and Byzantium. Amphipolis taken by Philip.
357. Phocian (or Sacred) war begins. Delphi seized by Phocians. Expedition of Dion to Sicily.
356. Birth of Alexander the Great. Temple of Ephesus burnt. Expulsion of Dionysius from Syracuse by Dion.
355. End of Social war. Independence of Rhodes, Cos, Chios, and Byzantium acknowledged by Athens.
352. Demosthenes delivers his first *Philippic*.
349–347. Olynthian war. Olynthus taken by Philip.
346. Surrender of Phocis to Philip. End of the Sacred war. Philip admitted to Amphictyonic Council. Dionysius recovers the tyranny.
343. Conquest of Syracuse by Timoleon. Expulsion of Dionysius. Embassy of Demosthenes with others to Philip.
342–341. Philip's expedition to Thrace.
341. Birth of Epicurus (died, 270).
340. First Samnite war begins. Perinthus and Byzantium besieged by Philip. Victory of Timoleon over the Carthaginians at the Crimisus.
338. Philip, general of the Amphictyonic League. Battle of Chæronea. Greece subjugated.
337–335. The Latin war. Supremacy of Rome over Latium.
336. Murder of Philip. Accession of Alexander. Accession of Darius Codomannus.
335. Alexander destroys Thebes; is chosen generalissimo of the Greeks.
334. Battle of the Granicus.
333. Battle of Issus.
332. Siege and capture of Tyre. Conquest of Egypt. Foundation of Alexandria.
331. Battle of Arbela. Subjugation of Persia.
330. Murder of Darius.
327–325. Campaigns of Alexander in India. Voyage of Nearchus from the Indus to the Euphrates.
323. Death of Alexander at Babylon. Second Samnite war; lasts twenty-one years.
321. First war among the "successors of Alexander." The Romans surrender to the Samnites and pass under the yoke at the Caudine Forks.
315. Thebes rebuilt by Cassander.
313. Samnite victory at Lautulæ.
312. Battle of Gaza. Victory of Ptolemy and Seleucus over Demetrius Poliorcetes. Pyrrhus, king of Epirus. The Appian way and aqueducts constructed (?).
304. Siege of Rhodes by Demetrius.
301. Battle of Ipsus. Final division of Alexander's dominions.
300 (*circa*). Chandragupta (Sandracottus) reigns in India; he makes a treaty with Seleucus. Foundation of Antioch by Seleucus.
299. Athens besieged and taken by Demetrius.
298–290. Third Samnite war.
295. Battle of Sentinum.
287. Birth of Archimedes (died, 212).
286. The Hortensian law passed at Rome; *plebiscita* declared binding on the whole people.
284 (*circa*). Alexandrian library founded by Ptolemy Soter.
280. Achæan League established. Invasion of Italy by Pyrrhus. Birth of Chrysippus (died, 207).
279. Irruption of the Gauls into Greece. First plebeian censor at Rome.
274. Battle of Beneventum. Pyrrhus defeated,—leaves Italy.
269. Silver money first coined at Rome.
268. Berosus flourished.
265. Rome supreme over all Italy.
264. First Punic war begins. Chronology of Parian marbles ends.
260. First Roman fleet launched. Victory of Duilius off Mylæ.
260–230 (*circa*). Reign of Asoka in India.
256. Victory of Regulus at Ecnomus. Invasion of Africa.
255. Defeat and capture of Regulus by Carthaginians. Evacuation of Africa.
250 (*circa*). Parthia becomes an independent kingdom under Arsaces.
247. The Thsin dynasty in China founded.
241. Defeat of Carthaginians by Catulus at the Ægates Insulæ. End of the first Punic war. Attalus, king of Pergamus.
240. The plays of Livius Andronicus exhibited (the first) at Rome.
238. Date of the Decree of Canopus: tablet of San (discovered by Lepsius, 1866 A.D.).
237. Conquest of Spain attempted by the Carthaginians. Seizure of Sardinia and Corsica by the Romans.
235. The gate of Janus shut.
234. Birth of Cato Major (died, 149).

227 B.C. Cleomenic war begins.
226. Reforms of Cleomenes at Sparta.
225–220. The Gauls driven from Cisalpine Gaul.
219. Siege of Saguntum by Hannibal. Beginning of second Punic war.
218. March of Hannibal from Spain into Italy. Passage of the Pyrenees and the Alps. Battles of the Ticinus and the Trebia.
217. Hannibal's passage of the Apennines. Battle of Lake Trasimenus. The two Scipios sent to Spain.
216. Battle of Cannæ. Alliance of Hannibal with Philip II. of Macedonia.
214–212. Siege and capture of Syracuse by Marcellus.
211. Defeat and death of the two Scipios in Spain. Capua recovered by Rome. Conquest of Judea by Antiochus.
211–205. First Macedonian war.
207. Battle of the Metaurus; Hasdrubal defeated and slain by the Romans. First gold coinage at Rome.
204. Scipio conducts the war in Africa. Siege of Utica.
202. Defeat of Hannibal at Zama.
201. Treaty of peace; end of second Punic war.
200–197. Second Macedonian war.
198. Flamininus proclaims liberty to the Greeks.
197. Battle of Cynoscephelæ. Philip defeated by Flamininus.
192. Philopœmen prætor of the Achæan League.
192–190. War between the Romans and Antiochus the Great. Battle of Magnesia.
188. The laws and discipline of Lycurgus abolished by Philopœmen.
184. Death of Plautus.
179. Perseus king of Macedonia.
172–168. Third Macedonian war:—battle of Pydna, victory of Æmilius Paulus over Perseus; Macedonia made a Roman province, 142.
168. Jerusalem taken by Antiochus Epiphanes.
167. Revolt of Judas Maccabæus. His occupation of Jerusalem (except the citadel), 165.
166. First comedy of Terence performed at Rome.
160–145. Hipparchus flourishes.
159. Death of Terence.
149. Third Punic war begins.
149–133. Lusitanian war,—Viriathus commands the Lusitanians; fall of Numantia, 133.
146. Rome declares war against the Achæan League. Carthage taken and destroyed by Scipio, Corinth by Mummius. Province of Africa constituted.
138. Birth of Sulla (died, 78).
134–132. Servile war in Sicily.
133. Laws of Tiberius Gracchus passed at Rome. Gracchus murdered. Kingdom of Pergamus bequeathed to Rome.
121. Reforms of Caius Gracchus. Gracchus murdered.
116. Birth of Varro (died, 28).
113. The Cimbri and Teutones invade Gaul.
111–106. Jugurthine war, conducted by Metellus and Marius.
109–101. War of Rome with the Cimbri and Teutones.
106. Birth of Pompey and of Cicero.
102. Victory of Marius over the Teutones at Aquæ Sextiæ (Aix).
101. Victory of Marius over the Cimbri at Vercellæ. End of the war.
100. Birth of C. Julius Cæsar.
95. Birth of Lucretius (died, 55).
90–88. The Social (Italian) war.
88. First Mithridatic war. Civil war of Marius and Sulla. Sulla occupies Rome. 87. Marius retakes Rome. Proscription.
86. Death of Marius. Athens stormed by Sulla. Birth of Sallust (died, 34).
84. Sulla makes peace with Mithridates.
83. War with Marian party in Italy.
82. Victory at the Colline Gate. Occupation of Rome. Dictatorship. Proscription.
79. Retirement of Sulla (dies, 78).
79–72. Civil war of Sertorius in Spain; and of Lepidus and Catulus in Italy.
74–65. Third Mithridatic war:—73–72. Victories of Lucullus.
73–71. Servile war in Italy. Spartacus defeated by Crassus.
70. Consulship of Pompey and Crassus. Birth of Virgil (died, 19).
69. Victory of Lucullus over Tigranes.
67. First appearance of Cæsar. Pompey reduces the pirates.
66. Lucullus recalled. Pompey sent into Asia; ends the war.
64. Pompey reduces Syria to a province:—Jerusalem taken, 63.
63. Birth of Augustus. Second conspiracy of Catiline. Orations of Cicero.
60. Pompey, Cæsar, and Crassus form the first Triumvirate.
59. Birth of Livy (died, 17 A.D.).
58. The Gallic war begins.
55, 54. Cæsar invades Britain. Crassus in the east; defeated and killed by the Parthians, 53.
52–51 B.C. Cæsar's war with Vercingetorix. Murder of Claudius by Milo.
51. Subjugation of Gaul completed.
49. Civil war between Cæsar and Pompey. Pompey driven from Italy. The Pompeians defeated in Spain. Cæsar dictator.
48. Battle of Pharsalia. Murder of Pompey in Egypt. Cæsar and Cleopatra.
47. Cæsar dictator again. War in Egypt. Partial destruction of the Alexandrian library. Cæsar defeats Pharnaces at Zela (*Veni, vidi, vici*).
46. African war. Battle of Thapsus. Death of Cato. Reformation of the calendar by Cæsar. His triumphs.
45. War in Spain. Battle of Munda;—defeat of the Pompeians. Cæsar *Pater Patriæ, Imperator* for life, Dictator.
44. Assassination of Cæsar. Flight of Brutus and Cassius. Antony master of Rome. Corinth and Carthage rebuilt.
43. Battle of Mutina. Second triumvirate—C. Octavius, M. Antony, M. Lepidus. Cicero put to death. Birth of Ovid (died, 18 A.D.).
42. Battles of Philippi. Death of Brutus and Cassius. The triumviri masters of the Roman world.
41. Meeting of Antony and Cleopatra at Tarsus.
40. Herod made king of the Jews.
36. Sextus Pompeius driven from Sicily (put to death, 35). Lepidus deprived of power.
32. War between Octavius and Antony.
31. Battle of Actium. Establishment of the Roman empire.
30. Deaths of Antony and Cleopatra.
29. The Gate of Janus shut.
27. Cæsar is made emperor for ten years and receives the title Augustus.
25. The Gate of Janus shut.
18. Imperial dignity reconferred; again, 8 B.C., 3 and 12 A.D.
17–7. Temple at Jerusalem rebuilt by Herod.
15. Victories of Drusus over the Rhæti.
12. Invasion of Germany by Drusus.
11–9. Campaigns of Tiberius in Pannonia and Dalmatia.
4. Birth of Christ, according to Ussher's system. Death of Herod.

4–6 A.D. Campaigns of Tiberius in Germany.
9. Destruction of Varus and three legions by Germans under Hermann (Arminius).
14. Death of Augustus. Accession of Tiberius.
14–16. Campaigns of Germanicus in Germany.
23. Influence of Sejanus.
25 or 26. Pontius Pilate, governor of Judea.
27. Tiberius retires to Capræ.
33. The crucifixion, according to Eusebius; 29, according to Lactantius, Augustine, Origen, and other authorities.
37. Accession of Caligula. Birth of Josephus.
41. Claudius emperor.
43. Expedition of Claudius to Britain. Successes of Aulus Plautius.
47. London founded by A. Plautius.
50. Defeat and capture of Caractacus. Taken prisoner to Rome.
54. Nero emperor.
61. Insurrection of the Britons under Boadicea. Victory of Suetonius Paulinus.
64. Rome on fire six days. Persecution of Christians.
65 (?). Deaths of St. Peter and St. Paul. Death of Seneca.
66. Jewish war begins, conducted by Vespasian.
68. Galba emperor.
69. Otho, Vitellius, Vespasian, emperors.
70. Fall of Jerusalem, taken by Titus.
71. The Gate of Janus closed. Triumph of Vespasian and Titus. The philosophers expelled from Rome between 71–75.
78. Agricola commands in Britain.
79. Titus emperor. Herculaneum and Pompeii destroyed by eruption of Vesuvius. Death of Pliny the Elder.
80. Advance of Agricola to the Tay.
81. Domitian emperor.
84. Agricola defeats the Caledonians, and sails round Britain.
86. Dacian war begins.
90. The philosophers again expelled from Rome.
95. Persecution of Christians. St. John banished to Patmos.
96. Nerva emperor.
98. Trajan. Plutarch flourishes.
103–107. Subjugation of Dacia, &c.
114–117. Trajan's expedition to the East.
117. Hadrian emperor. Conquests of Trajan abandoned. The Euphrates made the eastern frontier of the empire.
120. Hadrian visits Gaul and Britain. Hadrian's wall built, 121.
130. Birth of Galen (died, 200).
132–135. Second Jewish war,—Barchochebas leader of the Jews.
138. Antoninus Pius emperor. The empire at peace.
139. Conquests of Lollius Urbicus in Britain. Wall of Antoninus (Graham's Dyke) built.
161. Marcus Aurelius and Lucius Verus joint emperors.

163. Persecution of Christians.
166. Martyrdom of Polycarp.
167–178. War with the Marcomanni, Quadi, &c.
169. Death of Verus. M. Aurelius sole emperor.
180. Commodus.
183. Successes of Ulpius Marcellus in Britain. Commodus takes the name Britannicus, 184.
185. Birth of Origen (died, 253).
190–214. Tertullian flourished.
193. Pertinax emperor, murdered. Didius Julianus buys the empire. His rivals, Pescennius Niger and Septimius Severus.
194. Severus emperor alone.
196. Capture of Byzantium after three years' siege by Severus.
197. The Quartodeciman controversy.
198. Caracalla named *Augustus*.
202. Persecution of Christians.
208. Expedition of Severus to Britain:—invasion of Caledonia, 209; his wall completed, 210.
211. Death of Severus at York. Caracalla and Geta emperors. Geta murdered, 212.
214. First contact of the Romans with the Alamanni, German tribes on the upper Rhine.
217. Macrinus emperor. 218. Elagabalus emperor.
222. Alexander Severus emperor.
226. Dissolution of Parthian empire. Foundation of the new Persian monarchy (kingdom of the Sassanidæ) by Ardshir (Artaxerxes).
231. Persian war begins.
233. Triumph of Alexander Severus; murdered and succeeded by Maximin, 235.
236. Persecution of Christians.
238. The Gordiani, Pupienus and Balbinus (jointly), and Gordianus III. emperors.
242. Gordianus defeats Sapor, king of Persia.
244. Gordianus murdered and succeeded by Philip the Arabian.
249. Decius emperor. 250. His edict for persecution of Christians published. First invasion of the empire by the Goths. Death of Decius and his son in the campaign of 251.
251. Gallus emperor.
252. Pestilence begins, and lasts fifteen years.
253. Irruption of Goths and Burgundians into Mœsia and Pannonia. First appearance of the Franks in Gaul about this time.
254. Valerian emperor. His son Gallienus associated with him. Persecution of Christians.
258. Trapezus taken by Goths.
259. Sapor ravages Syria. Valerian taken prisoner.
260. Gallienus sole emperor. The Thirty Tyrants, between 260 and 268.
262. The Goths in Macedonia and Asia Minor. They destroy the temple of Ephesus. Antioch taken by Sapor.
263. The Franks invade Gaul.
267. The Heruli invade Greece, and are repulsed by Dexippus.
268. Claudius emperor. 269. He defeats the Goths in Mœsia.
270. Aurelian emperor. Victories over the Goths and the Alamanni.
272. Expedition of Aurelian to Palmyra.
273. Capture of Palmyra and of Queen Zenobia.
275. Tacitus emperor. 276. Probus emperor.
277. Probus drives the Alamanni from Gaul.
282. Carus emperor. Expedition to the East.
284. Diocletian emperor. 286. Maximian joint emperor with him. Revolt of Carausius in Britain.
289. Victory of Carausius over Maximian.
292. Constantius and Galerius named Cæsars. Division of the empire.
296. Britain recovered by Constantius.
297. Siege of Alexandria by Diocletian. Persian war.
298. Constantius defeats the Alamanni near Langres. Defeat of Narses.
303. Persecution of Christians by Diocletian.
305. Abdication of Diocletian and Maximian. Constantius and Galerius emperors. Beginning of monasticism in Egypt under St. Antony.
306. Death of Constantius at York. Proclamation of Constantine (the Great).
307. Revolt of Maxentius. Six emperors. Elevation of Licinius.
311. Edict of Nicomedia to stop the persecution.
312. Defeat and death of Maxentius.
313. Defeat and death of Maximian. Edict of Milan, by Constantine and Licinius, for general religious toleration.
314. War between the two emperors.
323. Constantine sole emperor.
324. Foundation of Constantinople; dedicated as capital of the empire, 330 (or 334).
325. First General Council of the Church meets at Nicæa.
326. Athanasius, patriarch of Alexandria. Controversy with Arius.
336. Death of Arius.
337. Constantine II., Constans, and Constantius II. joint-emperors. 338. Death of Eusebius.
347. Synod of Sardica.
348. Ulfilas bishop of the Goths (died, 388).
350–353. Revolt of Magentius. Defeated by Constantius.
357. Victory of Julian over the Alamanni at Argentoratum (Strasburg).
361. Julian emperor; his edict recalling the banished bishops and granting general toleration published, 362.
363. Persian war. Julian killed. Jovian emperor.
364. Valentinian and Valens joint emperors. Final division of the empire.
367–369. Theodosius in Britain; aids against Picts and Scots.
370. The Saxons land on coasts of Gaul.
373. Death of Athanasius.
375. War with the Quadi. Gratian emperor of the West, with Valentinian II. Invasion of the Huns.
376. Valens allows the Goths to settle in Thrace.
378. Constantinople threatened by Goths.
379. Theodosius the Great emperor of the East.
381. Second General Council, held at Constantinople. Pagan rites prohibited.
382. Alaric king of the Goths.
383. Revolt of Maximus in Britain.
390. Final suppression of Paganism. Massacre at Thessalonica. Death of Gregory of Nazianzus.
393. Honorius emperor of the West.
394. Theodosius master of the whole Roman world.
395. Death of Theodosius. Arcadius emperor of the East. The Huns invade the eastern provinces. Augustine made bishop of Hippo (died, 430). Alaric in Greece. Stilicho attains chief power under Honorius.
396. The Britons ask aid of Honorius against Picts and Scots.
397. Deaths of Martin of Tours and Ambrose of Milan.
398. Chrysostom bishop of Constantinople (died, 407).
400. Alaric ravages Italy.
403. Battle of Pollentia,—defeat of Alaric by Stilicho.
406. The Vandals, Alani, and Suevi invade Gaul.
408. Theodosius II. emperor of the East. Stilicho slain at Ravenna.
409. The Vandals, Alani, and Suevi invade Spain.
410. Sack of Rome by Alaric. Death of Alaric. Pelagius begins to preach about this time.
411. The Roman legions recalled from Britain; final withdrawal, about 418.
414. Marriage of Ataulphus, king of the Goths, to Placidia, daughter of Theodosius the Great. Persecution of Christians in Persia begins; lasts thirty years.
420. Death of St. Jerome.
423. Death of Honorius at Ravenna.
425. Administration of Aetius begins, lasting about thirty years.
428. Nestorius patriarch of Constantinople (banished, 435).
429. The Vandals under Genserie invade Africa. Death of Theodore bishop of Mopsuestia.
431. Third General Council held at Ephesus.
433. Attila king of the Huns.
438. Theodosian Code published.
439. The Vandals surprise Carthage.
440. Leo I. (the Great) bishop of Rome.
442. Treaty of peace between Valentinian and Genseric. Attila in Thrace and Macedonia.
446. Message of the Britons to Aetius for aid against the Saxons.
447. Attila ravages the Eastern empire. Theodosius concludes treaty with Attila.
449. The Robber-Council of Ephesus. Landing of the English in Britain.
450. Death of Theodosius II.
451. Invasion of Gaul by Attila. Victory of Aetius at Châlons. Fourth General Council held at Chalcedon. Monophysite controversy begins.
452. Invasion of Italy by Attila. Foundation of Venice.
453. Death of Attila. Dissolution of his empire.
455. Sack of Rome by Genseric. Intercession of Leo.
457. Hengist founds kingdom of Kent.
461–467. Rule of Ricimer. Severus nominal emperor.
462–472. Conquests of the Visigoths in Spain and Gaul.
465. Great fire at Constantinople.
475. Romulus Augustulus emperor of the West (banished, 476).
476. Odoacer, king of Italy. End of Western empire.
477. Death of Genseric. Landing of Ælla and South Saxons in Britain.
480. Earthquakes at Constantinople, lasted forty days.
482. Clovis, king of the Franks. The *Henoticon* of Zeno published.
486. Victory of Clovis over Syagrius at Soissons.
487. Theodoric, king of the Ostrogroths, threatens Constantinople.

489–493. Conquest of Italy by Theodoric.
491. Storming of Anderida by Ælla; kingdom of the South Saxons established.
493. Odoacer slain. Theodoric king of Italy.
495. Landing of Cerdic and West Saxons in Britain.
496. Victory of Clovis over Alamanni at Tolbaic. His baptism.
500. Missions of the Nestorians began early in this century.
502–505. Persian war. Siege and recovery of Armida.
507. Victory of Clovis over the Visigoths.
510. Paris made the seat of the Frankish monarchy.
511. Death of Clovis. Partition of his kingdom.
525. Boetius put to death by Theodoric.
525–526. Antioch destroyed by earthquake.
527. Justinian emperor. First edition of his Code published, 529.
528. The Benedictine Order founded.
529. Belisarius general of the Eastern armies; defeats the Persians at Dara. Edicts of Justinian against the philosophers, heretics, and pagans.
531. Chosroes king of Persia. Plague begins, which ravages the empire fifty years.
532. The Pandects promulgated by Justinian. Sedition (the *Nika*) at Constantinople, suppressed by Belisarius.
533–534. Belisarius conquers Gelimer; end of Vandal dominion in Africa.
535–540. The Gothic war.
536. Belisarius takes Rome.
537–538. Siege of Rome by Vitiges.
539. Destruction of Milan by the Goths. The Franks in Italy.
540. Ravenna taken by Belisarius. Antioch taken and plundered by Chosroes.
541. Totila king of the Ostrogoths. Abolition of the consulate by Justinian.
542. Earthquake and plague at Constantinople.
545. Rome besieged by Totila. Peace between Justinian and Chosroes.
546. Rome taken by Totila (recovered by Belisarius, 547). Controversy about the "Three Chapters" begins about this time.
547. Kingdom of Bernicia founded by Ida.
549. Rome again taken by Totila.
550. The empire invaded by Slaves and Huns.
551–2. Reform of the calendar by the Armenians; their era fixed. The silkworm introduced into Europe.
552. Death of Totila. Conquest of Rome by Narses.
553. Fifth General Council held at Constantinople. Defeat and death of Teias, last king of the Goths.
554. Defeat of the Franks and Alamanni by Narses.
556. Great earthquake at Constantinople.
558. Clotaire sole king of the Franks till his death in 561. Embassy of the Avars to Constantinople.
562. Peace for fifty years concluded between Justinian and Chosroes.
565. Deaths of Belisarius and Justinian. Justinus II. emperor. Ethelbert king of Kent.
566–567. The Lombards in alliance with the Avars destroy the kingdom of the Gepidæ in Pannonia.
568–571. Conquest of Italy by the Lombards. Exarchate of Ravenna established.
570 or 571. Birth of Mahomet.
572. War begins between the empire and Persia.
576. Tiberius defeats Chosroes at Melitene.
579. Death of Chosroes.
586. Recared, king of the Visigoths in Spain, converted to the Catholic faith.
590. Gregory I., the Great, bishop of Rome.
591. Maurice, emperor of the East, restores Chosroes II. to the throne of Persia.
593. Kingdom of Northumbria founded by Ethelfrith.
597. Arrival of Augustine in England (died, 605).
599. Reform of church service by Gregory the Great.
602. Supremacy of the bishop of Rome acknowledged by Phocas, emperor of the East. Canterbury, seat of archbishopric.
604. See of London founded.
610. Mahomet begins to preach at Mecca. Heraclius emperor of the East.
614. Damascus and Jerusalem taken by the Persians.
615. Death of St. Columban.
616. Invasion of Egypt by Persians.
622. Flight of Mahomet from Mecca to Medina (the Hegira). First of six expeditions of Heraclius against the Persians.
623. Battle of Beder, first victory of Mahomet.
626. Siege of Constantinople by Persians and Avars.
628. Death of Chosroes II. Treaty of peace between Heraclius and Siroes.
629. Visit of Heraclius to Jerusalem.
632. Death of Mahomet. Abu-Bekr succeeds.
634. Victory of Khaled at Ajnadin. Capture of Damascus. Omar third caliph. Aidan bishop of Lindisfarne.
636. Battles of Yermouk and Cadesia. Foundation of Bussorah.
637. Caliph Omar takes Jerusalem. Mosque of Omar founded.
638. Conquest of Syria completed by Amrou.
639–40. Invasion of Egypt and capture of Alexandria. *Ecthesis* of Heraclius published and condemned by the bishop of Rome. Monothelite controversy.
641. Death of Heraclius.
642. Theodorus pope of Rome; the first called "sovereign pontiff."
647. First invasion of Africa by the Saracens.
648. Capture of Cyprus.
651. Yezdegerd, last king of Persia, killed by Turks. Death of Aidan, bishop of Lindisfarne.
653. Conquest of Rhodes by Moawiyah; the Colossus destroyed. The Pope, Martin I., goes to Constantinople and is imprisoned by the emperor Constans II.
654. Siege of Constantinople by Moawiyah.
655. Penda, king of Mercia, defeated and killed by Oswy of Northumbria. Conversion of Mercia.
658. The emperor Constans II. makes peace with Moawiyah.
663. Constans II. received by Pope Vitalian at Rome.
664. Council of Whitby. Cædmon, the great English poet. Wilfrid archbishop of York.
667. Siege of Constantinople by Yezid.
668. Theodore archbishop of Canterbury.
670. Kairwan founded.
672. Siege of Constantinople by Sofien ben Aouf; the attack repeated yearly for seven years; "Greek fire" used.
678. Wilfrid driven from his see; preaches to the Frisians.
680. Sixth General Council held at Constantinople.
685. Justinian II. emperor of the East.
687. Death of Cuthbert, bishop of Lindisfarne.
688. Ina king of Wessex. Pepin d'Héristal (mayor of the palace) sole ruler of France (died, 714). Bulgarian war.
690. Death of Archbishop Theodore.
692–698. Carthage reduced, pillaged, and burnt by Saracens.
697. Doge of Venice first elected for life.
699 (690?). Death of Benedict Biscop.
709. Death of Wilfrid.
710. First invasion of Spain by the Saracens; conquest by Tarik; fall of Roderic, 711–713.
714. Charles Martel rules France as mayor of the palace. Toledo taken by Tarik.
716. Leo the Isaurian emperor. Siege of Constantinople by Saracens. The Bulgarians conclude a commercial treaty with Theodosius III.
718. Mission of Boniface in Germany.
719. Narbonne taken by Saracens.
721. Invasion of France by Saracens.
723. Conquest of Sardinia by Saracens.
726. Death of Ina, king of Wessex. First edict of Leo III. (The Iconoclast) against image-worship. Siege of Nicæa by the Saracens.
728. Ravenna taken by the Lombards (retaken by Eutychius, 729).
732. Battle of Tours,—victory of Charles Martel over the Saracens.
735. Death of the Venerable Bede.
740. Great earthquake at Constantinople, in Thrace, and in Bithynia.
741. Death of Charles Martel.
744. Abbey of Fulda founded by Boniface.
746. Great earthquake in Syria. The plague for three years in Italy, Greece, and Asia Minor.
747. The plague at Constantinople.
750. The dynasty of the Ommiades (caliphs) overthrown; the Abbasides succeed.
751. The Exarchate of Ravenna conquered by the Lombards under Astolphus. End of the dominion of the Eastern emperors in Central Italy.
752. The Merovingian line ends with deposition of Childeric III. Pepin (*Le Bref*), founder of Carlovingian line, is crowned at Soissons by Boniface. Stephen II. pope of Rome.
754. Council of Constantinople condemns images, pictures, and the crucifix, and proscribes the art of painting.
755. Grant of Exarchate of Ravenna and the Pentapolis to the Pope by Pepin. Beginning of the temporal power. Siege of Rome by Astolphus. Death of Boniface, apostle of Germany.
756. Cordova made seat of western caliphate by Abdelrahman I.
757. Rout of the Bulgarians by the emperor Constantine V.
763. Foundation of Baghdad, seat of the caliphate. Winter of 763–764, the Bosphorus and the Euxine frozen.
766. The imperial fleet destroyed by storm on the Euxine.
768. Charles the Great (Charlemagne) and Carloman kings of the Franks. Charles alone, 772.
770. Charles marries the daughter of Desiderius, last king of the Lombards.
771. Charles repudiates his wife and marries Hildegarda.
774. Overthrow of the Lombard kingdom by Charles the Great.

778. His expedition to Spain; battle of Roncesvalles.
780. Image-worship re-established by the empress Irene.
782. Massacre of the Saxons by Charles.
785. Haroun Alraschid caliph of Baghdad.
787. Seventh General Council, second of Nicæa, re-establishes image-worship. First landing of Northmen (Danes) in England.
794. Charles holds a great council at Frankfort.
797–802. Irene sole empress.
800. Charles the Great crowned emperor of the Romans by Pope Leo III. Extinction of supremacy of Byzantine emperors at Rome. Egbert king of the West Saxons.
801. Death of Paulus Diaconus.
802. The Athanasian Creed authoritatively imposed by Charles.
803. Limits of the two empires settled by treaty between Charles and Nicephorus. Massacre of the Barmecides by Haroun Alraschid.
804. Death of Alcuin (born about 735).
809. Death of Haroun Alraschid.
814. Death of Charles the Great. Louis *le Débonnaire* emperor of the Romans and king of France.
816–837. Eginhard, historian of Charles the Great, flourished.
816. Coronation of Louis and his wife Hermengarda by the Pope at Rheims.
822. Louis does public penance at Diet of Attigny.
823. Conquest of Crete and foundation of Candia by Saracens. Ebbo missionary to the Northmen about this time.
826. Anschar, apostle of the North, begins teaching in Denmark.
827. Egbert overlord of all the English kingdoms. Collection made of the capitularies of Charles the Great and Louis. The *Almagest* of Ptolemy translated into Arabic by command of Caliph Almamun.
831. The doctrine of transubstantiation maintained by Paschasius Radbert. Controverted by Rabanus Maurus.
833. Louis does public penance at Soissons.
835. Festival of All Saints instituted about this time.
836. Ethelwulf king of Wessex.
840. Lothaire emperor. Charles II. (the Bald) king of France.
841. Rouen pillaged by Northmen.
842. Piast chosen duke of Poland. Final establishment of image worship by council of Constantinople.
843. The Picts subdued by Kenneth M'Alpin. Treaty of Verdun. Division of dominions of Louis among his three sons.
845. Persecution of Paulicians by Empress Theodora. Paris threatened by Northmen.
846, 847. Rome threatened by the Saracens.
849. Birth of Alfred the Great. Persecution of Gottschalk by Hincmar.
850–870. Joannes Scotus Erigena flourished.
851. Great victory of Ethelwulf over the Northmen at Ockley.
855. Louis (of Bavaria) emperor.
857. Photius patriarch of Constantinople.
860. Foundation of kingdom of Navarre about this time.
862. Reputed foundation of Russian monarchy by Rurik. Photius excommunicated by the Pope.
862–868. Preaching of Methodius and Cyrillus in Moravia.
865. First expedition of Russians to Constantinople. South Italy ravaged by Saracens. The forged Decretals (Isidorian) adopted by Pope Nicholas I. about this time.
867. Photius excommunicates the Pope. Basilius I. emperor of the East.
868. Photius deposed by council at Rome.
869–870. Eighth General Council, held at Constantinople.
871. Alfred king of Wessex.
874. Norwegian settlement in Iceland.
875. Charles (the Bald) crowned emperor at Rome.
877. Louis II. (the Stammerer) king of France. Syracuse taken by Saracens.
878. The Danes defeated by Alfred. Peace of Wedmore.
880. Methodius permitted by the Pope to celebrate divine service in the vernacular tongue (Slavonian).
881. Albategni begins his astronomical observations about this time and continues them till 918. Charles III. (the Fat) emperor (deposed 887).
885. The Northmen under Rolf overrun Neustria (settled there by treaty with Charles the Simple, 912).
886. Siege of Paris by the Northmen. Leo VI. (the Philosopher) emperor of the East.
891. Death of Photius in exile.
894. Siege of Rome by Arnulph, king of Germany, who is crowned emperor, 896.
896. Exhumation of the body of Pope Formosus by order of Stephen VI.; trial, condemnation, and degradation of Formosus; his body thrown into the Tiber; the proceedings quashed by John IX., 898.
898. Charles (the Simple) king of France.
899. Louis IV. emperor—last of the Carlovingian line.
900. Palermo sacked by Saracens.
901. Edward the Elder king of Wessex.
904. Thessalonica taken by Saracens. Second expedition of Russians to Constantinople.
907. End of the Tang dynasty in China.
908. Theodora mistress of Rome; she occupies the castle of St. Angelo.
909. Abu Obeidallah, first of the Fatimite caliphs of Egypt.
910. The congregation of Cluny founded.
911. Conrad, duke of Franconia, elected emperor.
913. Constantine VII. (Porphyrogenitus) emperor of the East.
915. Berenger, king of Italy, crowned emperor by Pope John X.
917. Defeat of Byzantine army by Bulgarians at Achelous.
918. Henry the Fowler, duke of Saxony, elected king of Germany.
925. Athelstan king of the West Saxons.
926. (*circa*). Laws of Howel Dda sanctioned by Pope Anastasius.
929. Mecca pillaged by the Karmathians.
934. Victory of Henry the Fowler over Hungarians at Merseburg.
936. Louis IV. (*D'Outremer*), king of France. Otto I., king of Germany.
937. Victory of Athelstan at Brunanburh.
940. Edmund king of Wessex.
941. Third expedition of Russians to Constantinople.
943. Dunstan made abbot of Glastonbury, and chief minister to Edmund.
946. Edred king of Wessex. First embassy of Liutprand to Constantinople.
951. Otto I. proclaimed king of Italy; Berenger driven away.
954. Lothaire king of France.
955. Victory of Otto over Hungarians in Bavaria. Edwig king of Wessex.
956. Banishment of Dunstan. Death of Hugh the Great, count of Paris.
958. Edgar king of Mercia; crowned at Bath, 973, and rowed by eight vassal kings on the Dee.
959. Dunstan archbishop of Canterbury. Italy ravaged by Berenger. Hugh Capet declared duke of France by Lothaire.
960. The Sung dynasty in China founded.
962. Otto I. crowned emperor of the Romans by Pope John XII.
963. Deposition of the Pope by Otto. Nicephorus Phocas emperor of the East.
963–975. Eastern conquests of Nicephorus Phocas and John Zimisces.
964. Revolt at Rome,—return of John XII. Rome taken by Otto.
965. Second embassy of Liutprand to Constantinople; his imprisonment by Phocas.
967. Magdeburg made seat of archbishopric by Otto I.
969. John I. (Zimisces) emperor of the East.
970. Settlement of Paulicians at Philippopolis.
973. Otto II. emperor of the Romans.
974. Pope Benedict VI. strangled at Rome.
975. Edward the Martyr king of England (murdered, 979).
976. Basilius II. (Bulgaroktonos) emperor of the East.
979. Ethelred the Unready king of England.
980 (*circa*). Birth of Avicenna (died, 1036). Crescentius master of Rome.
983. Otto III. king of Germany. Greenland colonized from Iceland.
986. Louis V. (*le Fainéant*) king of France, last of the Carlovingian line.
987. Hugh Capet, founder of Capetian line, king of France.
988. Death of Dunstan. The Greek ritual introduced into Russia.
990 (*circa*). Invention of the balance-clock attributed to Gerbert (afterwards Pope Sylvester II.).
993. Earliest instance on record of canonization of a saint.
996. Robert the Wise king of France. Otto III. crowned emperor at Rome.
998. France laid under interdict. Crescentius besieged in Rome and put to death by Otto III.
999. Sylvester II. (Gerbert) pope.
1000. The emperor Otto III. makes a pilgrimage to the tomb of St. Adalbert at Gnesne, founds archbishopric of Gnesne, and erects Poland into a kingdom for Duke Boleslas. The Pope, Sylvester II., erects Hungary into a kingdom for Duke Stephen, apostle of Hungary.
1001. First invasion of India by Mahmud of Ghazni. Insurrection at Rome against Otto III.
1002. Henry II. king of Germany. Massacre of the Danes in England.
1003. John XVII. pope, three months. John XVIII. pope (abdicates, 1009).
1009. Sergius IV. pope.
1010. Conquest of Ghor by Mahmud in fourth invasion of India.
1012. Benedict VIII. pope.
1013. Submission of all England to Sweyn, king of Denmark.
1014. Battle of Clontarf—defeat of Danes by Brian Boroimhe. Henry II. crowned emperor.
1016. Edmund Ironside king of England. First appearance of the Normans in Italy.

1017. Canute king of England. Bulgaria made a province of the empire. Canouj taken by Mahmud.

1020. Death of Firdusi, the Persian poet.

1024. Conrad II. emperor. John XIX. (XX.) pope. Twelfth expedition of Mahmud to India; capture of Somnauth.

1025 (*circa*). Invention of musical notation by Guido Aretino.

1027. Birth of William of Normandy. Pilgrimage of Canute to Rome.

1029. Foundation of Aversa by the Normans.

1030. Death of Mahmud of Ghazni.

1031. Henry I. king of France. Fall of the caliphate of Cordova.

1033. Benedict IX. pope.

1035. Death of Sancho the Great of Navarre; division of his states. Foundation of the kingdoms of Castile and Aragon.

1038. The Turkmans defeat the Ghaznivides and conquer Persia. Foundation of the Seljukian dynasty.

1039. Henry III. emperor. Macbeth murders Duncan, king of Scots, and succeeds him. Conquest of Persia by Togrul Bey.

1040–1043. Conquest of Apulia by the Normans.

1042. Edward the Confessor king of England. Restoration of English line.

1043. Fourth expedition of Russians against Constantinople.

1044. Sylvester III. pope three months. Gregory VI. buys the papacy.

1046. Council of Sutri; the consent of the emperor declared essential to the election of the pope; the emperor deposes three popes, appoints Clement II., and is crowned by him.

1047. Victory of William of Normandy over the baronage at Valès-dunes.

1048. Damasus II. pope three weeks, said to be the first pope crowned. Invasion of the Eastern empire by the Seljukian Turks.

1049. Leo IX. pope. Intrigues of Hildebrand at his election. League of the pope and the two emperors against the Normans in Sicily.

1050. Condemnation of Berengar at councils of Rome and Vercelli. Hildebrand created cardinal.

1052. Visit of William the Norman to England. Death of Earl Godwine. The pope and the emperor celebrate Christmas at Worms.

1053. The Pope taken prisoner by Robert Guiscard, at the battle of Civitella (June 16). Open rupture of Greek and Latin churches.

1054. Macbeth defeated by Earl Siward at Dunsinane (slain 1056). Michael Cerularius, patriarch of Constantinople, assumes the title of Universal Patriarch. The Pope and the Patriarch excommunicate each other.

1055. Victor II. pope. Togrul Bey takes Baghdad and rescues the caliph from his enemies.

1056. Henry IV. emperor.

1057. Malcolm III. (Canmore) king of Scotland. Stephen IX. pope.

1058. Nicholas II. pope. Peter Damiani created cardinal (died, 1072).

1059. Election of the Pope vested in the College of Cardinals by bull of Nicholas II. Robert Guiscard made duke of Apulia and gonfaloniere of the church.

1060. Philip I. king of France.

1060–1090. Conquest of Sicily by the Normans under Count Roger.

1061. Alexander II. pope. Honorius II. anti-pope.

1062. Lanfranc abbot of Caen.

1063. Death of Togrul Bey.

1066. Harold II. king of England. His victory over Harold Hardrada and Tostig at Stamford Bridge, Sept. 25. Victory of William the Norman at Senlac (Hastings), Oct. 14. Norman conquest of England begins.

1068–1071. Siege and capture of Bari by the Normans. End of the Byzantine dominion in Italy.

1070. Lanfranc archbishop of Canterbury.

1071. Alp Arslan, Seljuk sultan, defeats and takes prisoner the emperor Romanus IV. at Manzikert.

1072. Palermo taken by Robert Guiscard. Malek Shah sultan of Persia.

1073. Gregory VII. (Hildebrand) pope.

1074–1084. Conquest of Asia Minor by the Turks.

1075. Disputes about investitures begin.

1076. Jerusalem taken by the Turks. Earthquake in England. Matilda countess of Tuscany (the Great Countess). Henry IV. deposes the Pope at Council of Worms. The Pope, at Council of Rome, deposes Henry and absolves his subjects from allegiance,—the first sentence of the kind. Henry is again excommunicated, 1078 and 1080.

1077. Submission of the emperor to the Pope at Canossa. London burnt. Secret gift of her states by Countess Matilda to the Holy See.

1079. The New Forest formed by William the Conqueror. Birth of Abelard. Reform of the Calendar ordered by Malek Shah.

1080. The duchy of Swabia given to Frederick of Hohenstauffen by the emperor Henry IV. Interdict laid on Poland, and title of king suppressed by the Pope. Anti-pope Clement III. set up by the emperor. Victory of the emperor over his rival Rudolf of Swabia.

1081. Capture and sack of Constantinople by Alexius Comnenus, April 1. Alexius crowned emperor April 2. Battle of Durazzo,—defeat of the emperor Alexius by Robert Guiscard.

1082. Siege of Rome by the Emperor Henry begins; the city taken, 1084.

1084. Gregory VII. besieged in Sant-Angelo by the emperor; delivered, and Rome pillaged by Robert Guiscard. Carthusian order founded by Bruno.

1085. Toledo taken from the Arabs by Alphonso VI. of Castile. Death of Robert Guiscard. Death of Gregory VII.

1086. Domesday Book completed. Victor III. pope. The Moors under Josef ben Taxfyn enter Spain to aid the Saracens. Battle of Zalaca,—defeat of Alphonso VI.

1087. William II. (Rufus) king of England.

1088. Urban II. pope. The Almoravides predominant in Spain.

1089. Death of Lanfrano (born about 1005).

1091. Birth of St. Bernard. Mantua taken by the emperor.

1092. Death of Sultan Malek Shah, and division of the Seljukian empire. Foundation of the order of Knights Hospitallers (knights of St. John of Jerusalem, knights of Malta), about this time (?). Roscelin found guilty of heresy at Council of Soissons.

1093. Anselm archbishop of Canterbury.

1095. Council of Clermont. Preaching of Peter the Hermit. The first crusade proclaimed. Excommunication of Philip king of France and his wife Bertrada by the Pope.

1097. Siege of Nicæa. Battle of Dorylæum. Edessa taken by crusaders and erected into a principality. Westminster Hall built about this time.

1098. Siege and capture of Antioch, which is made a principality for Bohemond. The Cistercian order founded. Edgar king of Scotland.

1099. Pascal II. pope. Siege and capture of Jerusalem by crusaders. Godfrey of Bouillon elected king. Battle of Ascalon.

1100. William the Red slain in the New Forest. Henry I. king of England. Woollen manufacture introduced in England by the Flemings about this time. Knights of St. John settled in England.

1101. Invasion of England by Robert duke of Normandy. Roger II. (Guiscard), the Great, count of Sicily.

1102. Disputes between Henry I. and Archbishop Anselm about investitures. The emperor excommunicated by Pope Pascal II. Preaching of Peter Bruys against prevalent superstitions, for about twenty years, probably between 1100 and 1130.

1105. Invasion of Normandy by Henry I. The emperor Henry IV. dethroned by his son Henry V.; excommunicated and deprived of imperial dress.

1106. Henry V. emperor. Battle of Tinchebrai; Henry I. of England defeats and captures Robert of Normandy, and conquers the duchy.

1107. Alexander I. king of Scotland. Bohemond invades the Eastern empire.

1108. Louis VI. (*le Gros*) king of France. Treaty of peace between Alexius and Bohemond.

1109. Tripoli in Syria taken by crusaders and erected into a county.

1110. Marriage of Maud daughter of Henry I. to the emperor Henry V. Treaty between the emperor and the Pope respecting investitures concluded at Milan.

1111. The emperor arrests the Pope; obtains a bull respecting investitures; releases the pope, and is crowned by him at Rome. The emperor received at Canossa by the Countess Matilda; names her his vice-regent in Lombardy.

1112. Council of Vienne; excommunicates the emperor.

1113. Bernard becomes a monk of Cîteaux. Peace of Gisors.

1114. Thurstan, archbishop of York, refuses consecration from archbishop of Canterbury.

1115. Bernard founds Clairvaux. Death of Matilda countess of Tuscany.

1116. March of the emperor into Italy to take possession of states of the countess. Council of the Lateran revokes the privilege of investitures conceded to the emperor.

1117–1120. Henry I. in Normandy. War with France and the earls of Anjou and Flanders.

1118. Order of Knights Templars founded. Gelasius II. pope, January 19. His seizure by the Frangipani, January 24. Appointment of anti-pope Gregory VIII. by the emperor. John II. Comnenus emperor of the East. Abelard teaches at Paris.

1119. Calixtus II. pope. Cistercian order re-constituted by Stephen Harding.

1120. Wreck of the White Ship, and death of William, son of Henry I. Premonstratensian order founded by St. Norbert.

1121. Council of Soissons compels Abelard to burn his book on the Trinity.

1122. Concordat of Worms. The dispute about investitures settled by the emperor's renunciation. Abelard founds the Paraclete.

1123. Ninth General Council (first of the Lateran). Confirmation of the settlement between the Pope and the emperor.

1124. The emperor invades France, but retires before Louis VI. Honorius II. pope. David I. king of Scotland.

1125. Lothaire II. king of Germany; opposed by Conrad, duke of Swabia, and Frederick, duke of Franconia.

1126. Visit of David of Scotland to Henry I.

1127. Roger, the great Count, recognized as duke of Apulia and Calabria. He carries on war with the pope and is excommunicated, but obtains investiture the next year. Marriage of Geoffrey of Anjou with Maud, daughter of Henry I.

1128. Death of William of Normandy, count of Flanders.

1129. Henry of Blois made bishop of Winchester. Earthquake in England.

1130. Innocent II. pope. Anacletus II. anti-pope. Roger II., count of Sicily, receives title of king from Anacletus, and makes Palermo his capital. Abbey-church of Cluny consecrated by Innocent II. Conference between Innocent and Lothaire at Liége; St. Bernard present. Heloise becomes abbess of the Paraclete.

1131. Death of Baldwin II., king of Jerusalem; Fulk of Anjou, his son-in-law, succeeds.

1133. Innocent II. re-established at Rome by Lotbaire. Lothaire crowned emperor by the Pope, who is again expelled by Anacletus. Count Roger takes the title of king of Sicily.

1134. Death of Alphonso I., king of Navarre and Aragon, and separation of the kingdom. Arnold of Brescia begins to preach about this time.

1135. Death of Robert II., duke of Normandy, in Cardiff Castle. Stephen (of Blois) king of England.

1137. Louis VII. (*le Jeune*) king of France, married to Eleanor of Guienne before his accession. King Roger driven out of Italy by Lotbaire. Death of Lotbaire. Pandects of Justinian discovered at Amalfi. Birth of Saladin.

1138. Conrad III. emperor. Roger king of Sicily takes the Pope prisoner, and compels him to confirm him in his kingdom. Death of Anacletus, and end of the schism. David, king of Scotland, invades England, and is defeated at the battle of the Standard (Northallerton). Civil war in England between adherents of Stephen and Maud.

1139. Portugal erected into a kingdom for Count Alphonso Henriquez. Malachy, bishop of Connaught, visits Clairvaux and Rome. Tenth General Council (second of the Lateran). Arnold of Brescia condemned and banished from Italy. Henry of Blois, bishop of Winchester, papal legate in England.

1140. Council of Sens. Bernard gets Abelard condemned. Abelard appeals to the Pope. Feast of t e Immaculate Conception of the Virgin introduced.

1141. Interdict laid on France by Innocent II. King Stephen taken prisoner by Robert of Gloucester at the battle of Lincoln. Maud received as "Lady of England." Winchester burnt.

1142. Maud besieged in Oxford by Stephen. Death of Abelard. Henry the Lion duke of Saxony.

1143. Manuel Comnenus emperor of the East. Celestine II. pope. On submission of Louis VII. the interdict on France is raised.

1144. Lucius II. pope; he concludes a treaty with Roger of Sicily. The primacy of the church of Toledo confirmed by the Pope.

1145. Maud withdraws from England. Conquests of Nour-eddin, sultan of Aleppo. Eugenius III. pope.

1146. Second Crusade proclaimed by the Pope; preached by St. Bernard. Invasion of Greece by King Roger; Thebes and Corinth plundered. Assembly at Vezelai; Louis VII. takes the cross. Arnold of Brescia heads insurrection at Rome, and expels the Pope. The Almohades enter Spain.

1147. Suger, abbot of St. Denis, appointed regent of France. The Crusaders, led by Conrad and Louis VII., arrive at Constantinople. St. Bernard pleads in behalf of the Jews. Suppression of the Henricians in Languedoc.

1148. The Crusaders reach Jerusalem, unsuccessfully besiege Damascus, and return to Europe.

1149. Recovery of Corfu from Saracens by the emperor Manuel.

1150. Compilation of Canon law completed by Gratian (begun by Ivo of Chartres, 1114). Noureddin conquers Edessa. Peter the Lombard writes his *Sentences*. Large silver terrestrial globe made by Edrisi for Roger of Sicily about this time. Almanac first published by Solomon Jarchi.

1151. Death of Geoffrey of Anjou. Invasion of Hungary by Manuel; peace, 1153.

1152. Eleanor of Guienne, divorced by Louis VII., marries Henry, son of Maud (Henry II. of England). Frederick I., Barbarossa, emperor of the Romans.

1153. Treaty between Stephen and Henry. Malcolm IV. king of Scotland. Anastasius IV. pope. Death of St. Bernard.

1154. Henry II. (Plantagenet line) king of England. Death of Roger of Sicily. Noureddin takes Damascus and makes it his capital. Louis VII. marries Constance of Castile. Invasion of Italy by Frederick Barbarossa. Adrian IV. (Nicholas Breakspeare) the only English pope.

1155. Rome laid under interdict by the Pope. Diet at Roncaglia. Arnold of Brescia banished by the Romans, strangled and burnt by order of the emperor. William I. of Sicily excommunicated and deprived of part of his kingdom by the Pope. Henry II. authorized by the Pope to undertake the conquest of Ireland. Thomas Becket chancellor of England. Coronation of Frederick Barbarossa at Rome.

1156. William of Sicily makes peace with the Pope. The margraviate of Upper Austria erected into a duchy. Death of Peter the Venerable, abbot of Cluny.

1157. Invasion of Poland by the emperor. The bank of Venice instituted. Munich founded by Henry the Lion. Diet at Besançon.

1158. Invasion of Lombardy by the emperor. Siege of Milan. Diet of Roncaglia. Henry II. visits Louis VII. at Paris.

1159. Expedition of Henry II. against Toulouse. War with France. Alexander III. pope. Victor IV. anti-pope.

1160. Council of Pavia convoked by the emperor for recognition of Victor. Excommunication of the emperor by Alexander. The Albigenses begin to attract attention about this time. Condemnation and branding of German heretics at Oxford.

1161. Peace between England and France. Pope Alexander III. received by the two kings.

1162. Destruction of Milan by the emperor. Becket archbishop of Canterbury; he resigns the chancellorship. Gilbert Foliot bishop of London.

1163. Hungarian war renewed by Manuel.

1164. The Constitutions of Clarendon subscribed. Council of Northampton. Flight of Becket. Becket at Sens and at Pontigny. Banishment of Becket's friends by Henry II. Third invasion of Lombardy by the emperor. Pascal III. anti-pope.

1165. William I., the Lion, king of Scotland.

1166. Zeugmin stormed by Manuel. Becket at Vezelai excommunicates his enemies. Fourth invasion of Italy by the emperor.

1167. War between Henry and Louis till 1169. The Lombard League formed. The League defeats the emperor at Legnano.

1168. Calixtus III. anti-pope. Victory of Manuel over Hungarians at Zeugmin. End of the war. The Lombard League put to the ban by the emperor.

1169. Meeting of Henry and Louis at Montmirail respecting Becket. Excommunication of Gilbert Foliot, bishop of London, by Becket. Invasion of Ireland by Strongbow. Another meeting of Henry and Louis at St. Denis.

1170. Formal reconciliation of Henry II. and Archbishop Thomas at Freteval. Assassination of the archbishop at Canterbury, Dec. 29. Birth of St. Dominic. Peter Waldo begins preaching at Lyons about this time.

1171. Henry II. invades Ireland, and is acknowledged king at Council of Casbel. Conquest of Egypt by Shiracouh and Saladin, generals of Noureddin. End of the Fatimite caliphs. War between Manuel and the Venetians till 1174.

1172. Absolution of Henry II. at Council of Avranches.

1173. Civil war stirred up by the king's sons in England and Normandy. Saladin sultan of Egypt. Canonization of Archbishop Thomas by Alexander III.

1174. Canonization of Bernard by Alexander III. Fifth invasion of Italy by the emperor. Siege of Alexandria. Henry II. does penance at the tomb of St. Thomas at Canterbury, July 12. William the Lion captured at Alnwick by Ranulph de Glanville, July 12; he is released after doing homage to Henry for the kingdom. Damascus taken by Saladin.

1175. The bull of Adrian IV. promulgated in Ireland. The Scottish prelates refuse canonical obedience to the archbishop of York.

1176. Victory of the Milanese over Frederick at Legnano (Como). Great Council at Northampton; the six circuits of the judges established. The Carthusian order approved by the Pope. Victory of Kilidy Arslan, sultan of Iconium, over Manuel at Myriokephalon. John of Salisbury bishop of Chartres.

1177. Earl John named Lord of Ireland; the country partitioned for completion of the conquest. Meeting of the Pope and the emperor at Venice; absolution of the emperor. Saladin defeated at Ramla by Renaud de Chatillon.

1178. Reconciliation of Henry II. and Louis VII. The heretics of Toulouse excommunicated and banished by the legate. Innocent III. anti-pope.

1179. Eleventh General Council (third of the Lateran). Crusade against the Albigenses sanctioned. Pilgrimage of Louis VII. to the tomb of St. Thomas.

1180. Philip II., Augustus, king of France. Alexius II., Comnenus, emperor of the East. Henry the Lion, duke of Bavaria, deprived of all his dominions at Diet of Wurzburg. Carthusian monks in England.

1181. William the Lion excommunicated, and Scotland laid under interdict, by Alexander III. Lucius III. pope. First assize of arms in England.

1182. Birth of St. Francis. Edessa taken by Saladin. The Jews banished from France.

1183. Treaty of Constance between the emperor and the confederate towns of Italy, confirming their privileges. Amida and Aleppo taken by Saladin. Andronicus I., Comnenus, emperor of the East.

1184. Reconciliation of the sons of Henry II. at Council of London.

1185. Urban III. pope. Thessalonica taken by the Normans. Isaac II., Angelus, emperor of the East. The crown of Jerusalem offered to Henry II. by the patriarch of Jerusalem and the Grand Master of the Templars, and refused.

1186. Guy of Lusignan king of Jerusalem. Revolt of Bulgaria. Second Bulgarian kingdom founded. Marriage of Henry, king of the Romans, with Constance, heiress of Sicily.

1187. Battle of Tiberias (Hattin),—victory of Saladin over the Christians. Capture of Jerusalem by Saladin. End of the Latin kingdom. Gregory VIII. pope two months. Clement III. Third Crusade.

1188. The Emperor Frederick and the kings of France and England take the Cross. The "Saladin tenth" imposed.

1189. Siege of Acre begun. Frederick sets out on the crusade. Richard I. king of England. Massacre of Jews in London.

1190. The order of Teutonic knights founded. Richard and Philip meet at Vezelai, and set out for the crusade. Tancred king of Sicily. Frederick twice defeats the sultan of Iconium, and takes the city. Frederick drowned in Asia Minor. Henry VI. emperor.

1191. Marriage of Richard I. to Berengaria. Capture of Acre by the Crusaders. Celestine III. pope. Return of Philip to France. Victory of Richard at Arsoof. Naples besieged by the emperor. Coronation of Henry VI. and Constance at Rome. Destruction of Tusculum.

1192. Guy of Lusignan titular king of Cyprus. Jerusalem threatened by Crusaders. Truce with Saladin. Arrest of Richard on his return by Leopold, duke of Austria. Usurpation of Earl John.

1193. Richard before the Diet of Haguenau. Death of Saladin. Marriage of Philip Augustus with Ingeburga of Denmark.

1194. Liberation and return of Richard. Richard defeats Philip at Freteval. Conquest of the Two Sicilies by the emperor, who is crowned king at Palermo. Birth of Frederick II. Llewelyn ap Jorwerth prince of Wales.

1195. Battle of Alarcos,—Alphonso VIII. of Castile defeated by Saracens. Alexius Angelus emperor of the East.

1196. Marriage of Philip Augustus with Agnes of Méranie.

1197. Château Gaillard built by Richard I.

1198. Innocent III. pope. Philip of Swabia (Hohenstauffen) emperor. War with his rival, Otto of Brunswick. Richard defeats the French at Gisors.

1199. Five years' truce between England and France by mediation of the Pope. John king of England. His nephew Arthur supported by Philip Augustus. Bohemia erected into a kingdom. Markwald, general of the emperor Henry VI., twice excommunicated by the Pope.

1200. Universities of Bologna and Paris founded before this time. Interdict laid on France by Pope Innocent III. Marriage of Louis of France to Blanche of Castile. Riga founded. Strife of Guelf and Ghibelline in Florence begins about this time. Layamon writes his Chronicle of Britain (the *Brut*).

1201. Council of Soissons. Death of Agnes of Méranie.

1202. Fourth Crusade under Baldwin, count of Flanders. Waldemar II., the Victorious, king of Denmark. War between France and England. Death of Abbot Joachim about this time. Conquest of Sicily (except Messina) by Markwald completed. Death of Markwald. Zara taken by Crusaders.

1203. Capture of Constantinople by Crusaders. Inquisition founded by Innocent III. as commission for conversion of the Albigenses. Murder of Arthur by King John.

1204. Loss and re-capture of Constantinople by Crusaders. Baldwin first Latin emperor of the East. Capture of Château Gaillard and conquest of Normandy from the English by Philip Augustus. Empire of Trebizond erected for Alexius Comnenus.

1205 (1193?). Birth of Albertus Magnus (died, 1280). Baldwin I. defeated and taken prisoner by the Bulgarians.

1206. Jenghiz Khan proclaimed sovereign of Mogul and Tatar tribes. Mogul Empire. Theodore Lascaris crowned emperor of Nicæa (elected at Constantinople 1204). Henry of Hainault Latin emperor of the East.

1208. England placed under interdict by Innocent III. Crusade against the Albigenses proclaimed by him. Otto IV. acknowledged emperor after murder of Philip.

1209. Franciscan order founded. King John excommunicated by the Pope. Otto crowned at Rome.

1210. Council of Paris condemns, burns, and forbids reading of Aristotle's *Metaphysics*. Alliance of the emperor Henry with the sultan of Iconium against Theodore. Invasion of China by Jenghiz Khan.

1211. Otto excommunicated by the Pope. Pandulph legate in England.

1212. Frederick II. crowned emperor of the Romans. The Children's Crusade. Battle of Navas de Tolosa,—victory of the kings of Castile, Aragon, and Navarre over the Moors.

1213. King John of England becomes the Pope's vassal. Second invasion of China by Jenghiz Khan. Battle of Muret.

1214. Birth of Roger Bacon (died, 1294?). Battle of Bouvines, defeat of Emperor Otto IV. by Philip Augustus. Death of William, the Lion, king of Scots; Alexander II. succeeds him.

1215. Siege and capture of Peking (Yen-king) by Jenghiz Khan. The Great Charter signed by King John. Twelfth General Council (fourth of the Lateran). Dominican order founded. Coronation of Frederick II. at Aix-la-Chapelle.

1216. Honorius III. pope. Henry III. king of England. Confirmation of the Great Charter.

1217. Fifth Crusade under Andrew, king of Hungary. Hubert de Burgh justiciary of England. Matthew Paris enters Benedictine order at St. Albans (died, 1259). Michael Scot, translator of Aristotle, living at Toledo. Peter of Courtenay emperor of the East. Order of Friar Preachers founded.

1218. Trial by ordeal formally abolished in England. Death of Otto. Battle on the Jaxartes between Jenghiz Khan and the Kharismians. Death of Simon de Montfort.

1219. Damietta taken by Crusaders. Robert of Courtenay emperor of the East.

1221. Conquest of Khorassan and Persia by Jenghiz. Dominican and Franciscan friars arrive in England. Birth of Bonaventura (died, 1274). Death of Dominic.

1222. The Golden Bull, basis of Hungarian liberties, signed by Andrew II.

1223. Louis VIII. king of France.

1224. University of Naples founded by Emperor Frederick II. Peter de Vinea chief adviser to Frederick about this time.

1226. Louis IX. (St. Louis) king of France. The Lombard League renewed against Frederick II. Death of Francis.

1227. Gregory IX. pope. Birth of Thomas Aquinas (died, 1274). Death of Jenghiz Khan.

1228. Sixth Crusade under Frederick II. Death of Stephen Langton, archbishop of Canterbury. Canonization of Francis by Gregory IX. Baldwin II. emperor of the East; John of Brienne his colleague and guardian during minority, 1229 to 1237.

1229. Treaty between Sultan El Kamel and Frederick II. Jerusalem given up to the Christians. Council of Toulouse establishes the Inquisition in Languedoc.

1231. Translation of the *Almagest* by command of Frederick II.

1233. Edmund Rich archbishop of Canterbury (died, 1240). Robert Grosseteste bishop of Lincoln (died, 1253). Gregory IX. intrusts the Dominican Order with sole direction of the Inquisition.

1234. Canonization of Dominic by Gregory IX. Promulgation of new code of the Decretals by Gregory.

1235. Isabella of England married to Frederick II. Canonization of Elizabeth of Hungary.

1236. Invasion of Russia and sack of Moscow by Tatars.

1237. Conrad IV. king of the Romans. Battle of Corte Nuova.

1238. Marriage of Simon de Montfort to Elcanor, sister of Henry III.; the earldom of Leicester given to him.

1239. Frederick II. makes his son Enzio king of Sardinia. Herman von Salza grand-master of the Teutonic knights. Moorish kingdom of Granada founded.

1240. Birth of Cimabue (died, 1302). Frederick invades States of the Church; Crusade against him proclaimed. Carmelite monks in England.

1241. Celestine IV. pope; dies before consecration. Death of Waldemar II. of Denmark. Enzio captures Genoese fleet, with cardinals, bishops, &c. Death of Empress Isabella.

1242. Battle of Taillebourg,—St. Louis defeats Henry III.

1243. Innocent IV. pope, after nearly two years' vacancy.

1244. Treaty between the Pope and the emperor.

1245. Thirteenth General Council (first of Lyons). Deposition of the emperor by the Pope. Death of Alexander of Hales.

1246. Canonization of Archbishop Edmund (Rich) by Innocent IV.

1248. Seventh Crusade under St. Louis. Inquisition introduced in Spain. Siege of Parma.

1249. Alexander III. king of Scots. Death of Peter de Vinea. University College, Oxford, founded.

1250. St. Louis defeated and captured by the sultan of Egypt; released in a month. Conrad IV. emperor. His claim opposed by William, count of Holland. The Mamelukes become masters of Egypt. Manfred regent of Sicily. College of the Sorbonne founded. Gunpowder probably invented about this time.

1252. Alphonso X. king of Castile. The Alphonsine Tables completed. English laws introduced in Wales.

1253. The Jews expelled from France.

1254. Alexander IV. pope. Birth of Marco Polo (died, 1324).

1255. Inquisition introduced in France. Königsberg founded by the Teutonic knights. Submission of the Two Sicilies to Manfred.

1257. Richard, earl of Cornwall, and Alphonso X. of Castile rival emperors of the Romans.

1258. Siego and capture of Baghdad by Tatars under Hulaku Khan. Extinction of the caliphate (Abbasides). "Provisions of Oxford" passod by the "Mad Parliament." Manfred crowned king of Sicily.

1259. Kublai khan of the Moguls. Manfred excommunicated.

1260. Appearance of the Flagellants in Italy. Manfred master of Tuscany.

1261. Urban IV. pope. Manfred again excommunicated. Capture of Constantinople by Michael Palæologus. End of Latin empire of the East.

1263. Battle of Largs,—defeat of Norwegians by Alexander III. of Scotland.

1264. Battle of Lewes,—Earl Simon defeats Henry III. and takes him prisoner.

1265. Clement IV. pope. Deputies of the commons sit in the parliament of England. Battle of Evesham,—defeat and death of Earl Simon. Birth of Dante (died, 1321). (?) Birth of Duns Scotus (died, 1308). Manfred, king of Sicily, defeated by Charles of Anjou; defeated again and killed by his rival, 1266. Composition of gunpowder known to Roger Bacon.

1266. Roger Bacon sends his *Opus Majus* to Pope Clement IV. Sagarelli, leader of the Apostolic Brethren, begins preaching in Parma.

1267. Treaty of Viterbo, between the dethroned emperor Baldwin, Charles of Anjou, and William, prince of Achaia.

1268. Edward of England takes the cross at Council of Northampton. Conradin defeated by Charles of Anjou at Tagliacozza and beheaded at Naples.

1269. Pragmatic Sanction, restricting the power of the Pope in France, promulgated by St. Louis.

1270. St. Louis sets out for the crusade, and dies before Tunis. Philip III., the Bold, king of France. Birth of William of Occam about this time (died about 1350).

1271. Gregory X. pope, after two years' vacancy. Journey of Marco Polo to the court of Kublai Khan.

1272. Edward I. king of England.

1273. Rudolph of Hapsburg emperor.

1274. Fourteenth General Council (second of Lyons); union of Greek and Roman Churches effected. New regulation of papal election.

1275 (*circa*). Arabic numerals used in treatise on the Astrolabe by Macha-Allah.

1276. Innocent V., Adrian V., and John XX. (XXI.) popes. Birth of Giotto (died, 1337).

1277. Nicholas III. pope.

1279. Statute of Mortmain passed in England.

1280. Conquest of China by Moguls completed.

1281. Martin IV. pope. Treaty of Orvieto, between the Pope, the king of Naples, and Venice, for conquest of the Greek empire.

1282. The "Sicilian Vespers,"—massaore of the French in Sicily; end of Angevine rule. Andronicus II. emperor of the East. Conquest and settlement of Wales by Edward I. Formation of the Zuyder Zee by inundation of the sea. Union of Greek and Roman churches annulled by Andronicus II.

1283. Statute of Rhuddlan (Statute of Wales) enacted. Conquest of Prussia by Teutonic knights completed.

1284. Charles of Anjou defeatod and captured by Roger de Loria, grand admiral of Sicily.

1285. Honorius IV. pope. Philip IV., the Bold, king of France. Death of Charles of Anjou.

1286. Margaret of Norway queen of Scots; a regency during her minority. Sagarelli banished from Parma.

1288. Nicholas IV. pope.

1289. Marriage-treaty of Prince Edward of England and Margaret queen of Scots concluded. Dante present at battle of Campaldino.

1290. Expulsion of Jews from England by Edward I. Death of Margaret of Norway on her way to Scotland. Edward I. appointed arbitrator between Baliol and Bruce, competitors for the Scottish crown, 1291.

1291. Capture of Acre by Malek al Aschraf, sultan of Egypt. Final loss of the Holy Land. Conference of Edward I. with northern barons at Norham. Beginning of Swiss confederation. Seizure and imprisonment of Italian bankers in France.

1292. Adolphus of Nassau emperor. John (Baliol) king of Scots. Ho does homage to Edward I. at Newcastle, December 26.

1294. Celestine V. pope, after vacancy of more than two years; abdicates. Boniface VIII. pope, December. Death of Kublai Khan. Masoud II., last sultan of Iconium, defeated and slain by the Moguls, and the sultanate divided.

1295. Final organization of English parliament. Return of Marco Polo to Venice. Premislas, duke of Poland, crownod king.

1296. Boniface VIII. publishes the bull *Clericis laicos*, January; republished, August 18. Philip issues an edict prohibiting exportation of gold, silver, provisions, &c., without consent of tho Crown, August 17. Boniface publishes a second bull, *Ineffabilis*, September. Conquest of Scotland by Edward I.; surrender of Baliol; interregnum, 1296–1306. The Persian poet Saadi dies about this time.

1297. Battle of Stirling,—victory of Wallace. St. Louis canonized by Boniface VIII. The Great Charter confirmed by Edward I. Boniface publishes a bull against tho Colonna family; after their reply he passes sentence of degradation, excommunication, and confiscation.

1298. Deposition of the Emperor Adolphus. Albert I. succeeds. Battle of Falkirk,—victory of Edward. Peace between England and France. Tho Pope proclaims a crusade against the Colonnas.

1299. Palestrina surrendered by the Colonnas to Boniface. Intervention of Boniface in affairs of Scotland by bull of June 27.

1300. Centennial Jubilee proclaimed by Pope Boniface VIII.; he assumes the motto *Ecce duo gladii*. Sagarelli burnt by the Inquisition at Parma. Siego of Caerlavrock by Edward I.

1301. Quarrel between Boniface VIII. and Philip the Fair begins. Excommunication of Philip. Titlo of Prince of Wales conferred on the son of Edward I.

1302. The parliament of Lincoln replies to the Pope's bull. Philip burns the Pope's bull, January 2. States-General of Franco, representative of the three estates, constituted by Philip IV., April. "Battle of Spurs," the French defeated at Courtrai by the Flemings, July. Philip issues an edict condemning the Inquisition, October.

1303. The emperor Albert promulgates at Nuremberg a Golden Bull, July. The Pope arrested by William of Nogaret at Anagni, September 7; rescued by the people; dies at Rome, October 11. Cession of Guienne to Edward I. by Philip the Fair. Benedict XI. pope. Tho Catalan Grand Company, formed by Roger di Flor, arrives at Constantinople.

1304. Stirling taken by Edward I. Submission of Scotland. Birth of Petrarch (died, 1374). The bulls against France revoked. Victory of Philip the Fair over the Flemings at Mons-en-Puelle.

1305. Clement V. pope. The Knights Templars denounced. Wallace put to death by Edward I., August 23.

1306. Murder of Comyn at Dumfries. Robert Bruce crowned king of Scotland. Roger di Flor assassinated at Adrianople.

1307. Excommunication of Bruce by papal legate at parliament of Carlisle. Edward II. king of England. Fra Dolcino, with Margarita, tortured and burnt at Vercolli. Arrest of Knights Templars in France and England. Battle of Apros,—victory of the Catalans over the Byzantine army.

1308. Assassination of the emperor by John of Austria. Henry VII. (of Luxembourg) succeeds him. Death of Duns Scotus.

1309. The Pope removes to Avignon. Robert of Anjou crowned king of Naples by the Pope. Sire de Joinville writes his history of Louis IX. Commission for trial of the Templars opens at Paris, August 7.

1310. Conquest of Rhodes by the knights of St. John. Persecution of the memory of Boniface VIII. by Philip. Dante publishes his *De Monarchia* about this time. Fifty-four Templars burnt at Paris.

1311–12. Fifteenth General Council, held at Vienne, October to November. Dissolution of order of Templars decreed. Condemnation of the Beghards. Rescript of the emperor defining relations of Swiss confederation to Austria and the empire. University of Orleans founded.

1313. Death of the emperor Henry VII., followed by interregnum. Birth of Boccaccio (died, 1375). Canonization of Celestine V. by Clement V. Death of Clement V. Stirling Castle besieged by Edward Bruce.

1314. Jacques de Molay, grand-master of the Templars, burnt at Paris. Frederick III. (duko of Austria) and Louis V. (IV.) (duke of Bavaria) rival emperors. Louis X. (Hutin) king of France. Battle of Bannockburn,—victory of Robert Bruce over Edward II., June 24. Stirling Castle given up.

1315. Battle of Morgarten,—victory of Swiss confederation over Leopold, duke of Austria. Final defeat of the Catalan Grand Company.

1316. John XXII. pope. John I. king of France four days. Philip V. king of France. Battle of Athenry,—victory of the English over the Irish.

1317. Mediation of the Pope between England and Scotland rejected by Bruce. Bruco excommunicated and Scotland laid under interdict.

1318. Edward Bruce defeated and killed at Dundalk.

1320. Insurrection of the peasantry (the *Pastoureaux*) in France, June. Conferenco of Robert of Naples with the Pope at Avignon. The Scottish parliament appeals to the Pope.

1321. Persecution of the lepers in France. Robert of Naples declared vicar of Italy during abeyance of the empire.

1321–1328. Civil wars between rival emperors of the East. Andronicus the elder and the younger.

1322. Charles IV. king of France. Battle of Mühldorf,—Frederick duke of Austria defeated and captured by the Emperor Louis.

1323. Thirteen years' truce between England and Scotland. The Floral Games instituted at Toulouse. Diet at Frankfort; issues proclamation denying necessity of the pope's consent to election of emperor, and his right to govern the empire in a vacancy.

1324. The Emperor Louis excommunicated by the Pope, March. John Wycliffe born about this time (died, 1384). Birth of William of Wykeham (died, 1404).

1326. Cannon used by the Florentines; by French and English, 1338 and 1339.

1327. Edward III. king of England. Edward II. deposed and murdered. The emperor declares the Pope a heretic; is crowned at Milan, and again excommunicated.

1328. Philip VI. (house of Valois) king of France. The emperor crowned at Rome, deposes the Pope, and gets Peter de Corbièro elected (Nicholas V.). Death of Castruccio Castracani, head of republic of Lucca. Independence of Scotland recognized by treaty of Northampton. Constantinople taken, and Andronicus II. deposed by his grandson Andronicus III.

1329. David II. (Bruce) king of Scotland. Blockade of Nicæa by Orkhan. Battle of Pelekanon,—first engagement between the emperor of the East and the sultan of the Ottomans. Establishment of the Ottoman Empire.

1330. Capitulation of Nicæa to Orkhan.

1332. Invasion of Scotland by Edward Baliol, assisted by Edward III. of England.

1333. Battle of Halidon Hill,—victory of Edward III. over the Scots. Casimir III. the Great, king of Poland. Stephen Dushan king of Servia.

1334. Benedict XII. pope.

1336. Birth of Timur (Tamerlane). Philip of France visits Avignon.

1337. Edward III. claims the crown of France. Plague of locusts in Europe for three years.

1338. Embassy from Louis of Bavaria and the king of France to the Pope to seek absolution for Louis; absolution refused. Mission of Barlaam from the Emperor Andronicus to Benedict XII. respecting reunion of Greek and Latin churches. Alliance of Jacob van Artevelde, captain of Ghent, with Edward III. Meeting of the emperor and Edward III. at Diet of Coblentz.

1339. Edward III. invades France from Flanders. Conquest of Bithynia by the Turks completed.

1340. Battle of Sluys,—victory of Edward III. over the French fleet. Siege of Tournay; a truce concluded. Birth of Chaucer (?).

1341. First passage of the Turks into Europe. John V. (Palæologus) emperor of the East. Regency of Anne of Savoy. Intrigues of John Cantacuzenus. Dispute about the Light of Mount Thabor begins. Petrarch crowned in the capitol at Rome. Disputed succession in Brittany; gives rise to civil war between John de Montfort and Charles of Blois.

1342. Clement VI. pope.

1343. Death of Robert the Wise, king of Naples.

1344. The jubilee period reduced to fifty years by Clement VI. War in Guienne. First English gold coinage (the florin). Discovery of Madeira by Robert Macham, an Englishman. Battle of Salado,—defeat of the Moors by Alphonso IV. of Portugal. Parliament of Paris organized by ordinance of Philip VI.

1345. Assassination of Jacob van Artevelde. Discovery of Canary Islands by Genoese and Spanish seamen. Servian empire established by Stephen Dushan; his code published, the oldest monument of Servian language. Assassination of the Grand-duke Apokaukos at Constantinople.

1346. Louis of Bavaria again deposed by the Pope. Charles IV. (Count of Luxembourg) elected king of the Romans. Victory of Edward III. over the French at Crecy, August 26. David II. of Scotland defeated and taken prisoner at Nevill's Cross, Durham, October 17. Siege of Calais begnn (taken by Edward III. 1347). Marriage of Orkhan, sultan of the Ottomans, with Theodora, daughter of Cantacuzenus.

1347. Invasion of Naples by Louis of Hungary, January. Flight of Queen Joanna; she sells Avignon to the Pope. Cola di Rienzi tribune and liberator of Rome. University of Prague (*Carolinum*) founded by the emperor. Death of Louis of Bavaria. Truce between England and France. John Cantacuzenus crowned emperor of the East.

1348–1351. The Black Death prevails in Europe. Massacres of Jews on suspicion of poisoning the wells. War of the Genoese with Cantacuzenus.

1349. The Statute of Laborers (England) passed. Dauphiny united to crown of France. Title of Dauphin given to the king's eldest son. The Flagellants condemned by bull of Clement VI.

1350. Order of the Garter instituted by Edward III. about this time. John II. king of France; Order of the Star instituted by him. Peter the Cruel, king of Castile. Reconstruction of Windsor Castle begun; completed, 1369. Second Jubilee at Rome.

1351. Joanna restored with her husband Louis of Tarentum to throne of Naples. Rienzi at Prague. Alliance of Venice with Cantacuzenus.

1352. Victory of Genoese over Venetians and Greeks, and their treaty with the Emperor Cantacuzenus. Rienzi surrendered to the Pope. Innocent VI. pope, December.

1353. Establishment of the Turks in Europe. First Statute of *Præmunire* in England. Rienzi made senator of Rome by Cardinal Albornoz.

1354. Naval Code published by Peter IV. of Aragon. Rienzi slain in insurrection at Rome. Cantacuzenus dethroned, December.

1355. War between England and France renewed. Charles IV. crowned at Rome. Assassination of Inez de Castro by Alphonso IV. of Portugal. Treaty between John Palæologus I. and Innocent VI. Arabic numerals used by Petrarch.

1356. The Golden Bull of the empire published by Charles IV. Battle of Poitiers,—Edward the Black Prince defeats and captures John II. and his son. Wycliffe publishes his *Last Age of the Church*.

1357. Ordinance for the estate of the land of Ireland issued. Truce between England and France. Triumphal entry of the Black Prince into London. David II. returns to Scotland.

1358. Rising of the peasants (the *Jacquerie*) in France.

1360. Treaty of Bretigny,—renunciation by Edward III. of his claim to the crown of France, to Normandy, Anjou, and Maine, followed by liberation of King John. France ravaged by the Free Companies. Amurath I. sultan of the Ottomans. Leo Pilatus at Florence, the first teacher of Greek in Western Europe.

1361. Conquest of Roumania by Amurath I. Adrianople made the seat of the sultans. The Janissaries established. Death of John Tauler (born 1290).

1362. Use of English in law pleadings directed by Act of Parliament. Urban V. pope, October.

1363. Philip the Bold duke of Burgundy.

1364. Charles V. king of France. The Coast of Guinea discovered by French seamen about this time. Battle of Auray,—defeat and capture of Bertrand Duguesclin by John Chandos; death of Charles of Blois; Brittany secured to John de Montfort. University of Cracow founded by Casimir the Great.

1365. Urban V. demands tribute of England. University of Vienna founded by Duke Rudolph IV.

1366. The Black Prince defeats Henry of Trastamara at Najara, and re-establishes Peter the Cruel.

1367–1371. William of Wykeham chancellor of England (again 1389–1391). Foundation of the Kremlin, 1367.

1368. University of Geneva founded. Myng dynasty founded in China; expulsion of the Moguls. Wycliffe's treatise *De Dominio* appears. Visit of the emperor to Rome.

1369. Renewal of war between France and England. John Palæologus visits Urban V. at Rome, and joins the Latin communion; he is arrested for debt at Venice. Birth of John Huss (?). Foundation of the Bastille.

1370. Timur sovereign of Tagatai. Limoges stormed by the Black Prince. Gregory XI. pope. Robert II., high steward (first of the Stuart line), king of Scotland. Death of Casimir the Great. Marriage of John of Gaunt with daughter of Peter the Cruel.

1372. Victory of the Spanish fleet over the English off Rochelle.

1373. March of John of Gaunt from Calais to Bordeaux.

1376. Death of the Black Prince. The "Good Parliament" in England.

1377. Return of the Pope from Avignon to Rome. Wycliffe cited before the bishop of London. The Pope publishes three bulls against Wycliffe. Richard II. king of England.

1378. Urban VI. pope. Clement VII. anti-pope at Avignon. The schism lasts forty years. Wenceslas (king of Bohemia) emperor. Cession of Cherbourg to the English by the king of Navarre. Appearance of Halley's Comet.

1379. Wycliffe sends out his poor priests. The emperor John V. imprisoned.

1380–1386. Conquest of Khorassan by Timur.

1380. Wycliffe's English New Testament completed. Death of Bertrand Duguesclin. Charles VI. king of France. Regency of duke of Anjou. Joanna queen of Naples deprived by Urban VI. Charles of Durazzo made king of Naples. Birth of Thomas à Kempis (died, 1471).

1381. Wycliffe's declaration against transubstantiation. Poll-tax granted in England. Revolt of the peasantry under Wat the Tyler. Arrest of Lollard preachers ordered. Wycliffe's opinions condemned by synod of London. An earthquake during the synod. The emperor John V. escapes from prison and becomes tributary to Amurath I.

1382. Victory of the French over the Flemings at Rosbecque.

1383. Expedition of Spencer bishop of Norwich into Flanders. Death of Queen Joanna of Naples.

1384. Wycliffe's English Bible completed about this time. Death of Wycliffe, December 31. Philip the Bold becomes count of Flanders.

1385. Urban VI. besieged in the castle of Nocera (Luceria) by Charles of Durazzo. He escapes to Genoa and puts five cardinals to death for conspiracy. The Scots aided by the French invade England. Richard II. takes and burns Edinburgh. Battle of Aljubarotta,—victory of John I. of Portugal over John I. of Castile.

1386. Timur invades Persia. Battle of Sempach,—Leopold of Austria defeated by the Swiss, July 9. Council of Regency in England, under duke of Gloucester. Impeachment of the earl of Suffolk. University of Heidelberg founded. The Jagellon dynasty established in Poland.

1387. Treaty concluded between Amurath I. and the Genoese of Pera. The barons arm against Richard II. and seize the Tower of London.

1388. Scottish invasion of England. Battle of Otterburn (August 19). Douglas killed and Percy (Hotspur) taken prisoner. Jubilee period reduced to 33 years. Battle of Falkioping,—Margaret queen of Norway, Denmark, and Sweden defeats and captures Albert of Sweden.

1389. Amurath I. defeats the Servians, Hungarians, and Bulgarians at Kassova and is killed. Bajazet I. succeeds him. Truce between France and England. Richard II. takes the government into his own hands. Boniface IX. pope. Compact of Nuremberg, between the emperor and German princes, against the Jews. Battle of Nafels,—victory of the Swiss over the Austrians, April 9.

1390. Statute passed for uniformity of weights and measures in England (Lancashire excepted). Constantinople unsuccessfully besieged by Bajazet. Third jubilee celebrated.

1391. Manuel II. emperor of the East (associated with his father since 1375). Conquest of Asia Minor completed by Bajazet.

1393 (*circa*). Gerson chancellor of the university of Paris.

1394. Four years' truce between England and France. Benedict XIII. pope at Avignon. Richard II. holds a parliament in Ireland. Jews banished from France by Charles VII. Nicolas de Clemangis publishes his *De Ruina Ecclesiæ*.

1395. Milan erected into a duchy for the Visconti by the Emperor Wenceslas. Battle of Nicopolis,—victory of Bajazet over Sigismund of Hungary and the Christians, September 28. Invasion of Russia by Timur.

1396. Marriage of Richard II. with Isabella of France. Truce for 25 years.

1397. Murder of the duke of Gloucester at Calais. The regency declared illegal. Union of Calmar, between Sweden, Denmark, and Norway.

1398–1399. Invasion of India, and capture of Delhi, by Timur. Anti-pope Benedict XIII. imprisoned in his palace at Avignon by Marshal Boucicaut. Boucicaut leads an army to the assistance of Manuel II.

1399. Deposition of Richard II. Henry IV. (first of the house of Lancaster) king of England. Order of Knights of the Bath instituted. Manuel sets out to visit European courts, December.

1400. Deposition of the emperor Wenceslas by the electors; election of Rupert, Count Palatine. John Huss ordained priest. Revolt of Owen Glendower in Wales. Invasion of Scotland by Henry IV. Death of Chaucer, Oct. 25. Birth of Guttenberg (died, 1467).

1401. The statute of heretics (*de hæreticis comburendis*) passed in England. William Sautre, a Lollard, burnt.

1402. Sultan Bajazet defeated and taken prisoner by Timur at Angoria; Soliman I. sultan. The Scots invade England, and are defeated by Hotspur at Homildon Hill. Return of Manuel to Constantinople.

1403. Death of Bajazet. The French make descents on Wales and the Isle of Wight. Benedict XIII. escapes from imprisonment. Revolt of the Percies. Battle of Shrewsbury,—Hotspur killed, July 23.

1404. Death of Philip the Bold, duke of Burgundy. Innocent VII. pope, succeeding Boniface. French descents on England. Alliance of the king of France with Glendower.

1405. Death of Timur. Revolt at Rome. Ladislas, king of Naples, seizes Rome and expels Innocent VII. Revolt of Archbishop Scrope. Birth of Æneas Sylvius (Pope Pius II.).

1406. James I. king of Scots. He is imprisoned in the Tower of London. Return of Innocent to Rome. Gregory XII. pope.

1407. Assassination of Louis, duke of Orleans, by John, duke of Burgundy, at Paris; origin of the civil war between Burgundians and Armagnacs. John Risby, Lollard preacher, burnt in Scotland.

1408. John Huss appeals to the Pope. Ladislas again enters Rome. Benedict holds a council at Perpignan.

1409. The rival popes are deposed by Council of Pisa. Alexander V. elected. Ladislas driven from Rome. University of Leipsic founded.

1410. Death of Alexander V. John XXIII. pope. John Huss excommunicated. Sigismund, emperor of the Romans, opposed by Josse, margrave of Moravia, who dies in a few months. Jagellon, king of Poland, defeats Teutonic Knights at Tannenberg, July 15. Wood-engraving begins to be practised about this time.

1411. Huss again excommunicated. Ladislas defeated; crusade published against him. Henry IV. sends troops to the duke of Burgundy. The university of St. Andrews founded. Battle of Harlaw,—defeat of Donald, lord of the Isles, by Earl of Mar, July 24.

1412. Henry IV. concludes a treaty with the Orleans party. Huss burns the Pope's bull. Ladislas makes peace with the Pope. Death of Margaret, queen of Norway, Sweden, and Denmark.

1413. Ladislas expels John XXIII. and plunders Rome. Interview of John XXIII. and the emperor at Lodi. The Pope convokes a council at Constance. Henry V. king of England. Sir John Oldcastle condemned as a heretic; escapes from the Tower. Mohammed I. sultan of the Ottomans.

1414. Death of Ladislas of Naples. Council of Constance (sixteenth General Council) opened November 5. Persecution of Lollards by Henry V.

1415. Abdication of John XXIII. He is arrested, deposed, and imprisoned by the council. Abdication of Gregory XII. John Huss burnt, July 6. Siege and capture of Harfleur by Henry V. Battle of Agincourt, October 25. Meeting of Benedict XIII. and Sigismund at Perpignan.

1416. Jerome of Prague burnt at Constance. Ceuta taken from the Moors by John I. king of Portugal, May 30. Sigismund visits France and England.

1417. Benedict XIII. deposed. Martin V. elected pope by Council of Constance. Death of Cardinal Robert Hallam, bishop of Salisbury, at Constance. Invasion of Normandy by Henry V. Caen besieged and taken. Gypsies appear in Germany about this time. The county of Savoy erected into a duchy.

1418. Massacre of Armagnacs at Paris by the Burgundians. Sir John Oldcastle hung in chains and burnt. Council of Constance closed, April 22. Prince Henry, the Navigator (born, 1394), begins to send out exploring expeditions.

1419. Madeira re-discovered by Portuguese. Death of the ex-emperor Wenceslas. John Ziska commander-in-chief of the Hussites. Assassination of the duke of Burgundy at Montereau. Death of Albany, regent of Scotland.

1420. Treaty of Troyes. Henry V. regent of France. Marriage of Henry with princess Catherine of France. Hussite wars begin. Crusade against Hussites proclaimed by the Pope. Ziska takes Prague and defeats Sigismund. The Pope receives at Florence an embassy from Manuel Palæologus, emperor of the East; he enters Rome.

1421. Henry V. holds a parliament at Rouen. Amurath II. sultan. Great inundation in Holland, the "Biesbosch" formed.

1422. Henry VI. king of England and France. Charles VII. crowned king of France. Regency of Bedford in France, of Gloucester in England. Siege of Constantinople by Amurath II.

1423. Council of Siena (transferred from Pavia) opened. Earliest specimen of Block Book dated this year. University of Louvain founded.

1424. James I. of Scotland liberated by Henry VI., proclaimed and crowned. Bedford defeats the French and Scots at Verneuil. Death of Benedict XIII. Election of anti-pope Clement VIII. Council of Siena transferred to Basel. Death of Ziska.

1425. John Palæologus II. emperor of the East; he concludes treaty with Amurath II. Statute for punishment of heretics and Lollards passed in Scotland.

1426. Rivalry of Gloucester and Cardinal Beaufort in England. Defeat of the Germans by Hussites at Aussitz.

1428. Siege of Orleans by the English. Death of the Earl of Salisbury. Lincoln College, Oxford, founded.

1429. Joan of Arc raises the siege and enters Orleans. Talbot defeated at Patay. Charles VII. crowned at Rheims. Termination of the schism in the papacy by abdication of Clement VIII. Order of the Golden Fleece instituted by Philip the Good, duke of Burgundy. Death of Gerson.

1430. Capture of Joan of Arc. Conquest of Thessalonica by Amurath II.

1431. Joan of Arc burnt at Rouen (?). Henry VI. crowned at Paris. Eugenius IV. pope. Eighteenth General Council transferred from Siena to Basel, opened July 23. Hussite invasion of Germany. Fifth crusade against Hussites. Battle of Taas,—victory of Hussites. Birth of Mantegna (died, 1506).

1432. The Azores taken possession of by Portuguese.

1433. Sigismund crowned at Rome by the Pope. Death of John I. the Great, king of Portugal.

1434. René the Good, duke of Anjou, succeeds his brother Louis as king of Naples; opposed by Alphonso V. of Aragon. Death of Ladislas of Poland. Cosmo de' Medici supreme at Florence about this time. Flight of Eugenius from Rome.

1435. Congress and Treaty of Arras,—abandonment of English alliance by the duke of Burgundy. Death of Bedford.

1436. Paris retaken by the French. Calais unsuccessfully besieged by the duke of Burgundy. States-General meet at Orleans. War between England and Scotland.

1437. John Palæologus embarks at Constantinople in the Pope's galleys for an interview at Ferrara. Murder of James I. king of Scots; James II. succeeds. Death of Sigismund. Birth of Cardinal Ximenes. Ulugh Begh compiles his Star Tables.

1438. Albert II. emperor (duke of Austria, and king of Hungary and of Bohemia). Council of Ferrara convoked by Eugenius IV. in opposition to Council of Basel; the emperor John Palæologus and the Greek Patriarch present. The Pope deposed by the Fathers of Basel, and the latter excommunicated at Ferrara; Amadeus, duke of Savoy, elected pope (Felix V.) at Basel.

Pragmatic Sanction (the *Palladium* of France), limiting the power of the Pope in France, established by Charles VII. Nine years' truce made between England and Scotland.

1439. Council of Ferrara transferred to Florence,—decree for union of Greek and Roman churches signed, but rejected by the Greeks. Doctrine of Purgatory adopted. Death of Albert II. Cardinal Bessarion, "restorer of learning," settles in Italy. Alliance of Zurich with Austria.

1440. Frederick IV. (III.) emperor. Invention of printing with movable types about this time. Amadeus declared anti-pope, heretic, &c., by Council of Florence. Belgrade unsuccessfully besieged by Amurath II. Title of Viscount introduced in England. Eton College founded. Oil-painting perfected by Jan van Eyck about this time.

1442. Abdication of Amurath II. Naples taken by Alphonso of Aragon, the kingdom lost by René of Anjou; union of Naples and Sicily as the Two Sicilies.

1443. Eugenius IV. forms a league against the Turks. Victory of John Hunniades at Kunobitza. King's College, Cambridge, founded by Henry VI.

1444. Peace of ten years between Hungary and the Turks concluded at Szegedin. The treaty violated with the Pope's sanction. Victory of the Turks and death of Ladislas and Cardinal Julian at Varna. George Podiebrad seizes the chief power in Hungary. African slave-trade begun by Portuguese. Revolt of Albania under Scanderbeg. Expedition of Charles VII. of France, at request of the emperor, against the Swiss. The siege of Zurich raised. Second abdication of Amurath II.

1445. Marriage of Henry VII. with Margaret of Anjou.

1447. Deaths of the duke of Gloucester and Cardinal Beaufort. Nicholas V. pope. End of the Visconti dynasty at Milan; Francisco Sforza claims the duchy. Foundation of the Vatican Library by Nicholas V.

1448. Constantine XI., Palæologus, last emperor of the East. Anjou and Maine surrendered to the French. Concordat between the empire and the Pope. Birth of Lorenzo de' Medici.

1449. Abdication of Felix V., anti-pope. Normandy conquered by the French. Queen's College, Cambridge, founded.

1450. Jubilee at Rome proclaimed by Nicholas V.; the period again raised to 50 years. Francisco Sforza takes Milan and is proclaimed duke. Impeachment and death of the duke of Suffolk. Insurrection of Jack Cade. Copper-plate engraving invented by Maso Finiguerra about this time.

1451. Mohammed II. sultan of the Ottomans. Conquest of Gascony by the French; Calais alone left to the English. Glasgow University founded.

1452. Murder of the Douglas by James II. The duchies of Modena and Reggio erected by Frederick III. Coronation of Frederick III. by the Pope at Rome (the last emperor crowned at Rome). Birth of Savonarola. Birth of Leonardo da Vinci (died, 1519).

1453. Conspiracy of Stephen Porcaro at Rome. Siege of Constantinople by the sultan Mohammed II. formed, April 6; the city taken by assault, May 29. Death of Constantine,—end of the eastern empire. Austria erected into an archduchy. Talbot defeated and killed at Castillon. First treaty between France and the Swiss.

1454. The duke of York protector in England.

1455. Calixtus III. pope. The Wars of the Roses begin with the first battle of St. Alban's, May 23. The earl of Warwick captain of Calais. Probable date of the *Mazarine Bible*, the earliest printed book known.

1456. Mohammed II. besieges Belgrade and is defeated by John Hunniades, who dies soon after.

1457. Death of Ladislas the Posthumous, king of Hungary and Bohemia. Reginald Pecock, bishop of Chichester, condemned by archbishop of Canterbury and imprisoned.

1458. Matthias Corvinus elected king of Hungary, George Podiebrad king of Bohemia. Pius II. (Æneas Sylvius Piccolomini) pope. Magdalen College, Oxford, founded. Conquest of the Morea by Mohammed II.

1459. Death of Poggio (born, 1381). University of Basel founded.

1460. Battle of Northampton. James III. king of Scots. The duke of York defeated and killed at battle of Wakefield. Cape Verd discovered by Diogo Gomez. Death of Prince Henry, the Navigator.

1461. Second battle of St. Alban's. Edward IV. (house of York) king of England. Battle of Towton. Louis XI. king of France. Conquest of Trebizond by Mohammed II.

1462. Mohammed reduces Wallachia. The emperor, besieged in Vienna, is delivered by George Podiebrad. Alliance of Louis XI. with the Swiss and the duke of Milan. Ivan III., the Threatening, grand duke of Russia.

1463. The university of Bourges founded by Louis XI. Venetian and Turkish war. Alliance between Venice, Hungary, and the Pope. Excommunication of George Podiebrad. Truce of Hesdin between Louis XI. and Edward IV.

1464. Formation of the *Ligue du bien public* in France. Posts established by Louis XI. Paul II. pope. Death of Cosmo de' Medici. Death of Cardinal Nicolas de Cusa. Fifteen years' truce between England and Scotland. Battle of Hexham. Conquest of Genoa by Sforza.

1465. Civil war in France. Battle of Montlhéry. Treaties of Conflans and St. Maur. Podiebrad deprived of his kingdom by Paul II.

1466. Normandy reannexed to the French crown. Imprisonment of Henry VI. in the Tower. Treaty of Thorn. Second excommunication of Podiebrad. Birth of Colet (died, 1519).

1467. Death of Scanderbeg. Charles the Bold, duke of Burgundy. Alliance between Edward IV. and Charles the Bold. Birth of Erasmus (died, 1536).

1468. The States-General meet at Tours. Marriage of Charles the Bold with Margaret of York. Treaty of Péronne, between Louis and Charles. Louis held prisoner by Charles. Liége taken and burnt by Charles.

1469. Marriage of James II. of Scotland with Margaret of Denmark. The Orkney and Shetland Islands surrendered to James. Order of St. Michael instituted by Louis XI. Lorenzo de' Medici head of the Florentine republic. Marriage of Ferdinand of Aragon with Isabella of Castile. Birth of Machiavelli (died, 1527).

1470. Ivan III. conquers Kasan and Novgorod. Flight of Warwick to France. Flight of Edward IV. to Burgundy. Henry VI. restored by Warwick. Conquest of Negropont by Mohammed II. The jubilee period fixed at 25 years.

1471. Return of Edward. Battles of Barnet and Tewkesbury. Deaths of Warwick and Henry VI. Invasion of France by Charles the Bold. Sixtus IV. pope. Death of Podiebrad. Birth of Wolsey (died, 1530). Birth of Albert Durer (died, 1528). Archbishopric of St. Andrews erected.

1472. Charles the Bold buys Guelderland and Zutphen. Guienne annexed to the crown of France. Marriage of Ivan III. with Sophia, daughter of Constantine Palæologus. Birth of Copernicus (died, 1543).

1473. Birth of Chevalier Bayard (died, 1524).

1474. The Perpetual Alliance between Louis XI. and the Swiss Confederation. Holstein erected into a duchy. Ferdinand and Isabella proclaimed sovereigns of Castile. Rival claim of Joanna supported by Alphonso V. of Portugal. Neuss besieged by Charles the Bold. Birth of Ariosto (died, 1533).

1475. Invasion of Burgundy by the Swiss. The siege of Neuss raised. Alliance of Edward IV. and Charles the Bold. Invasion of France by Edward. Peace of Pecquigny. University of Bordeaux founded. Birth of Michelangelo (died, 1564). Jubilee at Rome.

1476. Invasion of the Swiss Cantons by Charles. Victories of the Swiss at Granson, March 3, and Morat, June 22. Mohammed II. ravages Moldavia and conquers the Crimea. Caxton sets up his printing-press at Westminster, 1476 or 1477.

1477. Siege of Nancy by Charles the Bold, who falls in battle. His daughter Mary succeeds him. Marriage of Mary with Maximilian of Austria. Seizure of Burgundy by Louis. The "Grand Privilege" granted to the Dutch by Mary. Mohammed II. conquers Albania. University of Tübingen founded. Birth of Titian (died, 1576).

1478. Trial and death of the duke of Clarence. Conspiracy of the Pazzi at Florence sanctioned by Sixtus IV. Lorenzo de' Medici excommunicated by the Pope. Ivan III. defeats Ahmed, khan of the Golden Horde. Christian I. of Denmark founds the university of Copenhagen and the order of the Elephant. University of Upsala founded by Sten Sture.

1479. Ferdinand, the Catholic, becomes king of Aragon. Battle of Guinegate. Peace of Olmutz between Matthias Corvinus and the emperor. Ludovico il Moro takes possession of Milan.

1480. The Spanish Inquisition established by Ferdinand and Isabella. Birth of Sir Thomas More. Siege of Rhodes by Mohammed II. Conquest of Otranto. War breaks out between England and Scotland. Alliance of Lorenzo de' Medici with Ferdinand of Naples.

1481. Bajazet II. sultan of the Ottomans. Provence annexed to France. Beginning of the war between the Spaniards and the Moors. Alhama surprised by Spaniards. Otranto recovered from the Turks. First *auto-da-fé* in Spain, at Seville, by Torquemada.

1482. Death of Mary of Burgundy. Peace of Arras. The duke of Albany assumes the title of king of Scotland. Alliance of the duke with Edward IV.; siege of Berwick. Capture of Edinburgh by Albany and Gloucester. Cardinal Mendoza appointed archbishop of Toledo. Birth of Guicciardini (died, 1540). Birth of Œcolampadius (died, 1531).

1483. Edward V., king of England, murdered. Richard III. king of England. Charles VIII. king of France, regency of Anne of Beaujeu. League of Italian states against Venice. The Venetians excommunicated by Sixtus IV. Birth of Luther (died, 1546). Birth of Baber. Birth of Raphael (died, 1520). Torquemada inquisitor-general of Castile and Aragon.

1484. Birth of Zwingli (died, 1531). Innocent VIII. pope.

1485. Battle of Bosworth, August 22. Henry VII. (house of Tudor) king of England. Capture of Vienna by Matthias Corvinus. Birth of Sebastiano del Piombo (died, 1547).

1486. Rising of Lambert Simnel. Cape of Good Hope dis-

covered by Bartolomeo Diaz. Henry VII. marries Elizabeth of York.

1487. Defeat and capture of Simnel at battle of Stoke. Birth of Miles Coverdale. Conquest of Austrian states by Mattbias. Defeat and capture of the kban of Kasan by Ivan III. Zizim, brother of Bajazet II., kept prisoner by the Pope till 1495.

1488. James IV. king of Scotland. Disturbances in Flanders. Imprisonment of Maximilian at Bruges. Revolt of French princes. Battle of St. Aubin. Grand Swabian League formed (dissolved, 1533). Birtb of Andrea del Sarto (died, 1530).

1489. Treaty between Cbarles VIII. and Maximilian. Maximilian recognized by the Flemish towns as regent. Marriage (by proxy) of Maximilian to Anne of Brittany. Cyprus acquired by Venice. Tbe Pope deposes Ferdinand of Naples. Death of John Wessel (born, 1420).

1490. The marriage of Maximilian annulled. Death of Matthias Corvinus. Austria recovered by the emperor. Birth of Hugh Latimer about tbis time.

1491. Treaty of Presburg between the emperor and Ladislas of Hungary. Marriage of Charles VIII. with Anne of Brittany. Duchy of Brittany annexed to crown of France.

1492. Granada taken by Ferdinand V. End of the Moorish dominion in Spain. Tbe title of "Catholic" conferred on Ferdinand by the Pope. Expulsion of Jews from Spain. Death of Lorenzo de' Medici. Alexander VI. pope. Columbus sails on his first voyage, August 3; lands on San Salvador, October 12. Variation of the compass observed by Columbus. Invasion of France by Henry VII. Treaty of Etaples. Appearance of "Perkin Warbeck" in Ireland. Terrestrial Globe ("World-Apple") constructed by Martin Behaim.

1493. Birth of Paracelsus (died, 1541). Maximilian I. emperor. Treaty of Narbonne. Treaty of Senlis. Second voyage of Columbus. Bull of Alexander VI., fixing "line of demarcation" between Spanish and Portuguese possessions.

1494. Expedition of Charles VIII. to Italy. Discovery of Jamaica by Columbus. Savonarola restores popular government in Florence. Negotiations between the Pope and the Sultan. Poyning's Law (Ireland) passed. Persecution of the Lollards of Kyle.

1495. Death of Cardinal Mendoza. Treaty between the Pope and Charles VIII. Charles enters Naples. Battle of Fornova. Treaty of Vercelli. Naples re-entered by Ferdinand II. "Perkin Warbeck" invades England. Birth of Holbein (died, 1543).

1496. Evacuation of Naples by the French.

1497. Newfoundland discovered and the mainland of America reached by the Cabots. The Cape of Good Hope doubled by Vasco di Gama. Excommunication of Savonarola. "Perkin Warbeck" captured. Birth of Melanchthon (died, 1560).

1498. Louis XII. king of France. Savonarola hung and burnt, May 23. Third voyage of Columbus; the mainland of America reached. Death of Torquemada.

1499. Marriage of Louis XII. with Anne of Brittany. Conquest of the Milanese by the French. The mainland of America reached by Ojeda and Amerigo Vespucci. Execution of "Perkin Warbeck." Lepanto seized by the Turks.

1500. Birth of Charles the Fifth. Brazil discovered by Pinzon. Triumphal entry of Cæsar Borgia into Rome. Insurrection against the French at Milan. Sforza betrayed by the Swiss at Novara. Tbe Aulic Council established. Germany divided into six circles; into ten in 1512. Birtb of Benvenuto Cellini (died, 1571).

1501. Conquest of Naples by Louis XII. and Ferdinand the Catholic; they quarrel about partition of the kingdom; war lasts till 1504. Marriage of Arthur Tudor with Catherine of Aragon. Expulsion of the Moors from Spain. Columbus brought home in chains.

1502. Marriage of James IV. of Scotland with Margaret Tudor. Fourth voyage of Columbus. Treaty of peace between Turks and Venetians. University of Wittenberg founded.

1503. Battle of Cerignola. Tbe French driven from Naples by the Spaniards. Pius III. pope; on his death, Julius II. Borgia driven from Rome. Birth of Robert Stephens (Estienne) (died, 1559).

1504. Tbe Spanish conquest of Naples completed by the capture of Gaeta by Gonsalvo of Cordova, January 1. Treaty of Blois, between Louis XII., Maximilian I., and Archduke Philip. Alliance between Julius II., Louis, and Maximilian. Death of Queen Isabella. Baber becomes king of Cabul. Birth of Parmigiano (died, 1540).

1505. Baber conquers Candahar. Christ's College, Cambridge, founded. Birth of John Knox. Treaty of Blois between Louis and Ferdinand. Marriage of Ferdinand with Germaine de Foix. Colet dean of St. Paul's.

1506. Concord of Salamanca, between Ferdinand and Philip king of Castile. Death of Columbus, May 20. Madagascar discovered by Almeida. Birth of George Buchanan (died, 1582). First stone of St. Peter's at Rome laid, April 18.

1507. Margaret of Austria governess of the Netherlands. Reforms in the empire established at Diet of Constance.

1508. Unsuccessful expedition of Maximilian to Italy. The League of Cambray formed between the Pope, the emperor, and the king of France, against Venice, December 10. Birth of Alva.

1509. Henry VIII. king of England, April 22; his marriage with Catherine of Aragon, June. Wolsey almoner to the King. Conquest of Oran by Cardinal Ximenes. Excommunication of the Venetians by Julius II. Battle of Agnadello. Pisa sold to Florence. Capture of Padua by Venetians. Unsuccessful siege of Padua by Maximilian. Birth of Calvin (died, 1564). Albuquerque, governor of the Indies.

1510. Reconciliation between the Pope and the Venetians. Death of Cardinal d'Amboise. Conquest of Cuba by Spaniards. Louis XII. holds a national council at Tours. Luther visits Rome. Goa stormed by Albuquerque. Portuguese settlement in the Moluccas. University of Alcala founded by Ximenes.

1511. Capture of Mirandola by Julius II. The Holy League between the Pope, Ferdinand, and Venice. League between Ferdinand and Henry VIII. against France. Council of Pisa. Malacca taken by Albuquerque. Baber acquires Bokbara and Samarcand.

1512. Selim I. sultan of the Ottomans. Siege and sack of Brescia by Gaston de Foix. Battle of Ravenna, death of Gaston. Death of Giorgione (born, 1477). Nineteenth General Council (fifth of the Lateran) opens May 3. League between James of Scotland and Louis XII. War between England and France. Julius II. excommunicates Louis, and lays interdict on France. The Trinity House founded about tbis time. Conquest of Navarre and incorporation with Castile. Birth of Tintoretto (died, 1594). Birth of Vasari (died, 1574).

1513. Leo X. elected pope, March 11. Battle of the Spurs. Siege and capture of Terouenne by Henry VIII. Battle of Flodden, James IV. defeated and killed. Capture of Tournay. Christian II. king of Denmark. Balboa, "silent upon a peak in Darien," first sees the Pacific Ocean, September 25. Persecution of Reuchlin by tbe Inquisition. Louis XII. makes peace with tbe Pope.

1514. Death of Anne of Brittany. Truce between Louis and Ferdinand. Peace between England and France. Marriage of Louis with Mary of England, Oct. 9. Peace between England and Scotland. Wolsey made archbishop of York.

1515. Francis I. king of France, January 1; regency of his mother Louisa. French invasion of Italy. Battle of Marignano. Subjugatiou of the Milanese. Meeting of Louis X. and Francis I. at Bologna. Concordat signed and the Pragmatic Sanction abolished. Wolsey created cardinal and appointed chancellor. Birth of Roger Ascham (died, 1568). First part of tbe *Epistolæ Obscurorum Virorum* published (second part, 1517). Death of Botticelli (born, 1447).

1516. Death of Ferdinand the Catholic, January 23. Charles I. king of Spain. Regency of Ximenes. Treaty of Noyon, between Charles and Francis I. Treaty of London,—league against France. Peace of Brussels, between the emperor, Francis I., and the Venetians, December 4. Tbe "Perpetual Peace" between France and tbe Scots. Barbarossa, sultan of Algiers. More's *Utopia* published.

1517. Council of the Lateran closed, March 16. Sale of Indulgences authorized by Leo X. Tetzel in Germany. Luther's *Theses* published, October 31. Death of Ximenes, November 8. Sovereignty of the Mamelukes in Egypt overthrown by Selim I. Fernao d'Andrada visits China. Birth of John Foxe (died, 1587). Death of Fra Bartolommeo (Baccio della Porta) (born, 1469). Death of Francia (born about 1450).

1518. Wolsey made papal legate. Treaty between Francis I. and Henry VIII. Luther before Cajetan at Diet of Augsburg. Luther condemned by tbe Pope; appeals to General Council. Zwingli preacher at cathedral of Zurich.

1519. Death of Maximilian I., January 12. Charles I. of Spain elected Emperor (Charles V.), June 28. Disputation of Luther and Dr. Eck at Leipsic, June–July. Mexico taken by Cortez, November. Magdalen College, Cambridge, founded.

1520. Visit of Charles V. to England. Meeting of Henry VIII. and Francis I. on the Field of the Cloth of Gold, June. Bull of Leo X. against Luther, June. Cortez leaves Mexico, July. Luther burns the bull, December 10. Soliman II., the Magnificent, Sultan of the Ottomans. Massacre of Stockholm by Christian II., November. Magellan enters tbe Pacific Ocean, November 28.

1521. Luther excommunicated, January 3. Luther at tbe Diet of Worms, April. Carried off to the Wartburg. Execution of tbe duke of Buckingham. Excommunication of Francis I. Treaty of Bruges. Belgrade taken by Soliman. Henry VIII writes against Luther and receives the title of Defender of the Faith. Gustavus Vasa administrator of Sweden. Siege and capture of Mexico by Cortez, May to August. Milan recovered from the French. Death of Leo X., December I. Ladrone and Philippine Islands discovered by Magellan. The Log mentioned. Melanchthon's *Loci Communes* published.

1522. Adrian V. pope, January. Tbe French defeated in Lombardy. Charles V. visits England. Henry VIII. invades France. Persecution of the Moors in Spain. Rbodes surrenders to Soliman. Bomb-shells used by Turks at this siege. Escape of the

Constable de Bourbon from France. Death of Reuchlin (born, 1455). First voyage around the world made by a ship of Magellan's squadron. Complutensian Polyglot Bible published.

1523. League of Constable de Bourbon with the emperor and Henry VIII. Invasion of France. League of Rome. Capture of Jedburgh by earl of Surrey. Gustavus Vasa king of Sweden. Invasion of Italy by the French. Death of Ulrich von Hutten. (born, 1488). Clement VII. pope, November 19. Christian II. of Denmark deposed: Frederick I. elected king.

1524. Capture of Copenhagen by Frederick I. Rout of the French and death of Bayard at the Sesia. Peasant war in Germany breaks out under Munzer. Wolsey made legate for life. Invasion of the Milanese by Francis I. Siege of Pavia. Lahore taken by Baber. Luther's controversy with Carlstadt. Mikkelsen's *Danish New Testament* published. Birth of Palestrina (died, 1594). Death of Perugiuo (born, 1446). Death of Signorelli (born about 1440).

1525. Battle of Pavia,—Francis I. taken prisoner by Imperialists, February 24. Luther's marriage. League of Torgau. Treaty between England and France. Munzer defeated at Frankenhausen, and executed. Death of Frederick the Wise of Saxony; John the Constant succeeds him. Visitation of the monasteries undertaken by Wolsey. Religious liberty established in Denmark. The Buccaneers begin their piracies in the West Indies about this time. Secularization of the territory of the Teutonic knights; East Prussia erected into a duchy for Albert of Brandenburg, the grand-master.

1526. Marriage of Charles V. with Isabella of Portugal, January. Treaty of Madrid, January 14. Francis liberated, February. League of Cognac between Francis, the Pope, Venice, and Henry VIII., March. Battle of Paniput,—victory of Baber over Ibrahim Lodi, April. Diet of Spires, June. Victory of Soliman over Hungarians at Mohacz, August. Buda burnt. The Pope captured by Cardinal Colonna, September. Pizarro and Almagro arrange partition of Peru. *Swedish New Testament* published. Tyndale's *New Testament.*

1527. The crown of Hungary disputed by John Zapolya and Ferdinand of Bohemia. Rome taken and sacked by the Imperialists, the Pope taken prisoner, May. Death of Constable de Bourbon. Treaty between the emperor and the Pope. New alliance between England and France. Application of Henry VIII. to the Pope to examine into the lawfulness of his marriage. Capture of Genoa and Pavia by the French. Discovery of Bermudas by Juan Bermudez, and of New Guinea by the Portuguese. University of Marburg founded.

1528. Coronation of Gustavus, January 12. England and France declare war on the emperor. Patrick Hamilton burnt at Glasgow, February. Campeggio in England. Expulsion of the French from Genoa by Andrea Doria, September. *Latin Bible* of Pagninus published.

1529. The legatine court in England opened. Diet of Spires, at which the name "Protestants" is adopted. Peace of Cambray. Soliman takes Buda and gets Zapolya crowned king of Hungary, September. Lutheranism established in Sweden by Diet of Orebro. Vienna besieged by Soliman. Conference of Marburg, October. Fall of Wolsey. Conferences of the Pope and the emperor at Bologna, November to January, 1530. Death of Quintin Matsys (born, 1460).

1530. Coronation of Charles as king of Lombardy and emperor, February. The marquisate of Mantua erected into a duchy, March. Malta given by Charles V. to the knights of St. John. Diet of Augsburg opens, June 13; closes November 13. *Confession of Augsburg.* Marriage of Francis I. with Eleanor of Austria, July 4. Death of Wolsey, November 29. Death of Margaret, governess of the Netherlands. Death of Baber, December 26; Humayun succeeds. League of Smalkald formed, December 31.

1531. Inundation in Holland. Earthquake at Lisbon, January. Expulsion of Gypsies from England. Death of Zwingli at the battle of Cappel, October 11.

1532. First religious peace (peace of Nuremberg) concluded, July. Diet of Ratisbon. The *Caroline Code* passed. Court of Sessions organized by James V. Private marriage of Henry VIII. with Anne Boleyn. Christian II. imprisoned. Florence erected into a duchy for the Medici. Peru taken possession of by Pizarro and Almagro. Duchy of Brittany reunited to the crown of France. Machiavelli's *Del Principe* published. Bruccioli's *Italian Bible.* Antwerp Exchange built—the first of the kind.

1533. Cranmer archbishop of Canterbury. He pronounces Henry's marriage with Catherine null and void. His decision reversed by the Pope. John Fryth burnt at Smithfield. Marriage of Henry, duke of Orleans, with Catherine de' Medici. Flight of Calvin from Paris. Treaty between Francis I. and Barbarossa. Birth of Montaigne (died, 1592). Death of Lucas van Leyden (born, 1494.)

1534. The Papal power in England abrogated by Act of Parliament. The Act of Supremacy. Anabaptists besieged in Munster by the prince-bishop. Execution of Elizabeth Barton, the holy maid of Kent. Paul III. pope, October 13. Barbarossa seizes the kingdom of Tunis. John of Leyden (Bockelsohn), head of the Anabaptists at Munster. Society of Jesus founded by Loyola, Lainez, and others. Death of the earl of Kildare in the Tower of London, December. Munster's *Latin Bible.* Luther's Bible completed. Death of Correggio.

1535. Henry VIII. takes the title of Supreme Head of the Church of England, January. Expedition of Charles V. to Tunis; defeat of Barbarossa, capture of Tunis, June. Capture of Munster and execution of John, June. Thomas Cromwell vicar-general of the king in England. Visitation of the monasteries undertaken. Persecution of French Protestants. Execution of Fisher and More. George Wishart begins preaching in Scotland. Milan taken possession of by Charles V., October Siego of Copenhagen by Christian III. begun. Buenos Ayres founded by Pedro de Mendoza. Calvin's *Institutio Religionis Christianæ* published. Olivétan's *French Bible.* Coverdale's *English Bible.* Canada visited by Jacques Cartier.

1536. Death of Catherine of Aragon, January 8. Alliance between Francis I. and Soliman, against Charles V. Overthrow of the Geraldines in Ireland. Execution of Queen Anne (Boleyn) May 19, and marriage of Henry VIII. with Jane Seymour, May 20. Attainder of Reginald Pole for his book *De Unitate Ecclesiastica.* Incorporation of Wales with England. Calvin goes to Geneva. Dissolution of the lesser monasteries in England. Invasion of France by Charles V., July. Surrender of Copenhagen to Christian III., July 29. Siege of Marseilles by Charles, August to December. Lutheranism established in Denmark. Defeat of Imperialists by Turks at Eszek, November. Tyndale burnt at Vilvoord, October 6. The bull *In Cœna Domini* published by Paul III.

1537. Marriage of James V. with Madeleine of France, January 1. Catholic insurrection in England. Campaign of the French in the Netherlands. Death of Queen Madeleine, July 7. Commission of inquiry into the grievances of Ireland. Death of Queen Jane, October. Eruption of Etna, lasts a year.

1538. Calvin banished from Geneva, April. Negotiations of Charles V. and Francis I. at Nice, a truce for ten years signed, June. The Holy League of Nuremberg formed, June. Marriage of James V. of Scotland with Mary of Lorraine, June. Use of English Bible in churches enjoined, September. Parish registers ordered to be kept in England, September. Execution of relatives of Cardinal Pole; imprisonment of his mother the Countess of Salisbury. Paul III. excommunicates and deposes Henry VIII., December. Severe edict of Francis I. against the Protestants. David Beatoun created cardinal, December. The *Great Bible* published.

1539. Treaty of Toledo, "perpetual peace" between Charles and Francis, signed January 10. Dissolution of the Spanish Cortes, February. Revolt of Ghent. Dissolution of all monasteries in England. Statute of the Six Articles passed. Cardinal Beatoun archbishop of St. Andrews. Birth of Socinus (died, 1604).

1540. Entry of Charles and Francis into Paris, January 1. Marriage of Henry VIII. with Anne of Cleves, January 6. Charles at Ghent,—execution of leading citizens, ancient liberties suppressed, February. The Order of Knights of St. John suppressed in England. Execution of Thomas Cromwell, July 28. Henry marries Catherine Howard, July 28. Appointment of a second secretary of state in England. Disputation of Papist and Protestant doctors at Worms, November. The Society of Jesus conditionally sanctioned by Paul III. (unconditionally, 1543). The Louvre begun by Francis I. The rupee first issued.

1541. Diet of Ratisbon. Execution of Countess of Salisbury. Invasion of Hungary by Soliman. Occupation of Buda. Death of John Zapolya. Disastrous expedition of Charles V. to Algiers. Calvin returns to Geneva. The Mississippi discovered by De Soto.

1542. The ecclesiastical "Ordinances" adopted at Geneva, January 2. Diet of Spires. Execution of Queen Catherine (Howard), February. War between England and Scotland. War renewed between France and the emperor. Paul III. convokes Council of Trent, May. Siege of Perpignan, August to October. Battle of Solway Moss, November 25. Mary Queen of Scots, December 14. Regency of Arran. John Knox becomes a Protestant. Xavier sent to India. Mendez-Pinto in Japan. *Swedish Bible* published.

1543. Alliance between Henry VIII. and the emperor, February. Death of Copernicus, May 24. Invasion of Hungary by Soliman; Grau taken August, and large part of the kingdom conquered. Marriage of Henry VIII. with Catherine Parr, July. Coasts of Italy ravaged by Barbarossa. Attack on duchy of Juliers; capture of Düren by Charles V. Cardinal Beatoun chancellor of Scotland. Enzinas's *Spanish New Testament* published. Tyndale's Bible proscribed by English Parliament. The Copernican system of the world published, May.

1544. The kingdom of Sweden declared hereditary in the house of Gustavus, January. Diet of Spires, opens February 20. Battle of Cerisoles, April. Edinburgh and Leith burnt by the English, May. Henry VIII. invades France, July; takes Boulogne, September. Peace of Crespi, September. Paul III. summons the adjourned council for March, 1545, November. Birth of Tasso (died, 1595). University of Königsberg founded.

1545. Extermination of the Vaudois in Provence ordered by Francis I., January. Battle of Ancrum Muir, February 17. Peter du Breuil, Calvinist preacher, burnt at Tournay, February 19. Diet of Worms, March. Parma and Piacenza erected into a duchy by Paul III. for his son, Piero Luigi Farnese. Council of Trent opened, December 13. Silver mines of Potosi discovered.

1546. Death of Luther, February 18. Assassination of Cardinal Beatoun at St. Andrews, May 28. Peace between England and France, June. Tyndale's and Coverdale's New Testaments and many English books proscribed by royal proclamation, July 8. Anne Askew burnt in London, July 16. Stephen Dolet burnt at Paris, August 3. The Smalkaldio War begins. Christ Church, Oxford, and Trinity College, Cambridge, founded by Henry VIII. Death of Giulio Romano. Birth of Tycho Brahe (died, 1601). The *King's Primer*, first sketch of the *Book of Common Prayer*.

1547. Conspiracy of Fiesco at Genoa, January 2. The earl of Surrey behcadcd, January 19. Edward VI. king of England, January 28; protectorate of Somerset. Council of Trent transferred to Bologna, March. Henry II. king of France, March 31. Battle of Mühlberg,—defeat and capture of John Frederick, elector of Saxony, by Charles V., April 24. Capitulation of Wittenberg signed, May 19. The Protector invades Scotland, and defeats the Scots at Pinkie, September 10. Visitation of churches in England. Birth of Cervantes (died, 1616). University of Jena founded.

1548. Sigismund II. king of Poland. Charles V. at Diet of Augsburg publishes the *Interim*, May 15. Rise of Adiaphoristic controversy. Charles's edict of Reformation, June 14. Mary, queen of Scots, is sent to France. The Netherlands, as the circle of Burgundy, incorporated with the empire. Constance seized by Imperialists and put under the ban, October 14, 15. Marriage of Antoine de Bourbon with Jeanne d'Albret, October.

1549. Act of Uniformity passed in England. Lord Seymour beheaded. War between England and France. Catholic risings in England. Siego of Boulogne by the French begun. Auto-da-fé at Paris at the coronation of Catherine de' Medici, June. Death of Pope Paul III., November 10. Death of Paul Fagius, November (born, 1504). Death of Margaret, queen of Navarre, December 21. English *Book of Common Prayer* first used, June. Mission of Xavier to Japan,—to 1551.

1550. Julius III. pope, February 8. Peace between England and France and Scotland; Boulogne surrendered, April. The new liturgy first used at Dublin. Joan Bocher burnt, May 2. The Spanish Inquisition established in the Netherlands by Charles V.; his edict against the Protestants, April 29. Diet of Augsburg. Death of the Imperial Chancellor Granvella, August 28. Siege of Magdeburg by Maurice of Saxony begun, September. Camera Obscura invented by Baptista Porta. Rise of Protestantism in England. Vasari's *Lives of the Painters* published.

1551. Death of Martin Bucer, February (born, 1491). Council meets again at Trent, May 1. War about duchy of Parma. Treaty between Henry II. of France and Maurice, October 5; ratified by Henry, January 15, 1552. Capitulation of Magdeburg, November 3. Birth of William Camden (died, 1623). Robert Recorde's *Grounde of Artes* published. Teklucyan's *Polish New Testament*. Castalio's *Latin Bible*.

1552. Act of Uniformity passed in England. Execution of Somerset, January. War between Maurice and the emperor. Council of Trent prorogued, April 28. Seizure of the three bishopries, Metz, Toul, and Verdun, by Henry II. Siege of Metz begun by Charles V. Invasion of Hungary by Turks. Peace of Passau, August 12. Death of St. Francis Xavier, December 2. Birth of Father Paul (Pietro Sarpi) (died, 1623). Birth of Spenser (died, 1599). Birth of Raleigh (died, 1618). Birth of Sir Edward Coke (died, 1632).

1553. Siege of Metz abandoned, January. Mary queen of England, July 6. Lady Jane Grey proclaimed, July 10. Battle of Sievershausen; the elector Maurice killed, July 9. Servetus burnt at Geneva, October 27. Death of Rabelais (?). Archangel reached by Richard Chancellor.

1554. Wyatt's insurrection in Kent, January. John Knox escapes to France, January. Execution of the Lady Jane, February 12. Marriage of Queen Mary with Philip of Spain, July. War continued between the emperor and the king of France. War of Siena. Absolution of England by Cardinal Pole, November. Birth of Sir Philip Sidney (died, 1586). Birth of Hooker (died, 1600).

1555. Diet of Augsburg opens, February. The Marian persecution begins. Marcellus II. pope, April 9, three weeks. Paul IV. pope, May 23. The *Peace of Religion* published, September 26. Abdication of sovereignty of the Netherlands by Charles in favor of his son Philip, October. The Synergist Controversy begins.

556. Akbar Mogul emperor, January. Charles resigns the crown of Spain to Philip II., January 16. Truce of Vaucelles between the emperor and the king of France, February 5. Archbishop Cranmer burnt, March 21. Cardinal Pole archbishop of Canterbury, March 22. Charles resigns tho imperial crown to his brother Ferdinand I., September 7. The Pope refuses to recognize Ferdinand. Invasion of Papal States by Alva. Ridley and Latimer burnt at Oxford, October 16. Trinity College, Oxford, founded. Mercator's Projection invented. Beza's *Latin New Testament* published.

1557. Charles V. retires to a monastery, February. First ambassador from Russia arrives in England, February. The Inquisition established in France, April 26. England declares war on France, June. Battle of St. Quentin, August 10. The town taken by Spaniards, August 27. Guise appointod lieutenant-general of the kingdom, August. Peace between the Pope and Philip II., September. St. John's College, Oxford, founded.

1558. Calais taken by Guise, January 1–7. Ferdinand I. recognized emperor, March 12. Marriage of Mary, queen of Scots, with the Dauphin, April 24. Battle of Gravelines, July 13. Death of Charles V., September 21. Death of Cardinal Pole, November 17. Elizabeth queen of England, November 17.

1559. The Royal Supremacy restored in England, January. Peace of Cateau-Cambrésis, April 2. John Knox arrives in Scotland, May 2. Marriage of Philip II. with Elizabeth of France, June. Francis II., king of France, July 10. Philip II. returns to Spain, August. Margaret of Austria regent of the Netherlands. First auto-da-fé of Protestants at Valladolid. Pius IV. pope, December 26. Birth of Tilly. Birth of Isaac Casaubon (died, 1614).

1560. Death of John Alasco, January (born, 1499). Treaty of Berwick, January. Conspiracy of Amboise, February, March. Edict of Romorantin, May. French evacuate Scotland, July. The Reformation established by Scots parliament, August 25. Duke of Savoy makes war on the Vaudois, September. Prince of Condé arrested, November. Charles IX. king of France, December 5. Regency seized by Catherine de' Medici. States-General meet at Orleans, December 31. Birth of Arminius (died, 1609). Westminster School founded.

1561. Birth of Bacon, January (died, 1626). Edict of Orleans, January 31. Rebellion of Shane O'Neal in Ireland, spring. The "Triumvirate," alliance against the Huguenots, Easter. Edict of July. Return of Queen Mary to Scotland, August. Colloquy of Poissy, September 9 to October 9. The first observatory built at Cassel. Leonard's *Polish Bible* published. Tobacco introduced into Europe.

1562. Edict of January (or of Toleration) in France. Apostasy of the king of Navarre, January. Massacre of Vassy, May 1. War between Catholics and Protestants in France begins. Slaughter of Protestants at Toulouse, May. Queen Elizabeth concludes treaty with Condé, September 20. Havre occupied by the English, September. Siege of Rouen begun by the king of Navarre, September 18; taken, October 26. Death of Peter Martyr, November 12 (born, 1500). Death of king of Navarre, November 17. Birth of Lope de Vega, November (died, 1635). Battle of Dreux, Condé taken prisoner, December 19. African slave trade begun by Hawkins. Truce between the emperor and the sultan.

1563. Council of Trent re-opened, January 18. The Thirty-nine Articles of the Church of England settled by Convocation, January 29. Assassination of duke of Guise, February 18. Pacification by Edict of Amboise, March 19. France declares war on England, July 6. Surrender of Havre. July 8. Charles IX. declared of age, August 17. Council of Trent closed, December 4. Foxe's *Book of Martyrs* published.

1564. Acts of Council of Trent confirmed by Pius IV., January 26. Birth of Galileo, February 18 (died, 1642). Treaty of peace between England and Frauce, April 1. Birth of Shakspeare. Death of Calvin, May 27. Maximilian II. emperor, July 25. Edict of Roussillon, August 6. Birth of Marlowe (died, 1593). Congregation of the Oratory founded at Rome.

1565. Siege of Malta by Mustapha Pasha, May to September. Marriage of Mary queen of Scots with Lord Darnley, July 29. Confederation of the Gueux founded in the Netherlands, November. Death of Pius IV., December 9. Conferences between Catherine de' Medici and Alva at Bayonne.

1566. Pius V. pope, January 7. The "Compromise" published by the Leaguers in the Netherlands, January. The *Grande Ordonnance de Moulins* published, February. Murder of David Rizzio, March 9. Revolt of the Netherlands begins. Invasion of Hungary by Soliman. Death of Soliman at Szigeth, September 5. Selim II. sultan. Severe decree of Philip II. against the Moors, November 17. The Russia Company sanctioned by Act of Parliament.

1567. Murder of Darnley, February 10. Marriage of Mary to Bothwell, May 15. Shane O'Neal defeated, May; assassinated, June 2. Queen Mary compelled to resign the crown to her son, James VI., July 24. Mary imprisoned, Murray regent. Alva sent as governor to the Netherlands, August. The Council of Blood organized. War of religion renewed in France. Battle of St. Denis, November 10. Death of Constable Montmorenci, November 12. Rugby School founded.

1568. Seizure and imprisonment of Don Carlos by his father, Philip II., January. The Inquisition condemns the inhabitants of the Netherlands to death, February 16. Edict of Longjumeau, March 23. Revolt of Moors in Spain, April. Battle of

Langside, May 13. Flight of Mary to England. Louis of Nassau defeats the Spaniards at Heyligerlee, May 23. Execution of Egmont and Horn, June 5. Death of Don Carlos, July. Eric XIV. of Sweden deposed, September 30. The English College at Douai founded. Party of the *Politiques* formed in France. Birth of Campanella (died, 1639).

1569. Battle of Jarnac, Condé killed, March 13. Tuscany erected into a grand duchy, September 1. Coligny proscribed by parliament of Paris, September 13. Battle of Moncontour, October 3. Revolt of Catholic earls in England, November. De Reyna's *Spanish Bible* published.

1570. Assassination of the Regent Murray, January 23. Excommunication of Queen Elizabeth by Pius V., February 25. Invasion of Cyprus by the Turks, July. Peace of St. Germain, August 8. Marriage of Charles IX. with Elizabeth of Austria, November 26. Great inundations in Holland. Conquest of Yemen by Selim II. Ascham's *Scholemaster* published.

1571. Severe laws against the Catholics in England. The Regent Lennox killed, September 4. Regency of Mar. Holy League against Turks, formed by the Pope, the King of Spain, and Venice. Victory of Don John of Austria over the Turks at Lepanto, October 7. Universities of Oxford and Cambridge incorporated. Jesus College, Oxford, founded. Birth of Kepler (died, 1630). Harrow School founded.

1572. Seizure of Briel by the Confederates, spring. Gregory XIII. pope, May 13. Execution of the duke of Norfolk, June 2. Death of Jeanne d'Albret, June 10. William of Orange declared Stadtholder, July 15. Death of Sigismund II. of Poland, July. Marriage of Henry of Navarre and Margaret of Valois, August 18. Massacre of St. Bartholomew, August 24 *seq.;* Coligny killed. Death of John Knox, November 24. Siege of Haarlem by Spaniards, December 9. Conquest of Guzerat by Akbar (1572–74).

1573. Siege of La Rochelle by duke of Anjou, February. Death of De l'Hôpital, March 13. Duke of Anjou elected king of Poland, May. Treaty with the Huguenots of Rochelle, &c., June 24. Edict of toleration issued by Charles IX., July. Surrender of Haarlem, July 12. Siege of Alkmaar by Spaniards, August; raised, October 8. Siege of Leyden, October 31. Earl of Morton regent of Scotland, November. Alva recalled, Requesens governor of the Netherlands, December. Birth of Donne (died, 1631). Birth of Inigo Jones (died, 1652). First English translation of Euclid published.

1574. Henry III. king of France, May 30. Expedition of Sebastian, king of Portugal, against the Moors in Africa. Siege of Leyden raised, October 3. Amurath III. sultan, December. Birth of Ben Jonson (died, 1637)

1575. Stephen Bathori elected king of Poland, December. Conquest of Bengal and Behar by Akbar. Birth of Guido (died, 1642). University of Leyden founded by Prince of Orange.

1576. The League, in France, organized, February. Death of Requesens, March 5. *La Paix de Monsieur*, in favor of the Huguenots, May 14. Rudolph II. emperor, October 12. Sack of Antwerp, November. Pacification of Ghent, November 8. Don John governor of the Netherlands, November. Henry III. joins the League, December. The plague at Milan. Frobisher's Strait discovered. Birth of John Fletcher (died, 1625). Birth of Robert Burton (died, 1639). The dipping needle invented by Robert Norman.

1577. The Union of Brussels, January. The Perpetual Edict published by Don John, March 12; confirmed by Philip II., April 7. Peace of Bergerac (or Poitiers), September. Insurrection at Ghent, autumn. Deposition of Don John, December 7. New Union of Brussels, December 10. Drake sails on voyage round the world, December 13. Birth of Rubens (died, 1640).

1578. Treaty between Queen Elizabeth and the Dutch, January 7. Battle of Gemblours, January 31. Battle of Rymenants, August 1. Sebastian of Portugal defeated and killed by the Moors, at Alcazarquivir, August 4. Death of Don John, October 1. Alexander Farnese, duke of Parma, governor of the Netherlands, October. Lyly's *Euphues* published. The English State Paper Office founded. Order of the Holy Ghost instituted by Henry III. of France. Birth of William Harvey (died, 1657).

1579. Union of Utrecht, basis of the Dutch Republic, proclaimed, January 29. Treaty of Nérac, between Catherine de' Medici and the king of Navarre, February 28. Treaty between the Walloon provinces and the Farnese, May 17. Siege of Maestricht by Spaniards, March to June 29. A body of Spaniards invade Kerry, and occupy Smerwick, July. Socinus preaches in Poland. Protestantism proscribed in Austria.

1580. Birth of Archbishop Ussher (died, 1656). William of Orange put under the ban by Philip, June. Battle of Alcantara, August 25. Portugal annexed to Spain, and Philip proclaimed king, September 2. Duke of Anjou made stadtholder of the Netherlands, September 19. Massacre of Smerwick, November 11. Return of Drake. Revolt of the Desmonds in Ireland. Formula of Concord published by the elector of Saxony. Rise of the Brownists in England. Montaigne's *Essais* published.

1581. Execution of the Regent Morton, June 3. Declaration of Independence by the United Provinces, July 26. Siege of Cambrai by Spaniards; raised by Anjou, August. Execution of Campian, December 1. Birth of Domenichino (died, 1641). Birth of Lord Herbert of Cherbury (died, 1648). Turkey Company, of London, incorporated.

1582. Reformation of the Calendar (New Style) introduced by Gregory XIII., February 24. The raid of Ruthven, August. University of Edinburgh founded. Death of St. Theresa.

1583. Attempt of Anjou to seize Antwerp, January 17. Birth of Grotius (died, 1645). Birth of Wallenstein.

1584. Death of Anjou, June 10. Assassination of the Prince of Orange, at Delft, July 10. His son Maurice elected stadtholder. Siege of Antwerp by the duke of Parma, July. Treaty between the League and Philip II., December. Discovery and colonization of Virginia. Emmanuel College, Cambridge, founded. Birth of Selden (died, 1654). Birth of Massinger (died, 1640).

1585. Sextus V. pope, April 24. Edict of Nemours, July 7. Queen Elizabeth accepts protectorate of the Netherlands, July. Barneveldt appointed advocate-general of Holland and West Friesland. Expedition of Drake against Spanish West Indies. Capitulation of Antwerp, August 17. War of the three Henries, in France. English army under Leicester sent to Netherlands, December. Abbas the Great shah of Persia. Birth of Richelieu. Birth of Beaumont (died, 1616). Birth of Drummond of Hawthornden (died, 1649).

1586. Babyngton's plot against Queen Elizabeth, September. Battle of Zutphen, September 22; Sir Philip Sidney wounded; he dies, October 7. Trial of Mary, queen of Scots, October 11. Shakespeare in London. Camden's *Britannia* published. The Escorial completed by Philip II.

1587. Mary, queen of Scots, beheaded, February 8. Expedition of Drake to Cadiz, April. Sluys capitulates to Spaniards, August 4. German invasion of France, July. Battle of Coutras, October 20. Davis's Straits discovered. Persecution of Christians in Japan (again 1590 and 1597).

1588. Guise enters Paris, May 9. Day of the Barricades, May 12. The "Invincible Armada" sails from Lisbon, June 1; defeated and dispersed, July and August. Edict of Union between the League and Henry III., July 21. States-General at Blois, October 10. Assassination of Guise, December 23; of Cardinal of Guise, December 24. Birth of Hobbes (died, 1679). *Annales Ecclesiastici* of Baronius (1588–1607). The Rialto, Venice, built. Death of Paolo Veronese.

1589. Death of Catherine de' Medici, January 5. Mayenne, head of the League, enters Paris, February 12, and is named lieutenant-general of the kingdom. Alliance of Henry III. with the Huguenots, April. Expedition of Drake and Norris to Portugal, April to June. Siege of Paris by the two Henries, July. Assassination of Henry III., August 1. Henry IV. of Navarre king of France. Battle of Arques, September 21. Paris attacked by Henry IV., October 31–November 1. James VI. of Scotland marries Anne of Denmark, November 24. Patriarchate of Moscow established.

1590. Battle of Ivry, March 14. Breda recovered by Prince Maurice, March. Siege of Paris by Henry IV., May 7; raised by Parma, September 9. Urban VII. pope, September 15; thirteen days. Gregory XIV. pope, December 5. Spenser's *Faerie Queene* appears. First treatise on Decimal Fractions, by Stevinus. Sidney's *Arcadia*.

1591. Spanish garrison in Paris, February 12. Henry IV. condemned by the Pope, March 1. Capture of Deventer and Zutphen by Maurice, May, June. Innocent X. pope, October 29; dies, December 30. Siege of Rouen by Henry IV., November. Aragonese liberties suppressed, November. Trinity College, Dublin, incorporated. Earthquakes in the Azores lasting twelve days. Wynkyn de Worde carries on Caxton's business after his death.

1592. Clement VIII. pope, January 20. Rouen relieved by Parma, April. Death of Parma, December 3. The Falkland Islands sighted by Davies. Presbyterianism established in Scotland.

1593. Severe acts against Puritans and Popish recusants in England, February–April. Dreux taken by Henry IV., June 18. He abjures Protestantism, July 25. Gertruydenberg taken by Prince Maurice. Birth of Izaak Walton (died, 1683).

1594. Coronation of Henry IV. at Chartres, February 27. He enters Paris, March 22. Submission of the Sorbonne, April. Reduction of Groningen by Prince Maurice, July 22. Brest taken from Spaniards by French and English, November. Expulsion of the Jesuits from Paris, December 29. Rebellion of Tyrone in Ireland. Hooker's *Ecclesiastical Polity* appears. Birth of Nicolas Poussin (died, 1665).

1595. Mohammed III. sultan, January 17. Henry IV. declares war on Spain, January 17. Absolution of Henry IV. by the pope, September 17. Cambray taken by Spaniards, October 2. Dutch East India Company formed. Dutch settlement in Java.

1596. Treaty of Folembrai between Henry IV. and Mayenne, January, puts an end to the League. Calais taken by Spaniards, April 17. Peace of Teusin, between Russia and Sweden, May 18. Alliance of England and France against Spain, May

24. Invasion of Hungary and capture of Erlau by Mohammed III., summer. Capture of Cadiz by English and Dutch forces, June 21. Archduke Maximilian defeated by Mohammed III. at Keresztes, October 24–26. Sidney Sussex College, Cambridge, founded. Birth of Descartes (died, 1650). Spitzbergen reached by Barentz.

1597. Victory of Prince Maurice over the Spaniards at Turnhout, January 22. Amiens taken by Archduke Albert, March 12, and retaken by Henry IV., September 15. Thermometer invented by Galileo before this year. Bacon's *Essays* published.

1598. The Edict of Nantes, April 30. Peace of Vervins between France and Spain, May 2. Philip III. king of Spain, Sept. 13.

1599. Divorce of Henry IV. from his queen Margaret, February. Essex appointed lord-lieutenant of Ireland, March 12. The Deccan tributary to Akbar. Imprisonment of Campanella (1599–1629). Birth of Velazquez (died, 1660). Birth of Vandyck (died, 1641). Sully appointed superintendent of finance to Henry IV. Birth of Oliver Cromwell, April 25. Birth of Blake.

1600. Giordano Bruno burnt at Rome, February 17. Prince Maurice defeats the Spaniards at Nieuport, July 2. Henry IV. declares war on Savoy, August. Gowrie conspiracy in Scotland, August 5. Marriage of Henry IV. with Mary de' Medici, December 9. The English East India Company chartered, December 31. Birth of Calderon (died, 1681). General symbols in algebra introduced by Vieta. Zodiacal light seen by Tycho Brahe. William Gilbert's *De Magnete* published.

1601. Treaty of peace between France and Savoy, January 17. Execution of the earl of Essex, February 25. Siege of Ostend by Archduke Albert, July 4. Kinsale occupied by Spaniards, September.

1602. Submission of Tyrone. Execution of Marshal Biron at Paris, July 29. Culture and manufacture of silk introduced into France. Birth of Mazarin. *Hamlet* published.

1603. Queen Elizabeth dies, and is succeeded by James VI. of Scotland as James I. of England, March 24. Union of the two crowns. The Millenary Petition of the Puritans presented to the king, April. Ahmed I. sultan, December. The Jesuits recalled to France. Disputes of the Gomarists and Arminians in Holland. Chapman's *Iliads of Homer* published (*Odyssey*, 1614).

1604. Hampton Court Conferences between the prelates and the Puritans, January 14–16. Treaty of peace between England and Spain, August 18. Surrender of Ostend to Spinola, September 20. James I. proclaimed King of Great Britain, France, and Ireland, October 24. French settlement in Canada. Hooker's *Ecclesiastical Polity* completed.

1605. Paul V. pope, May 6. The "False Demetrius" crowned czar of Russia, summer. Death of Akbar, October 13. Jehangir succeeds him. Gunpowder Plot; arrest of Guy Fawkes, November 5. Bacon's *Advancement of Learning* published. Birth of Sir Thomas Browne (died, 1682). The first part of *Don Quixote* published. The *Mercure de France*, first French periodical, begun.

1606. Venice laid under interdict by the Pope, April 17. The Jesuits expelled from Venice. Peace of Sitvatorok between the emperor and the sultan, November 11. Patent for colonization of Virginia granted. Birth of Pierre Corneille (died, 1684).

1607. The Spanish fleet at Gibraltar destroyed by the Dutch, April 25. Return of Halley's Comet observed by Kepler. University of Giessen founded.

1608. Hungary ceded by Rudolph II. to Archduke Matthias, June 29. Trial of Arminius at the Hague. The telescope invented in Holland. Birth of Clarendon (died, 1674). Birth of Milton (died, 1674). Birth of Fuller (died, 1661). Reform of Port Royal begun by Angélique Arnauld.

1609. Twelve years' truce between Spain and the Netherlands, March 29. The Protestant Union of German Princes formed, May 4. Catholic League organized, July. Religious liberty for all sects conceded by the emperor, July 12. Moscow taken by the Poles. Siege of Smolensko by the Poles, November. Two edicts of Philip III. for expulsion of Moriscoes. The satellites of Jupiter discovered by Simon Marius, December; by Galileo, January, 1610. Kepler's Laws (the first and second) published. The Bank of Amsterdam founded.

1610. Assassination of Henry IV. by Ravaillac, May 14. Louis XIII. king of France; regency of Mary de' Medici. Charter for colonization of Newfoundland, May. Hudson's Bay discovered. Wadham College, Oxford, founded. Phases of Venus discovered by Galileo. *Douay Bible* published.

1611. Christian IV. of Denmark declares war on Sweden, April. Matthias king of Bohemia, May 23. Surrender of Smolensko to the Poles, July. Gustavus Adolphus king of Sweden, November 9. The plague at Constantinople. Plantation of Ulster. First creation of baronets in England. Sun-spots discovered by Fabricius and Galileo. Congregation of the Oratory at Paris founded. Birth of Fairfax. Birth of Turenne. Authorized Version of the Bible published. The Charter House, London, incorporated.

1612. The Great Mogul authorizes English factories at Surat, Ahmedabad, &c., January 11. Death of Emperor Rudolph II., January 20. Matthias elected, June 13. Death of Henry, prince of Wales, November 6 (born, 1593). Birth of Leighton (died, 1684). Birth of Samuel Butler (died, 1680). The pendulum applied to clock-work by Sanctorius.

1613. Marriage of Elector Palatine with Princess Elizabeth of England, February. The Romanoff dynasty in Russia founded, February. The New River, London, completed, Michaelmas. Birth of La Rochefoucauld (died, 1680). Birth of Jeremy Taylor (died, 1667). Birth of Montrose.

1614. Revolt of Condé terminated by Peace of Menehould, May 15. Last meeting at Paris of States-General before the Revolution, September 27. Invention of Logarithms by Napier of Merchiston (died, 1617). Birth of Henry More (died, 1687). Raleigh's *History of the World* published. University of Groningen founded.

1615. Embassy of Sir Thomas Roe to the Great Mogul, January. The Jews again expelled from France, April. Death of Arabella Stuart in the Tower, September 27. Marriage of Louis XIII. with Anne of Austria, and of Don Philip with Elizabeth of France, November 25. Birth of Baxter (died, 1691).

1616. Death of Shakespeare, April 23 (O.S.). Death of Cervantes, April 23. The Cautionary Towns in Holland delivered up to the Dutch by James I., May 27. Cape Horn doubled by Le Maire and Schouten. Baffin's Bay discovered. Circulation of the blood discovered by Harvey about this time. Birth of John Owen (died, 1683).

1617. Peace of Stolbowa between Sweden and Russia, February. Bacon appointed lord-keeper, March. Raleigh sails for Guiana, March. Mustapha I. sultan. Assassination of Marshal d'Ancre at Paris, April 24. The queen-mother banished to Blois, May. Ferdinand king of Bohemia, June. Execution of the wife of Marshal d'Ancre, July 8. Birth of Cudworth (died, 1688).

1618. Othman II. sultan, February 26. Arrest of Grotius and Barneveldt by States-General, February. The "Book of Sports" promulgated by James I. May 24. Archduke Ferdinand, king of Hungary, July 1. Execution of Raleigh, October 29. The duke of Lerma dismissed from office, October. Synod of Dort, November 13. Revolution in Bohemia; beginning of Thirty Years' War. Birth of Cowley (died, 1667). China invaded by Manchoos about this time. Kepler's third Law announced. Congregation of Saint-Maur formed in France.

1619. Vanini burnt as atheist at Toulouse, February 19. Escape of Mary de' Medici from Blois, February 19. Grotius imprisoned, and Barneveldt beheaded, May. Dutch and English trade in the East Indies regulated by treaty, July 17. Ferdinand deposed by States of Bohemia, August 19; elected emperor, August 28. Capture of Presburg by Bethlen Gabor, October 20. Frederick, Elector Palatine, crowned king of Bohemia, October 25. Vienna besieged by Bethlen Gabor and the Bohemians, December. Batavia built by the Dutch. Birth of Prince Rupert. Birth of Colbert.

1620. Treaty of Ulm, July 3. Massacre of Protestants in the Valtelline, July 19. Bethlen Gabor king of Hungary, July. Invasion of the Palatinate by Spinola, autumn. The Pilgrim Fathers sail in the "Mayflower" from Delft, September 6, and land in New England, December 11. Victory of the Turks at Jassy over Gratiani and the Poles, September 20. Battle of Prague,—the elector Frederick defeated, November 8. Bacon's *Novum Organum* published. Birth of John Evelyn (died, 1706).

1621. Gregory XV. pope, February 9. Impeachment of Lord Chancellor Bacon, March. Philip IV. king of Spain, March 31. Grotius escapes from prison, March 21. The Protestant Union dissolved, May. Riga taken by Gustavus Adolphus, September 21. The English Commons claim freedom of discussion, December 19. Death of Cardinal Bellarmine (born, 1542).

1622. Peace of Nikolsburg, between Bethlen Gabor and the emperor, Hungary renounced by the former, January 7. The English Parliament dissolved, February 9. Shah Abbas takes Baghdad, May 1. Battle of Wimpfen, May 6. Othman II. deposed and Mustapha restored, May 19. Siege of Bergen-op-Zoom by Spinola, June to October. Heidelberg surrenders to Tilly, September 15–19. Richelieu created cardinal, September 5. Peace of Montpellier, end of war with the Huguenots, October 19. Surrender of Mannheim to Tilly, November 1. The bishopric of Paris raised to archbishopric. Birth of Molière (died, 1673). *Congregatio de Propaganda Fide* instituted at Rome by Gregory XV.

1623. Journey of Prince Charles of England and the duke of Buckingham to Madrid, March to October. The Valtelline occupied by papal troops, May. Urban VIII. pope, August 6, Tilly defeats Duke Christian of Brunswick, at Stadtlohn, August 9. The Spanish marriage treaty broken off by England, December. Birth of Pascal (died, 1662). *Shakespeare's Works*, the first folio, published.

1624. Monopolies declared illegal in England, February. England declares war on Spain, March 10. Richelieu becomes a member of the Council, April. Treaty of Compiègne between France and Holland, June 20. The Valtelline seized by the French, November. Pembroke College, Oxford, founded. Bar-

bados, first English settlement in West Indies. Burton's *Anatomy of Melancholy* published. Lord Herbert's *Tractatus de Veritate*. Privilege of Sanctuary in England abolished.

1625. Huguenot insurrection in France, January. Charles I. king of England, March 27. Death of Maurice, prince of Orange, April 23. Charles I. marries (by proxy) Henrietta of France, May 11. Breda taken by Spinola, June 5. English expedition against Cadiz. Charles I. dissolves the parliament, August 12. Grotius's *De Jure Belli ac Pacis* published.

1626. Impeachment of Buckingham, February. Treaty of Monçon between France and Spain, March 5. Minden taken by Tilly, June 9. Charles I. dissolves his second parliament, June 15. Edict of Louis XIII. for demolition of castles in France, July 31. Göttingen taken by Tilly, August 11. Battle of Lutter,—defeat of Christian IV. of Denmark by Tilly, August 27. Birth of Madame de Sévigné (died, 1696). Birth of Robert Boyle (died, 1691).

1627. Siege of Rochelle begun, summer. Expedition of Buckingham to Isle of Rhé, July–October. The Rudolphino Tables completed by Kepler. Birth of Bossuet (died, 1704).

1628. Cromwell sits for Huntingdon in third parliament, March. Petition of Right presented to Charles I., May 28; passed, June 7. Laud bishop of London, July. Assassination of Buckingham, August 23. La Rochelle taken by Richelieu, October 28. Death of Shah Abbas, December. Siege of Stralsund by Wallenstein. Birth of Bunyan (died, 1688). The Taj Mehal built.

1629. Campaign of Louis XIII. against duke of Savoy, January to June. Edict of Restitution published by the emperor, March 6. Third parliament of Charles I. dissolved, March 10. Charter granted to the Massachusetts Bay company, March. Peace between England and France, April. Peace of Lübeck, between the emperor and the king of Denmark, May 22. Montauban reduced, August. Richelieu first minister of state, November. Birth of Huyghens (died, 1695).

1630. Richelieu invades Italy, February. Gustavus Adolphus enters Germany, June. Mantua surprised by Imperialists, July 17. Wallenstein deprived of his command, August. Death of Spinola, September 25. Birth of Isaac Barrow (died, 1677). Birth of Tillotson (died, 1694). The Slide Rule invented by Oughtred.

1631. Treaty of Bernwald,—alliance of France and Sweden against the emperor, January 23. Magdeburg besieged by Tilly, March; stormed and sacked, May 20–22. Treaty of Chierasco concluded, April 6. Gustavus concludes a treaty with Elector of Brandenburg, June 11. Battle of Leipsic,—victory of Gustavus over Tilly, September 7. March of Gustavus to the Rhine, September to Christmas. Mentz taken, December 13. Wallenstein recalled, December. Great eruption of Vesuvius. Description of the Vernier published by the inventor. Transit of Mercury first observed, by Gassendi. Birth of Dryden (died, 1700).

1632. Lorraine subject to France by treaty of Vic, signed January 6. Passage of the Lech by the Swedes, Tilly wounded, April 5. Death of Tilly, April 6. Munich entered by Gustavus, May 17. Nuremberg seized by Gustavus. Siege and capture of Maestricht by Prince Frederick Henry, August. Schomberg defeats Montmorency at Castelnaudary, September 1. Execution of Montmorency, October 30. Battle of Lützen, victory and death of Gustavus, November 16. Christina queen of Sweden. Regency of Oxenstiern. Birth of John Locke (died, 1704). Birth of Spinoza (died, 1677). Birth of Puffendorf (died, 1694). Birth of Wren (died, 1723).

1633. Union of Heilbronn, April 9. Coronation of Charles I. in Scotland, June 18. Laud archbishop of Canterbury, August. Nancy besieged and taken by and ultimately ceded to Louis XIII., September 20. *The Book of Sports* republished by Charles I., October. Ratisbon taken by Duke Bernhard, November. Prynne fined, pilloried, and imprisoned, for his *Histrio-mastyx*. Galileo condemned by the Inquisition.

1634. Lorraine annexed to France; Parliament of Austrasia established at Metz. Wallenstein assassinated, February 25. Urbain Grandier burnt on charge of witchcraft, August 18. Battle of Nordlingen,—victory of Imperialists over the Swedes, September 6. Writ of ship-money issued by Charles I. Treaty between the French and the Swedes, November. Siege of Heidelberg by Imperialists; raised by the French, December. Order of the Sisters of Charity founded by St. Vincent de Paul. The Ammergau Passion Play instituted.

1635. Philippsburg taken by Imperialists, January. Alliance between the French and the Dutch, February. Treves surprised by Spaniards, and elector taken prisoner, March 26. France declares war on Spain, May 10. Peace of Prague, between the emperor and the elector of Saxony, May 30. The French Academy founded by Richelieu. Articles of the Church of England adopted by Irish Church. The Jardin des Plantes, Paris, founded. Norwood measures a degree of the meridian in England.

1636. John Hampden resists the imposition of ship-money. University of Utrecht founded. Birth of Boileau (died, 1711). Harvard College, U.S., founded.

1637. Ferdinand III. emperor, Feb. 15. Trial of Hampden, June 12. Prynne, Bastwick, and Burton condemned by Star Chamber, June 14. Decree of Star Chamber for regulation of printing, July 1. Book of Canons and Common Prayer issued for Scotland; disturbances on its introduction at Edinburgh, July 23. Descartes's *Discours de la Méthode* published. Death of Nicholas Ferrar (born, 1593).

1638. The Solemn League and Covenant of the Scots published, March 1. General Assembly at Glasgow abolishes Episcopacy, November, December. Siege and capture of Breisach by Bernhard, December 17. Baghdad taken by the Turks, December 25. Cyrillus Lucaris (patriarch of Constantinople) put to death. Birth of Malebranche (died, 1715). Chillingworth's *Religion of Protestants* published.

1639. The Scots take up arms, January. Lesley takes possession of Edinburgh Castle, March 23. Pacification of Berwick, June 18. Admiral Tromp defeats Spanish Fleet in the Downs, October 11–12. Birth of Racine (died, 1699). Transit of Venus first observed by Horrox and Crabtree.

1640. The Short Parliament of Charles I. meets, April 13; dissolved, May 5. Revolt of Catalonia, June. Newcastle occupied by Scots, August 27. Turin invested by the French, May; surrenders, September 24. Last sitting of High Commission Court, October 22. The Long Parliament meets, November 3. Impeachment of Strafford, November 11. Independence of Portugal recovered; John duke of Braganza proclaimed king, December 1. Frederick William, the "Great Elector" of Brandenburg, December 1. Treaty between France and the Catalans, December 16. Jansenius publishes his *Augustinus*. Peruvian bark introduced into Europe. Micrometer invented by Gascoigne.

1641. Union of Catalonia with France, January 23. Ibrahim I. sultan, February. Archbishop Laud sent to the Tower, March 1. Trial of Strafford, March 22; he is beheaded, May 12. Abolition of the Star Chamber. Visit of Charles I. to Scotland, August to November. Irish Rebellion, massacre of Protestants, October 23. The Grand Remonstrance presented to Charles I., December 1. The terms "Roundheads" and "Cavaliers" come into use. Malacca taken by the Dutch. The *Meditationes* of Descartes published.

1642. Attempted arrest of the five members by Charles I., January 4. Death of Mary de' Medici, July 8. Charles I. sets up his standard at Nottingham, August 22. Perpignan surrenders to the French, September 9. Execution of Cinq-Mars for conspiracy, September 12. Roussillon taken possession of by France. Battle of Leipsic,—victory of Swedes over Imperialists, October 13. Battle of Edgehill, October 23. Oxford occupied by Charles I., October 26. Death of Richelieu, December 4. Mazarin first minister. New Zealand and Van Diemen's Land discovered by Tasman. Calculating machine invented by Pascal. Birth of Newton (died, 1727).

1643. Louis XIV. king of France, May 14; regency of Anne of Austria. Battle of Rocroi, May 19. Death of Hampden, June 24. The Assembly of Divines meets at Westminster, July 1. Bristol surrenders to Prince Rupert, July 27. Opening of Congress of Munster, July. Thionville recovered by the French, August 10. Siege of Gloucester by Charles I., August–September. Battle of Newbury, death of Lord Falkland, September 20. The Covenant taken by the House of Commons and Assembly of Divines, September 25. Philip IV. drives the French from Aragon, November. The barometer invented by Torricelli. Birth of Bishop Burnet (died, 1715). First volume of the *Acta Sanctorum*, by Bollandus and Henschen, published.

1644. The Swedes under Torstenson invade Denmark, January 16. The Scots enter England, January. Trial of Archbishop Laud, March–November. Battle of Marston Moor, July 2. Gravelines taken by the French, July 28. Battle of Freiburg, August 3–5. Philippsburg besieged by the French; taken, September 9. Sack of Aberdeen by Montrose, September 13–16. Second battle of Newbury, October 27. Christina assumes government of Sweden, December 18. Conquest of China by the Manchoos. Milton's *Areopagitica* published. Birth of William Penn (died, 1718).

1645. Archbishop Laud beheaded, January 10. Turenne defeated by General Merci at Mariendal, May 5. Battle of Naseby, June 14. Alexis czar of Russia, July 13. Peace between Sweden and Denmark, August 14. Bristol surrendered by Prince Rupert, September 10. Lesley defeats Montrose at Philiphaugh, September 13. Capture of Trèves by Turenne, November 9. Death of Olivarez (born, 1587).

1646. Charles I. surrenders to the Scots, May 5. Surrender of Oxford to the Parliament, June 24. Dunkirk taken by the French, October 12. Birth of Leibnitz (died, 1716).

1647. Charles I. given up by the Scots to the Parliament, January 30. Treaty of Ulm between France and Bavaria, March. Surrender of Harlech Castle, the last royal post, March 30. Charles I. seized at Holmby House, June 4. Masaniello heads revolt at Naples, July 7. Death of Prince Frederick Henry of Orange. Occupation of London by the army, August 6. Another insurrection at Naples, August 21. George Fox begins to preach.

1648. Treaty of Munster between Spain and the United Provinces, recognizing independence of the latter, January 30. Royalist revolt in England, February. Tortosa stormed by Marshal Schomberg, July 12. Battle of Preston, August 17. Battle of Lens,—victory of prince of Condé over Archduke Leopold, August 20. The war of the Fronde begins, August 27. Fairfax takes Colchester, August 28. The Peace of Westphalia; close of the Thirty Years' War, October 24. "Pride's Purge," December 6. The "Rump" Parliament. The pressure of the atmosphere demonstrated by Pascal's experiment on Puy de Dôme, September 19.

1649. Execution of Charles I., January 30. Blockade of Paris by Condé, January. Charles II. proclaimed at Edinburgh, February 5. England declared a Commonwealth, May 19. Mohammed IV. sultan, July 28. Cromwell storms Drogheda, September 12, and Wexford, October 9. Milton's *Eikonoklastes* published.

1650. Rebellion of Montrose, January. Arrest of the princes of Condé, Conti, and Longueville, January 18. Execution of Montrose, May 21. Victory of Cromwell over Lesley at Dunbar, September 3. Surrender of Edinburgh Castle, December. Battle of Rethel, December 15. Cape Town founded by the Dutch. Milton's *Defensio Populi Anglicani* published. First permanent settlement in Carolina. Birth of Marlborough.

1651. The States of Holland abolish office of Stadtholder, January. Condé and the other princes liberated, February. Mazarin in exile, March. Catholic and Protestant leagues formed in Germany, spring. Charles invades England, August. Monk storms Dundee, September 1. Victory of Cromwell over Charles at Worcester, September 3. Flight of Charles to France, October. Navigation Act passed by English Parliament, October 9. Capitulation of Limerick to Ireton, October 27. Death of Ireton, November 26. Great inundation in Holland from bursting of dyke. Birth of Fénelon (died, 1715). Hobbes's *Leviathan* published. Taylor's *Holy Living* and *Holy Dying*.

1652. Return of Mazarin to power, January. Amnesty granted by English Parliament, February 24. War between English and Dutch begins, May. Irish Rebellion suppressed by May. Battle of the Faubourg St. Antoine, Paris, July 2. England declares war on the Dutch, July 8. Mazariu again retires, August. Surrender of Dunkirk to Spaniards, September 18. Victory of Blake and Penn over the Dutch, September 28. Catalonia reunited to Spain. Victory of Van Tromp, November 28. The *Liberum Veto* first used in Poland.

1653. Return of Mazarin to power, February 3. Victory of Blake over Van Tromp off Portland, February 18, 19, 20. Expulsion of "The Rump" by Cromwell, April 20. Barebones's Parliament meets, July 4. Blake destroys the Dutch fleet at the Texel, July 31. Cromwell made Lord Protector, December 16. War between Catholic and Protestant cantons of Switzerland. Walton's *Complete Angler* published. John de Witt grand pensionary of Holland.

1654. Peace concluded between England and Holland, April 5. Scotland declared incorporated with England, April 12. Coronation of Louis XIV., June 7. Abdication of Christina of Sweden, June 16. Turenno relieves Arras, besieged by Spaniards, August 25. First Parliament of the Protector meets, September 4. The Cossacks under protection of Russia. War between Russia and Poland, which lasts thirteen years, begins, September. Madras made seat of a presidency. Milton's *Second Defence of the People of England* published. Air-pump invented by Otto von Guericke.

1655. Cromwell dissolves the parliament, January 31. Alexander VII. pope, April 7. Jamaica taken by Penn and Venables, May. Cromwell assists the Vaudois, June. Invasion of Poland by Charles X. of Sweden, July. Treaty of alliance between the elector of Brandenburg and the Dutch, July 27. Surrender of Warsaw to Charles X., August 30; of Cracow, October 8. Treaty of alliance between England and France, October 24. Subjugation of Prussia by Charles X., December. A satellite of Saturn discovered by Huyghens. Fuller's *Church History of Britain* published. The *Journal des Savants* begun.

1656. Alliance between Charles X. of Sweden and the Great Elector, June 15. Surrender of Warsaw to Poles, June 21. Warsaw recovered by Charles and the elector, July. Blake captures Spanish treasure fleet off Cadiz, September 9. Czar invades Livonia and takes Dorpat, October 26. Treaty of Liebau between Charles X. and the Great Elector, November 20. Pascal's *Lettres Provinciales* published. Harrington's *Oceana*. Conquests of the Dutch in Ceylon. General Post-office, London, established.

1657. Attempt to assassinate Cromwell, January 19. Cromwell concludes treaty with France, March 23. Denmark declares war on Sweden, spring. Death of the Emperor Ferdinand III., April 2. Blake destroys the Spanish treasure ships at Santa Cruz, April 20. Cromwell declines the title of king, May 8. Treaty of Vehlau, September 19. Mardyke taken by the English and French, September 23. Walton's *Biblia Polyglotta* published. Reflecting telescope constructed by Gregory. Birth of Fontenelle (died, 1757).

1658. Passage of Charles X. over the Little Belt on the ice, January 30–31; over the Great Belt, February 5–10. Treaty of Roeskild signed, March 8. Battle of the Dunes, June 14. Dunkirk taken by Turenne, June 17, and delivered over to the English. Leopold I. emperor, July 18. Charles X. renews war with Denmark, August. Aurungzebe dethrones and succeeds his father, Shah Jehan, August 20. Death of Cromwell, September 3. Richard Cromwell named protector. Siege of Copenhagen by Charles X. begun, September. Surrender of Thorn to the Poles, December 21. Festival of the Sons of the Clergy instituted.

1659. Retirement of Richard Cromwell, May 25. First Convention of the Hague signed, May; second, July; third, August. Peace of the Pyrenees, between France and Spain, concluded November 7. De Ruyter defeats the Swedes near Nyeborg, November 14, and takes Nyeborg.

1660. General Monk occupies London, February 3. Charles XI. king of Sweden, February 13. Peace of Oliva, May 3. Charles II. of England proclaimed, May 8. Entry of Charles into London, May 29. Treaty of Copenhagen, June 6. Marriage of Louis XIV. with the Infanta, June 9. The Royal Society of London founded. Episcopacy restored in England. Navigation Act re-enacted. The crown of Denmark made hereditary. Taylor's *Ductor Dubitantium* published. Birth of Sir Hans Sloane (died, 1753). Death of St. Vincent de Paul (born, 1577).

1661. Exhumation of the bodies of Cromwell, Bradshaw, and Ireton, January 30. Death of Mazarin, March 9. New charter granted to East India Company, April 3. Savoy Conferences between Episcopalian and Presbyterian divines, April 15 to July 25. Execution of the marquis of Argyll, May 27. Peace of Kardis, between Russia and Sweden, July 1. Treaty between Dutch and Portuguese respecting Brazil, August. Episcopacy restored in Scotland, December. The Corporation Act passed. Birth of Defoe (died, 1731).

1662. Act of Uniformity passed by English Parliament, May 19. Licensing Act (books). Marriage of Charles II. with Catherine of Braganza, May 20. Execution of Vane, June 14. Duke of Ormond viceroy of Ireland. Nonconformist clergy driven out of the Church by Act of Uniformity, St. Bartholomew's day, August 24. Dunkirk sold to Louis XIV., and given up, November. Canal of Languedoc projected by Riquet. Birth of Bentley (died, 1742).

1663. Invasion of Hungary by the Turks, spring. Carolina granted by Charles II. to Clarendon, Monk, and others. The steam-engine suggested by Marquis of Worcester, in his *Century of Inventions*. The Academy of Inscriptions, Paris, founded. Guineas first coined in England. Birth of Prince Eugene. First part of Butler's *Hudibras* published (completed, 1678). Lord Herbert's *De Religione Gentilium*.

1664. Treaty of Pisa between the Pope and France, February 22. Second war between the English and Dutch begins. Battle of St. Gotthard,—victory of Montecuculi over the Turks, August 1. Treaty between the emperor and the Porte, August 10. The Conventicle Act passed. The French East India Company established. The Mahratta chief Sivajee attacks Surat. The Binomial Theorem discovered by Newton. Palace of Versailles begun.

1665. England declares war against the Dutch, February 22. Battle of Solebay, June 3. Battle of Villaviciosa, June 17. Charles II. king of Spain. The Great Plague in London. The Five-Mile Act passed. The *London Gazette* established. John Sobieski grand marshal of Poland.

1666. Louis XIV. declares war on England, January 16. Sea-fight between English and Dutch in the Downs, June 1–4. The Dutch defeated off the North Foreland, July 25. Great Fire of London, September 2–6. The Covenanters defeated at the Pentland Hills, November 28. Academy of Sciences, Paris, founded.

1667. Louis XIV. invades the Spanish Netherlands, May. De Ruyter sails up the Thames, June–July. Clement IX. pope, June 20. Peace of Breda, end of second Dutch war, July 21. Clarendon dismissed by Charles II., August 30. The "Cabal" ministry formed, September. Impeachment of Clarendon by the Commons, November. *Paradise Lost* published. Morland's calculating machine invented. Birth of Swift (died, 1745).

1668. Secret treaty between Louis XIV. and the emperor concluded, January. The Triple Alliance between England and the Netherlands, afterwards joined by Sweden, against France, January 23, April 25. Peace between Spain and Portugal, February 13. Conquest of Franche Comté by Louis XIV., February. Peace of Aix-la-Chapelle, May 2. Charles II. obtains pension from Louis XIV. Island of Bombay granted by Charles II. to East India Company. Birth of Boerhaave (died, 1738).

1669. Eruption of Etna, March. Candia surrendered to the Turks, September 16. Locke draws up constitution for Carolina. Phosphorus discovered by Brandt. Reflecting telescope constructed by Newton. Death of Rembrandt (born, 1606).

1670. Clement X. pope, April 29. Seizure of Lorraine by

Louis, September. Second Conventicle Act passed. Hudson's Bay Company incorporated. Treaty between France and England, respecting Hollaud, December 31. Walton's *Lives* published. Spener begins to hold his *Collegia Pietatis* (origin of Pietism). Spinoza's *Tractatus theologico-politicus* published.

1671. The island of St. Thomas taken possession of by the Danes. Treaty of alliance between Spain and the Dutch concluded, December. *Paradise Regained* and *Samson Agonistes* published.

1672. Public treaty between France and England, February 12. Declaration of Indulgence to Nonconformists issued by Charles II., March 15. England and France declare war on the Dutch, March–April. Treaty of Stockholm between France and Sweden, April. Conquest of Holland by Louis XIV., May–June. Battle of Southwold Bay, May 28. The office of stadtholder restored; William of Orange appointed, July 8. Massacre of the brothers De Witt, at the Hague, August 20. Birth of Addison (died, 1719). Birth of Muratori (died, 1750).

1673. The Declaration of Indulgence withdrawn, May 8. Treaty of peace between France and elector of Brandenburg, June 16. Maestricht taken by Louis, June 30. Alliance of the Dutch with the emperor and the king of Spain, August 30. Trèves taken by Vauban, September 8. Bonn taken by William of Orange, November 4–12. The French evacuate Holland, winter. John Sobieski defeats the Turks, November 10. Test Act passed.

1674. Peace between England and Holland, February 9. John Sobieski king of Poland, May 21. Reconquest of Franche Comté by Louis XIV., May–June. The Emperor Leopold declares war on France, June. The Palatinate ravaged by the French, June. Revolt at Messina, summer. Condé defeats the Prince of Orange at Senef, August 11. Turenne defeats Imperialists at Entzheim, October 4. First French settlement in the East Indies (Pondicherry). Birth of Isaac Watts (died, 1748).

1675. Battle of Türkheim, Turenne drives Imperialists out of Alsace, January 5. Invasion of Brandenburg by Swedes, spring. The elector defeats the Swedes at Fehrbellin, June 28. Conferences of Nimeguen open, July. Turenne killed at Sassbach, July 27. Velocity of light discovered by Roemer. St. Paul's Cathedral begun by Wren (completed, 1710). Greenwich Observatory founded. Flamsteed, astronomer royal (died, 1719). *Spiritual Guide* of Miguel Molinos published.

1676. Feodor II. (or III.) czar of Russia, February 8. Secret treaty between Louis and Charles II. for annual pension signed, February 17. Death of De Ruyter at Syracuse, April 29. Maestricht invested by Prince of Orange, July 8; the siege raised, August 27. Innocent XI. pope, September 21. Differential thermometer invented by Sturm. Birth of Sir Robert Walpole (died, 1745). Barclay's *Apology for the True Christian Divinity* published.

1677. The French defeat the Prince of Orange at Cassel, April 11. Marriage of the prince with Mary, daughter of James, duke of York, November 4. The Society of Sons of the Clergy incorporated. Spinoza's *Ethica* published.

1678. Treaty of alliance between Charles II. and the Dutch, January 26. Another secret treaty between Charles and Louis signed, May 17. Peace of Nimeguen, between France and Holland, August 10. Accession of Spain, September 17. Invention of Popish Plot by Titus Oates, August 13. First war between Russia and Turkey begins (lasts till 1682). Revolt of Hungarians under Count Tekeli. Polarization of light observed by Huyghens. First part of Bunyan's *Pilgrim's Progress* published (second, 1684). Birth of Lord Bolingbroke (died, 1751).

1679. Charles II. dissolves the parliament, January 24. Peace between France and the emperor, February 5. Assassination of Archbishop Sharp of St. Andrew's, May 3. Duke of Monmouth defeats the Covenanters at Bothwell Bridge, June 22. Treaty of St. Germain-en-Laye, between France, Sweden, and the elector of Brandenburg, June 29. Treaty of Fontainebleau, between France and Denmark, September 2. Treaty of Lunden between Denmark and Sweden, September 26. *Habeas Corpus Act* passed. The terms "Whig" and "Tory" come into use. Death of Cardinal de Retz (born, 1614).

1680. Execution of Lord Stafford, December 29. The Swedish crown made absolute. A great comet excites alarm in Europe.

1681. Pennsylvania granted to William Penn, March 4. Strasburg seized by Louis XIV., September 30. Shaftesbury imprisoned on a charge of treason, July–November. Bossuet's *Discours sur l'Histoire Universelle* published. Dryden's *Absalom and Achitophel* published (1681–2). Birth of Young, the poet (died, 1765).

1682. Ivan V. and Peter I. (the Great) joint sovereigns of Russia, June 25. Bombardment of Algiers by the French, August and September. Chelsea Hospital founded.

1683. Death of Shaftesbury, January 21. Alliance of Warsaw, between the emperor and the king of Poland, March 31. London deprived of its charters by Charles II., June 12. The Ryehouse plot discovered, June. Vienna besieged by the Turks under Kara Mustapha, July 14. Execution of Lord William Russell, July 21. John Sobieski defeats the Turks and relieves Vienna, September 12. The French invade the Netherlands and take Courtray and Dixmuyde, November. Execution of Algernon Sidney, December 7. Execution of Kara Mustapha, December 25. The great frost of thirteen weeks in England. Birth of Conyers Middleton (died, 1750).

1684. Oudenarde bombarded by the French, March. Genoa bombarded by the French, May. Luxembourg taken by Marshal Créqui, June 4. The Holy League against the Turks formed. Persecution of Huguenots; the dragonnades ordered by Louvois. Truce of Ratisbon, August 15. Siamese embassy received by Louis. Differential calculus invented by Leibnitz. Birth of Berkeley (died, 1753).

1685. James II. king of England, February 6. Graham of Claverhouse persecutes the Covenanters, spring. Insurrection of Argyll in Scotland, May. The doge of Genoa submits to Louis, at Paris, May 15. Insurrection of the duke of Monmouth, June. Trial and imprisonment of Baxter, June. Earl of Argyll executed, June 30. Battle of Sedgemoor, July 6. Monmouth beheaded, July 15. The "Bloody Assizes" of Judge Jeffreys, August and September. Campaign of Imperialists against Turks in Hungary. Revocation of Edict of Nantes, October 22. Molinos, founder of the Quietists, arrested, and his *Spiritual Guide* condemned by the Inquisition. Birth of Handel (died, 1759).

1686. James II. dispenses with the Test Act. League of Augsburg against France, July 9. Mass publicly celebrated at Oxford, August. Capture of Buda by Imperialists, September 2. Conquests of Venetians in the Morea. School of Saint-Cyr founded. Death of Maimbourg (born, 1620).

1687. Tyrconnel lord deputy of Ireland, January. Declarations of Indulgence by James II., February and April. Reception of papal nuncio by James, July 3. Battle of Mohacz, August 12. Athens surrendered to Venetians, September 29. The kingdom of Hungary made hereditary in house of Austria, October. Soliman III. sultan, November 9. Mazeppa hetman of the Cossacks. Newton's *Principia* published. La Bruyère's *Caractères*. Dryden's *The Hind and the Panther*.

1688. Declaration of Indulgence by James II., April 25. Trial of the seven bishops, June. Belgrade taken by the Imperialists, September 6. Louis declares war on the empire, September 24. Avignon seized by the French, October. The pope excommunicates the parliament of Paris. Landing of William, prince of Orange, at Torbay, November 5. Louis declares war on the Netherlands, November 26. The English Revolution. Flight of James II., December 11. Birth of Pope (died, 1744). Birth of Nadir Shah. Bossuet's *Histoire des Variations des Églises Protestantes* published.

1689. Meeting of Convention Parliament, January 22. The emperor declares war on France, January 24. Declaration of Right accepted, and William and Mary declared king and queen of England, February 13; of Scotland, April 11. Landing of James II. in Ireland, March. Louis declares war on Spain, April 15. Episcopacy abolished in Scotland, April. First Mutiny Act passed, April. Siege of Londonderry by James, April 20; the town relieved, July 30. Alliance of the emperor with Dutch Republic, May 12 (the "Grand Alliance" joined by William III., December 30, and by Spain, June 6, 1690). William declares war on France, May 17. Toleration Act passed, May 24. Louis declares war on England, June 25. Battle of Killiekrankie, death of Dundee, July 27. Alexander VIII. pope, October 6. Bill of Rights passed, November 2. Resignation of Ivan, Peter I. czar alone. Fort St. David, Madras, built. Birth of Richardson, the novelist (died, 1761). Birth of Montesquieu (died, 1755). Transit instrument invented by Roemer. Pompeii discovered.

1690. Sea-fight off Beachy Head,—defeat of English and Dutch fleet by the French, June 30. Battle of the Boyne, July 1. Battle of Fleurus, July 1. Limerick besieged by William III., August 8–30. Savoy joins the Grand Alliance, October 20. Locke's *Essay concerning Human Understanding* published. Death of Robert Barclay (born, 1648).

1691. Nonjuring bishops deprived of their sees, February 1. Ahmed II. sultan, June. Innocent XII. pope, July 12. Battle of Aghrim, July 12. Death of Louvois, July 16. Battle of Salankemen. Mustapha Köprili defeated and killed, August 19. Siege of Limerick by General Ginkell formed, August 25. Capitulation and treaty of Limerick, October 3.

1692. Marlborough dismissed, January 10. Massacre of Glencoe, February 13. Battle of La Hogue, May 19. Namur taken by Louis, June 5. Battle of Steinkirk, August 3. Birth of Bishop Butler (died, 1752).

1693. Sea-fight off Cape St. Vincent,—English under Rooke defeated by Admiral Tourville, June 29. Battle of Neerwinden (or Landen), July 19. Pondicherry taken by the Dutch, September 5. The Palatinate overrun by the French. Catinat defeats duke of Savoy at Marsaglia, October 4. St. Malo bombarded by the English, November 29. Quesnel's *Réflexions Morales* published.

1694. Bombardment of Dieppe and Havre by the English, July; of Dunkirk and Calais, September. Death of Archbishop Tillotson, November 22. Death of Queen Mary, December 28.

The Triennial Act passed. The Bank of England incorporated. The *Dictionnaire de l'Académie Française* published. Birth of Voltaire (died, 1778). University of Halle founded.

1695. Death of Marshal Luxembourg, January 4. Mustapha II. sultan, January 27. Fénelon archbishop of Cambrai, February. Bombardment of Brussels by Marshal Villeroi, August. Namur taken by William III., August 4; the citadel, September 1. Severe laws against Roman Catholics passed by Irish parliament, autumn. Censorship of the press in England ceases. Imprisonment of Madame Guyon. Death of Pierre Nicole (born, 1625).

1696. Assassination plot against William III., February 15. Calais bombarded by Benbow, March. Death of John Sobieski, June 17. Azoff taken by Czar Peter, July 28. Treaty of peace between France and Savoy, August 29. Bayle's *Dictionnaire historique et critique* published. Greenwich Hospital begun by Wren (finished, 1705). *Asiento* treaty between Spain and Portugal. Birth of Marshal Saxe.

1697. Charles XII. king of Sweden, April 16. Barcelona besieged by the French; taken, August 10. Battle of Zenta, victory of Prince Eugene over the Turks, September 11. Peace of Ryswick, September 20. Czar Peter in England. St. Paul's Cathedral opened, December 2. Dryden's translation of the *Æneid* published.

1698. First "Partition Treaty" between France, England, and Holland, for partition of Spanish dominions on the death of Charles II., October 11. Fort William, Calcutta, built. Darien Company incorporated. Society for Promoting Christian Knowledge and Society for Propagation of the Gospel in Foreign Parts founded. French settlement on the Mississippi. Birth of Metastasio (died, 1782). Birth of Bishop Warburton (died, 1779).

1699. Peace of Carlowitz, between the Porte and the emperor, the king of Poland, and the republic of Venice, concluded, January 26. Death of the elector of Bavaria, February. Frederick IV. king of Denmark, August 25. Treaty of alliance between Czar Peter and Augustus II. of Poland against Sweden, November 21. Dampier's expedition of discovery in the South Seas, 1699–1701. Fénelon's *Aventures de Télémaque* published.

1700. Second Partition Treaty signed, March 13. Siege of Copenhagen by Charles XII., August. Peace of Travendahl, August 18. Czar Peter declares war on Sweden, September 1. Charles II. of Spain appoints the duke of Anjou his successor, October 2. Philip V. (duke of Anjou), the first Bourbon king of Spain, proclaimed at Fontainebleau, November 16; at Madrid, November 24. Treaty of the Crown between the emperor and the elector of Brandenburg, November 16. Clement XI. pope, November 23. Battle of Narva, November 30. Birth of James Thomson (died, 1748). Birth of Zinzendorf (died, 1760).

1701. Frederick III., elector of Brandenburg, king of Prussia, January 18. Order of the Black Eagle founded, January. Marlborough commander-in-chief in Holland, June 1. War of the Spanish succession begins, summer. Second Grand Alliance formed between the emperor, William III., and the Dutch Republic, September 7. Death of James II., September 16; his son recognized as king of England by Louis XIV. Courland occupied by Charles XII. Birth of Boscowich (died, 1787).

1702. Act of Settlement (Hanoverian succession) passed, February. William III. died; Anne queen of Great Britain, March 8. England declares war against France and Spain, May 4. Warsaw taken by Charles XII., May 24. Insurrection of the Camisards in the Cevennes, summer. Charles XII. defeats the Poles at Clissow, July 20, and enters Cracow. Cadiz attacked by English and Dutch, August. Spanish fleet at Vigo, destroyed by allies, October 12. Battle of Friedlingen, October 14. Liége taken by Marlborough, October 23. Clarendon's *History of the Grand Rebellion* published. Birth of Philip Doddridge (died, 1751).

1703. Ratisbon seized by elector of Bavaria, March. Battle of Pultusk, May 1. The Methuen treaty concluded, May 6. Bonn taken by Marlborough, May 15. Archduke Charles takes title of king of Spain, September 12. Ahmed III. sultan, September. Battle of Hochstädt, September 20. Surrender of Thorn to Charles XII., October 15. The "Great Storm" in England, November 26–December 1. St. Petersburg founded. Queen Anne's Bounty established. Order of the Thistle revived. Death of Samuel Pepys (born, 1632). Birth of Jonathan Edwards (died, 1758). Birth of John Wesley (died, 1791).

1704. Frederick Augustus of Poland deposed, February; Stanislas Leczinski elected king, July. Dorpat taken by Czar Peter, July 13. Gibraltar taken by Admiral Rooke, July 24. Narva taken by Czar Peter, August 9. Battle of Blenheim (or Hochstädt), August 13. Newton's *Optics* published. Swift's *Tale of a Tub*.

1705. Invasion of Courland by Czar Peter, February. Siege of Gibraltar by French and Spaniards raised, and French squadron destroyed by Admiral Leake, March. Joseph I. emperor, May 5. Expedition of earl of Peterborough and Sir Cloudesley Shovel to Spain, May. Battle of Cassano, August 16. Barcelona invested by English, August; surrenders, October 4. Invasion of Silesia by Charles XII., September 1. Mittau taken by Peter, September. Peace between Sweden and Poland, November 18. Newcomen's steam-engine patented. Composition of light discovered by Newton. Death of Spener (born, 1635). Birth of Abraham Tucker (died, 1774).

1706. Battle of Fraustadt, February 13. Turin invested by the French, May. Marlborough gains possession of Brabant, May–October. Battle of Ramilies, May 12. Madrid entered by English and Portuguese, June 24. Philip recovers Madrid, August 5. Eugene defeats the French before Turin, and raises the siege, September 7. Invasion of Saxony by Charles XII., September 16. Peace of Altranstädt, between Charles XII. and Frederick Augustus, who renounces the throne of Poland, September 24. Milan entered by English and duke of Savoy, September 24. Birth of Franklin (died, 1790). Death of Bayle (born, 1647). Tindal's *Rights of the Christian Church Asserted* published (burnt by order of House of Commons, 1710).

1707. Act of Union passed by Scots parliament, January 16; by English parliament, March 6; comes into operation, May 1. Death of Aurungzebe, February 21. Battle of Almanza, April 14. Invasion of France by Eugene and the duke of Savoy, June 30. Toulon attacked by the allies, July 17. National flag of Great Britain appointed, July. Invasion of Russia by Charles XII., September. The kingdom of Naples subjugated by Imperialists, September 30. Execution of Patkul, October 10. First parliament of Great Britain meets, October 23. Capture of Lerida by the French, November 11. Calcutta made the seat of a presidency. Academy of Sciences, Berlin, founded. Watts's *Hymns* published. Birth of Linnæus (died, 1778). Birth of Buffon (died, 1788). Birth of Fielding (died, 1754). Birth of Euler (died, 1783).

1708. Attempted descent on Scotland by the Pretender James, March. Suspension of Habeas Corpus Act, March–October. Ghent and Bruges surrender to the French, July. Battle of Oudenarde, July 11. Sardinia surrenders to Sir John Leake, August. Peter defeats the Swedes at Liesna, September 28. Death of Prince George of Denmark, October 28. Lille taken by the allies, October; the citadel surrenders, December. Birth of Haller (died, 1777). Birth of Chatham (died, 1778).

1709. Alliance against Charles XII., June–October. Tournay taken by Marlborough and Eugene, June 30. Battle of Pultowa,—the power of Sweden broken, July 8. Charles XII. retires to Bender. Frederick Augustus restored to throne of Poland, July. Battle of Malplaquet, September 11. Siege of Mons by the allies, September 25; surrender, October 20. First Barrier Treaty between Great Britain and States-General of Holland, October 29. Birth of Johnson (died, 1784).

1710. Port Royal buildings demolished by decree of Louis XIV., January. Trial of Dr. Sacheverell, February–March. The Danes driven out of Sweden by Stenbock, March 10. Conferences of Gertruydenberg open, March; close, July. Douai taken by the allies, June 26. Battle of Saragossa, August 20. Charles III. enters Madrid, September 28. The sultan declares war on the czar, November. Philip V. restored, December. Conquest of Carelia and Livonia. The South Sea Company founded. Berkeley's *Principles of Human Knowledge* published. Leibnitz's *Théodicée*. Matthew Henry's *Exposition of the Old and New Testaments*. Birth of Thomas Reid (died, 1796). Birth of Pergolesi (died, 1736).

1711. Peter declares war against Turkey, January 25. Girona taken by the French, January 31. Death of the Dauphin, April 14. Death of the Emperor Joseph, April 18. English expedition against Canada, May to October. Harley Lord High Treasurer, May. Peter compelled to make peace with the Turks, July 21. Marlborough takes Bouchain, August. Charles III. quits Spain, September, and is elected emperor (Charles VI.), October 12. Marlborough deprived of all his offices, December. *The Spectator* published (1711–1712 and 1714). Birth of Hume (died, 1776). Birth of Kaunitz (died, 1794).

1712. The Duke of Ormond appointed commander-in-chief of British forces, January 1. Conferences for peace opened at Utrecht, January 29. Quesnoy taken by Eugene, July 4. Suspension of arms between England and France, July 17. Siege of Landrecies by Imperialists; raised by the French August 21. Philip V. renounces his claim to crown of France, November. Birth of J. J. Rousseau (died, 1778).

1713. Altona burnt by General Stenbock, January 9. Second Barrier Treaty, January 30. Frederick William I. king of Prussia, February 25. The peace of Utrecht, March 31. Pragmatic Sanction published by the emperor, April 13. Stenbock surrenders to the allies, May 16. Clarendon Press, Oxford, established. Herculaneum discovered. Birth of Diderot (died, 1784). Birth of Sterne (died, 1768). Birth of Lacaille (died, 1762).

1714. Peace of Rastadt between France and the emperor, March 6. George I. king of England, August 1. Marriage of Philip V. with Elizabeth Farnese, September 16. Escape of Charles XII. to Sweden, November. Birth of Vattel (died, 1767). Birth of Whitefield (died, 1770). Imperial Library, St. Petersburg, founded.

1715. War renewed between Sweden and Prussia, April. Impeachment of Bolingbroke, Oxford, and Ormond, June. The Riot

Act passed, July 20. Louis XV. king of France, September 1. The regency seized by duke of Orleans. Jacobite Rebellion, James III. proclaimed by earl of Mar at Braemar, September 6. Ministry of Walpole, from October 10. Battle of Sheriffmuir (Dunblane), November 13. Battle of Preston, November 12–13. Third Barrier Treaty between the emperor, Great Britain, and the States-General of Holland, November 15. The Morea reconquered by Turks. Treaty of commerce between Great Britain and Spain, December 15. Siege of Stralsund begun, October; it surrenders to the Prussians, December 22. *Gil Blas* published. Pope's *Homer's Iliad* (1715–1720). Birth of Condillac (died, 1780).

1716. Alliance between Great Britain and Holland, February 17. Execution of the Earl of Derwentwater and Lord Kenmure, February 24. Charles XII. invades Norway, March. Surrender of Wismar to Prussians, April 19. The Mississippi Scheme projected by Law, May. The Septennial Act passed, May 7. Alliance between Great Britain and the emperor, May 25. Turks defeated by Eugene at Peterwardein, August 5. The Perpetual Peace proclaimed at Warsaw, November 3. Sinking fund for extinction of national debt established. Birth of Garrick (died, 1779). Birth of Thomas Gray (died, 1771).

1717. Triple Alliance between France, England, and Holland, January 4. Dismissal of Walpole, April 10. Visit of Czar Peter to Paris, May. Treaty of Amsterdam between France, Russia, and Prussia, August 4. Turks defeated by Eugene at Belgrade, August 16. Sardinia invaded by Spaniards, August–October. Eruption of Vosuvius, described by Berkeley. Birth of Horace Walpole (died, 1797). Birth of D'Alembert (died, 1783).

1718. Invasion of Sicily by Spaniards, July 1. Peace of Passarowicz, July 21. Byng's expedition to the Mediterranean, summer. The Quadruple Alliance between Great Britain, France, and the emperor, joined by Holland, August 2. Siege of Fredrikshall by Charles XII., November. Death of Charles, December 11. England declares war on Spain, December 27.

1719. Retreat of Swedes from Norway, January. France declares war against Spain, January 10. Execution of Baron Gortz, March 13. Capitulation of Fontarabia to Marshal Berwick, June 18. Capitulation of St. Sebastian, August 19. Capture of Vigo by the English, October 21. Treaty of Stockholm between Great Britain and Sweden, November 20. Dismissal of Cardinal Alberoni, December 5. *Robinson Crusoe* published. Montfaucon's *Antiquité Expliquée*. Watts's *Psalms of David*.

1720. Accession of Spain to the Quadruple Alliance, January 25. Duke of Savoy becomes king of Sardinia. Treaty between Denmark and Sweden, June 12. Failure of the Mississippi Scheme, July. Break-up of the South Sea Scheme, autumn. Birth of Charles Edward Stuart, December 31. Birth of William Collins (died, 1756).

1721. Second administration of Sir Robert Walpole begins, April 4. Innocent XIII. pope, May 8. Treaty of Nystadt, between Sweden and Russia, September 10; cession of Livonia and Ingria to Russia. Peter I. emperor of all the Russias, November. The see of Vienna made an archbishopric. Birth of Akenside (died, 1770). Birth of Robertson, historian (died, 793). Birth of Smollett (died, 1771).

1722. Jacobite plot in England, May. Suspension of Habeas Corpus Act, October. Bishop Atterbury sent to the Tower, August. Invasion of Persia by Peter, summer. Conquest of Persia by the Ghiljeis completed, October. Coronation of Louis XV., October 25. Moravian settlement at Herrnhut founded by Count von Zinzendorf.

1723. Buda burnt, March 28. Death of Cardinal Dubois, August 10. Death of Regent Orléans, December 2. War between Turkey and Persia. Treaty between Peter I. and Prince Thomas for cession of several provinces. Academy of Sciences of St. Petersburg founded. Birth of Sir Joshua Reynolds (died, 1792). Birth of Adam Smith (died, 1790). Birth of Blackstone (died, 1780).

1724. Abdication of Philip V. in favor of his son Don Louis, January 8. Coronation of Catherine, empress of Russia, May 7. Benedict XIII. pope, May 29. Treaty of peace between Russia and Turkey, July 8. On death of Don Louis, Philip resumes the crown, September 6. Eruption of Hecla. Voltaire's *Henriade* published. Rapin's *Histoire d'Angleterre*. Swift's *Drapier's Letters*. Wollaston's *Religion of Nature Delineated*. Fahrenheit's thermometer invented. Birth of Kant (died, 1804).

1725. Death of Peter the Great, February 8. Congress of Cambray breaks up, April. Treaty of Vienna between the emperor and Philip V. signed, April 30. The Hanover treaty between England, France, and Prussia against the Vienna treaty, September 3. Marriage of Louis with Maria Leczinski, September 5. Order of St. Alexander Newsky founded. Vico's *Scienza Nuova* published. Flamsteed's *Historia Cœlestis Britannica*. Pope's *Homer's Odyssey*. Birth of Clive (died, 1774). Birth of Semler (died, 1794).

1726. Alliance between Russia and the empire, August 6. Earthquake at Palermo, August 26. *Travels of Gulliver* published. Thomson's *Seasons* (1726–1730). Birth of John Howard (died, 1790). Birth of Christian Friedrich Schwarz (died, 1798). Death of Kneller (born, 1648).

1727. Siege of Gibraltar by Spaniards, February. Peter II. emperor of Russia, May 27. Preliminaries of general peace signed at Paris, May 31. George II. king of England, July 10. Gay's *Beggar's Opera* produced. Aberration of light discovered by Bradley. First part of Lardner's *Credibility of the Gospel History* published (completed, 1757). Birth of Gainsborough (died, 1788).

1728. Congress of Soissons, June 14. Behring's Strait discovered. Rise of Methodism. Birth of Goldsmith (died, 1774). Birth of John Hunter (died, 1793). Birth of Joseph Black (died, 1799). Sect of Glassites (Sandemanians) founded. The *Dunciad* published.

1729. Revolt of Corsica against the Genoese. Peace of Seville, between Great Britain, France, and Spain, November 9. Accession of Holland, November 21. Birth of Lessing (died, 1781). Death of Samuel Clarke (born, 1675). Death of Sir Richard Steele (born, 1671).

1730. Ashraf of Persia defeated and killed by Kouli Khan (Nadir Shah), January; Tamasp restored. Anne empress of Russia, January 30. Clement XII. pope, July 12. Earthquake in China, September 30. Christian VI. king of Denmark, October 13. Mahmoud I. sultan, October 16. Birth of Burke (died, 1797). Birth of Josiah Wedgwood (died, 1795). Birth of Suwaroff (died, 1800). Tindal's *Christianity as Old as the Creation* published. Calmet's *Dictionnaire historique et critique de la Bible*.

1731. Second Treaty of Vienna, March 16. Accession of Spain, July 22. Kouli Khan defeats Turks at Hamadan. The English language ordered to be used in all courts of justice. Voltaire's *Lettres philosophiques* published (condemned to be burnt, 1734). Birth of Cowper (died, 1800). Birth of Churchill (died, 1764). Birth of Henry Cavendish (died, 1810).

1732. Treaty between Empress Anne and Kouli Khan, January. Pragmatic sanction guaranteed by Diet of the empire, January 11. Oran retaken by Spaniards, July. Deposition of Shah Tamasp by Kouli Khan, August. Berkeley's *Minute Philosopher* published. Birth of Necker (died, 1804). Birth of Lalande (died, 1807). Birth of Washington. Birth of Warren Hastings. Birth of Haydn (died, 1809).

1733. Death of Frederick Augustus II. of Poland, February 1; Stanislas proclaimed king, September 12, supported by France and Spain; Frederick Augustus, elector of Saxony, elected, October 5, supported by the emperor, and by Russia. Louis XV. declares war against the emperor, October 10. Capture of Kehl by Marshal Berwick, October 19. Treaty of alliance between France, Spain, and Sardinia, October 25. Stanislas takes refuge at Dantzic. Family compact between Philip V. and Louis XV., November. Conquest of the Milanese by the French, November–January, 1734. Pope's *Essay on Man* published. Birth of Bishop Horsley (died, 1806). Birth of Priestley (died, 1804).

1734. Siege of Dantzic by Russians, March; surrendered, July 9. Trèves taken by the French, May 8. Invasion of Naples by Spaniards, May. Battle of Bitonto,—defeat of Imperialists, May 25. Marshal Berwick killed before Philippsburg, June 12. Death of Marshal Villars, June 17. Imperialists defeated at Parma, June 29. Surrender of Philippsburg to French, July 18. Battle of Guastalla,—Imperialists defeated, September 19. Conquest of Naples completed, November 24. Birth of Romney (died, 1802). Birth of Mesmer (died, 1815).

1735. Don Carlos crowned king of the Two Sicilies (Charles III.), July 3. Preliminaries of peace between France and the emperor signed at Vienna, October 3. The *Systema Naturæ* of Linnæus published. Expedition of French savants to Peru to measure a degree of the meridian (they return in 1743).

1736. Abdication of Stanislas, January 27. Marriage of Maria Theresa of Austria with Francis of Lorraine, February 12. Kouli Khan proclaimed king of Persia (Nadir Shah), February 26. Porteous riots at Edinburgh, April 14 and September 7. Spain accedes to treaty of peace, April 15. War between Russia and Turkey renewed, April. Death of Prince Eugene, April 27. Azoff taken by the Russians, July 1. Treaty of peace between Nadir Shah and the Porte, July. Tuscany occupied by the Imperialists, December. Steam-vessel patented by Hulls. Butler's *Analogy* published. Birth of Horne Tooke (died, 1812). Birth of Prince Potemkin (died, 1791). Birth of Lagrange (died, 1813). Birth of James Watt (died, 1819).

1737. The emperor makes war on Turkey, July. Oczakoff taken by Russians, July. Death of Queen Caroline of England, December 1. University of Göttingen opened. Whiston's *Josephus* published. Birth of Gibbon (died, 1794). Birth of Charles Hutton (died, 1823). Birth of Galvani (died, 1798).

1738. Candahar taken by Nadir Shah, March. Russian invasion of the Crimea renewed. Orsova taken by Turks, August 9. Alliance between France and Sweden, November 10. Treaty of Vienna between France and the emperor; cession of Lorraine to France, November 18. Nadir Shah declares war on the Great Mogul, and seizes Ghazni, Cabul, and Peshawur. Handel's *Israel in Egypt* produced. Birth of William Herschel

(died, 1822). Birth of Benjamin West (died, 1820). Hume's *Treatise of Human Nature* published. Warburton's *Divine Legation of Moses* (1738–1741). Rollin's *Histoire Ancienne* completed. Solar microscope invented by Lieberkühn.

1739. The Great Mogul defeated and captured by Nadir Shah, February 9. Delhi entered, March 8. The Mogul restored and made tributary, April. Subsidy treaty between Great Britain and Denmark, March 25. Siege of Belgrade by Turks. Capture of Choczim by Russians, August 29. Capture of Jassy, September 14. Peace of Belgrade between the emperor and the Porte, September 18. England declares war against Spain, October 30. Peace between Russia and the Porte, November. Porto Bello taken by Admiral Vernon, November 22. Birth of Dumouriez (died, 1823). Foundling Hospital, London, established by Thomas Coram. Whitefield begins open-air preaching.

1740. Frederick II., the Great, king of Prussia, May 31. Belgrade restored to Turkey, June. Benedict XIV. pope, August 17. Death of the Emperor Charles VI., October 20. Under the Pragmatic Sanction his daughter Maria Theresa, succeeds as queen of Hungary and Bohemia; opposed by elector of Bavaria. Ivan VI. emperor of Russia, October 29. Invasion of Bokhara and Kharismia by Nadir Shah. Frederick II. invades Silesia, December 16. Birth of Boswell (died, 1795).

1741. Battle of Mollwitz, victory of Frederick II. over Austrians, April 10. Cartagena attacked by Admiral Vernon, April 27. Treaty of Nymphenburg between Spain and Bavaria, May. Alliance between George II. and Maria Theresa, June 24. Coronation of Maria Theresa as queen of Hungary, June 25. Elector of Bavaria invades Austrian dominions, end of June. Sweden declares war on Russia, July 24. Frederick II. takes Breslau, August 10. Lower Austria seized by elector of Bavaria, October. Capture of Neiss by Prussians, October 31. Capture of Prague by Bavarians and allies, November 26. Revolution in Russia; Ivan VI. deposed, December 6; Elizabeth Petrowna proclaimed empress, December 7. Spanish troops sent to Italy, December. Stockholm Academy of Sciences, founded. Middleton's *Life of Cicero* published. Birth of Lavater (died, 1801). Death of Rollin (born, 1661).

1742. Elector of Bavaria chosen emperor, as Charles VII., January 24. Fall of Walpole, February 1. Munich taken possession of by Austrians, February 13. Frederick II. invades Moravia and Bohemia, March–April. France declares war against the queen of Hungary, England, and Holland, July 3. Treaty of peace at Berlin, July 28. Capitulation of Swedish army to Russians, September 4. Alliance between Great Britain, Prussia, and Holland (Treaty of Westminster), November. Treaty of Moscow, between Great Britain and Russia, December 11. Retreat of French under Belle-Isle from Prague to Egra, December 16–26. Handel's *Messiah* produced. Young's *Night Thoughts* (1742–1746). Fielding's *Joseph Andrews*. Robins's *New Principles of Gunnery*. Humo's *Essays* (1742–1752). Centigrade thermometer invented by Celsius. Birth of Blücher (died, 1819).

1743. Death of Cardinal Fleury, January 29. Munich again taken by Austrians, June 12. Battle of Dettingen, June 27. Treaty of Abo, between Russia and Sweden, August 17. Broad Bottom administration formed by Pelham, August. Ingolstadt taken by Austrians, September 12. Treaty of Worms, between Great Britain, the queen of Hungary, and the king of Sardinia, September 23. Secret treaty (second "Family Compact") between France and Spain, October 25. War between Nadir Shah and the Turks. Mosul besieged, October. Academy of Sciences, Copenhagen, and University of Erlangen, founded. Birth of Lavoisier (died, 1794). Birth of Paley (died, 1805). Birth of Condorcet (died, 1794). Birth of Jefferson (died, 1826).

1744. Unsuccessful attempt of Charles Edward to make a descent on England, February. Sea-fight between English and French and Spanish fleets off Toulon, February 22. Louis XV. declares war against England, March 15; against queen of Hungary, April 26. Louis invades Flanders, May. Union of Frankfort, between the emperor, the king of Prussia, the elector Palatine, and the king of Sweden, May 22. Secret treaty between Frederick II. and France, June 5. Frederick II. invades Bohemia (second Silesian war), August. Capture of Prague by Frederick, September 16. Capture of Munich by the French, October 16. Prague evacuated by Prussians, November 26. Anson's voyage round the world completed, June. Great eruption of Cotopaxi. First Wesleyan Conference held. Akenside's *Pleasures of Imagination* published. Euler's *Theoria Motuum*. Birth of Marat. Birth of Herder (died, 1803).

1745. Treaty of Warsaw, between the elector of Saxony, Great Britain, the queen of Hungary, and States-General, January 8. Death of Charles VII., January 20. Peace of Fuessen, between the elector of Bavaria and queen of Hungary, April 22. Treaty between France, Spain, Naples, and the Genoese, May 7. Battle of Fontenoy, May 11. Capture of Cape Breton by the English, June 26. Jacobite rebellion; Charles Edward lands in Scotland, July 23. Secret treaty between Great Britain and Prussia, August 26. Francis I., grand duke of Tuscany, elected emperor, September 13. James VIII. proclaimed at Edinburgh, September 17. Battle of Prestonpans, September 21. Carlisle taken by the Pretender, November 15. Frederick II. invades Saxony, November. Derby reached by the Pretender, December 4. Surrender of Dresden to Frederick II., December 18. Milan entered by the Spaniards, December 19. Charles Edward retreats to Scotland, December 20. Frederick concludes treaties of Dresden with Saxony and Austria, December 25. Swedenborg's *De Cultu et Amore Dei* published. Wahhab begins to propagate his doctrines. Birth of Volta (died, 1826).

1746. Battle of Falkirk, January 17. Brussels taken by Marshal Saxe, February 20. Battle of Culloden, April 16; end of the rebellion. Antwerp taken by Marshal Saxe, May 19. Ferdinand VI. king of Spain, July 9. Frederick V. king of Denmark, August 6. Execution of Lords Balmorino and Kilmarnock, August 18. Genoa bombarded by English fleet, surrenders to Austrians, September 6. The French and Spaniards driven out of Italy, September. Madras capitulates to the French, September 19. Namur taken by the French, September 19. Earthquake at Lima, October 28. Austrians driven from Genoa, December 10. *Frederician Code* published. Handel's *Judas Maccabæus* produced. Hervey's *Meditations*. Birth of Sir William Jones (died, 1794). Birth of Pestalozzi (died, 1846).

1747. Lord Lovat beheaded, April 9. Invasion of Brabant by the French, April. William of Nassau appointed Stadtholder of the Netherlands, May 4. Admiral Anson defeats French fleet off Finisterre, May 14. Commodore Fox captures French West India fleet, June 16. Nadir Shah assassinated, June. Charles Edward escapes to Franco, September. Bergen-op-Zoom taken by the French, September 16. Admiral Hawke defeats French fleet off Belle Isle, October 14. University of St. Petersburg founded. Origin of the Shakers about this time. Birth of Dr. Parr (died, 1825). Birth of Canova (died, 1822). Death of David Brainerd (born, 1718).

1748. Maestricht invested by the French, April 13; surrenders, May 7. Peace of Aix-la-Chapelle, October 18. Centenary of Peace of Westphalia celebrated at Hamburg, October 25. Invasion of India by Afghans. Montesquieu's *Esprit des Lois* published. Richardson's *Clarissa Harlowe*. Smollett's *Roderick Random*. Handel's *Solomon* produced. Birth of Jeremy Bentham (died, 1832). Birth of J. L. David, painter (died, 1825).

1749. Flanders and Brabant evacuated by the French, January–February. Cape Breton restored to France, June. Eruption of Vesuvius, June–August. Madras restored to the English, September. War of succession in the Carnatic. Swedenborg's *Arcana Cœlestia* begun (completed, 1756). Middleton's *Free Inquiry* published. Birth of Mirabeau. Birth of Alfieri (died, 1803). Birth of Laplace (died, 1827). Birth of Goetho (died, 1832). Birth of C. J. Fox (died, 1806). Birth of Tippoo Saib (died, 1823). Birth of Jenner (died, 1823).

1750. Treaty of Madrid between Great Britain and Spain, October 5. Death of Marshal Saxe, November 30. Westminster Bridge opened. Fielding's *Tom Jones* published. Johnson's *Rambler*, 1750–1752. Baumgarten's *Æsthetica*.

1751. Death of Frederick, prince of Wales, March 20. Adolphus Frederick king of Sweden, April 6. Arcot taken by Clive, August 31. Publication of Diderot's *Encyclopédie* begun (completed, 1765). *Philosophia Botanica* of Linnæus. Birth of Lord Eldon (died, 1838). Birth of R. B. Sheridan (died, 1816). Birth of Voss (died, 1826). Society of Antiquaries of London incorporated.

1752. The New Style adopted in Great Britain, January 1. Conquest of the Punjab by Afghans. Franklin proves identity of lightning and electricity. Birth of Legendre (died, 1833). Birth of J. G. Eichhorn (died, 1827). Death of Whiston (born, 1667). Birth of Madame D'Arblay (died, 1840). Birth of Blumenbach (died, 1840).

1753. The British Museum founded. Wesley's *Hymns* published. Birth of Dugald Stewart (died, 1828). Birth of William Roscoe (died, 1831). Birth of Carnot (died, 1823). Birth of Thomas Bewick (died, 1828).

1754. Othman III. sultan, December 13. Peace between French and English in India, December 26. New Marriage Act passed in England. Earthquakes at Constantinople and Cairo. Condillac's *Traité des Sensations* published. Edwards's *Inquiry into the Freedom of the Will*. First part of Hume's *History of England* (completed, 1761). Birth of Madame Roland. Birth of Kléber (died, 1800). Birth of Talleyrand (died, 1838). Birth of Crabbe (died, 1832). Society of Arts, London, founded.

1755. Benedict XIV. concludes concordat with Spain, January 11. General Braddock's expedition against the French in Canada; he is defeated and killed, July 9. Lisbon destroyed by earthquake, November 1. University of Moscow founded. Eruption of Catlegia, Iceland, lasts from October, 1755, to August, 1756. Johnson's *Dictionary* published. Birth of Marie Antoinette. Birth of Flaxman (died, 1826). Birth of Hahnemann (died, 1843). Death of Mosheim (born, 1694).

1756. League of Austria, Russia, Saxony, and Sweden against Prussia. Treaty of alliance between France and Austria, May 2. England declares war against France, May 17. Admiral Byng defeated by French off Minorca, May 20. Capture of Calcutta by Suraja Dowla, June 18. Prisoners perish in the Black Hole. Capitulation of English garrison in Minorca to the French, June 28. The Seven Years' War begins with invasion of Saxony by Frederick II., August 27. Dresden entered and Saxon archives seized, September 10. He defeats the Austrians at Löwositz, October 1. Capitulation of Saxon army, October 15. William Pitt (Chatham) secretary of state, December. Militia Bill passed in England, December. Burke's *Inquiry into the Origin of our Ideas on the Sublime and Beautiful* published. Birth of William Godwin (died, 1836). Birth of Mozart (died, 1791).

1757. Calcutta retaken by the English, January 2. Treaty between Great Britain and Prussia against France and Austria, January 11. Chandernagore taken by English, March 14. Admiral Byng shot, March 14. The French enter Westphalia, the Prussians Bohemia, April. Pitt dismissed from office, April. Battle of Reichenberg, April 24. Battle of Prague; Marshals Brown and Schwerin killed, May 6. Russians invade Prussia, June. Pitt secretary of state again, with powers of prime minister, June. Battle of Plassy,—victory of Clive over the Subahdar, June 23. Hesse-Cassel occupied by French, July. Verden and Bremen occupied by French, August. Minden taken by the French, August 3. Mustapha III. sultan, October 29. Order of Maria Theresa founded. Lacaille's *Fundamenta Astronomiæ* published. Carbonic acid described by Black. Birth of Lafayette (died, 1834). Birth of Sir Samuel Romilly (died, 1818). Birth of Volney (died, 1820), Birth of Baron von Stein (died, 1831). Birth of William Blake (died, 1827).

1758. Prussia overrun by Russians, January. Prince Ferdinand of Brunswick drives the French from Hanover, &c., February–March, and takes Minden, March 14. Subsidy treaty between Great Britain and Prussia, April 11. Clement XIII. pope, July 6. Arcot taken by the French, October 4. Battle of Hochkirchen,—Daun defeats Frederick II., October 14. French besiege Madras, December 11–February 19, 1759. New treaty of alliance between France and Austria, December 30. Dollond's achromatic object-glass invented. *Annual Register* begun by Dodsley. Swedenborg's *New Jerusalem* published. Birth of Nelson.

1759. Surat taken by the English, March 2. Treaty between Russia and Sweden for neutrality of the Baltic, March 9. Battle of Minden, August 1. Charles III. king of Spain, August 10. Admiral Boscawen defeats French fleet in Bay of Lagos, August 18. Expulsion of Jesuits from Portugal, September 3. Dresden taken by Imperialists, September 5. Battle of Quebec; deaths of Montcalm and Wolfe, September 13. Admiral Hawke defeats Marshal Conflans in Quiberon Bay, November 20. Marshal Daun captures General Finck and his army at Maxen, November 21. Return of Halley's comet. Births of Porson, Wilberforce, Pitt, Robespierre, Danton, Schiller, Burns. Death of Maupertuis (born, 1697). *Rasselas* and first part of *Tristram Shandy* published.

1760. Capture of Arcot by the English, February 9. Battles of Landshut, June 23; Corbach, July 10; Liegnitz, August 16. English conquest of Canada completed, September 8. Berlin occupied by Russians, October 9–12. George III. king of Great Britain, October 25. Battle of Torgau,—Daun defeated, November 3. Eddystone lighthouse completed by Smeaton. Macpherson's *Ossian* published, 1760–63. Birth of Saint-Simon (died, 1825).

1761. Pondicherry taken by Coote, January 14. Dominica taken by the English, June 6. "Family Compact" between the kings of France and Spain, August 15. Marriage of George III., September 8. Resignation of Pitt, October 5. Colberg taken by Russians, December 16. Bridgewater Canal completed by Brindley. Transit of Venus. Death of William Law (born, 1686).

1762. England declares war on Spain, January 2. Peter III. emperor of Russia, January 5. Martinique taken by the English, February 4. Frederick II. concludes peace with Russia, May 5. Earl of Bute prime minister of England, May 29. Portugal invaded by Spaniards, May. Peace of Hamburg between Frederick II. and Sweden, May 22. Peter III. deposed, and succeeded by Catherine II., July 9; put to death, July 19. Havana taken by earl of Albemarle, August 13. The Spaniards driven out of Portugal, autumn. Hyder Ali rajah of Mysore. Rousseau's *Contrat Social* and *Emile* published. Death of Anson (born, 1697). Births of Fichte, Cobbett, and William Carey.

1763. Peace of Paris, between Great Britain, France, Spain, and Portugal, February 10. Peace of Hubertsburg, between Austria, Prussia, and Saxony, February 15; end of the Seven Years' War. George Grenville first lord of the treasury, April 8. Arrest of John Wilkes, April 30. Latent heat discovered by Black, 1759–63. Birth of Jean Paul Richter (died, 1825).

1764. Wilkes expelled the House of Commons, January 19. Alliance between Russia and Prussia, April 11. Ivan VI. murdered, July 6. Stanislas Poniatowski elected king of Poland September 7. Jesuit Order suppressed in France by Louis XV. November 26. Byron's voyage round the world begun. Lardner's *Testimonies to the Truth of the Christian Religion* published. Death of Hogarth (born, 1697).

1765. Stamp Act passed by British parliament, March 22. Opposition to it begun by Virginia, May. Lord Clive governor and commandor-in-chief at Calcutta, May. Rockingham administration formed, July 10. Joseph II. emperor, August 18. Lady Huntingdon's Connexion founded. Blackstone's *Commentaries* published.

1766. Death of the Chevalier de St. George (the old Pretender), January 2. Christian VII. king of Denmark, January 14. American Stamp Act repealed, March 18. Second Pitt administration, August 2. War between Hyder Ali and the Nizam of the Deccan; alliance of the English with the Nizam, November. Expedition of Wallis and Carteret to the South Seas. Bougainville's voyage round the world begun. Lessing's *Laocoon* published. Goldsmith's *Vicar of Wakefield*. Births of Madame de Stael, Dalton, W. H. Wollaston, and Malthus.

1767. Expulsion of Jesuits from Spain, March 31. Corsica given up by Genoa to France, May 15. Alliance of Hyder Ali and the Nizam against the English, September. Otaheite discovered by Wallis and Carteret. *Nautical Almanac* first published. Births of W. von Humboldt, A. W. Schlegel, and Maria Edgeworth.

1768. Wilkes elected M.P. for Middlesex, March; riot caused by his imprisonment, May 10. General Gage arrives with British troops at Boston, September 26. Lord Chatham resigns privy seal, October 15. War between Russia and Turkey, October. Jesuits expelled from Naples, Parma, and Malta. Cook's first voyage round the world, 1768–71. The Royal Academy of Arts, London, founded. Death of Nathaniel Lardner (born, 1684). Births of Schleiermacher, Chateaubriand, and General Hoche.

1769. The Letters of "Junius" begin to appear, January. Hyder Ali ravages the Carnatic, January. Wilkes again expelled the Commons, February 2; re-elected for Middlesex, February 16. Hyder Ali compels the English to enter into alliance with him, and to restore their conquests, April. Clement XIV. pope, May 19. Occupation of Corsica by the French, May. Shakespeare Jubilee at Stratford-on-Avon, September 6–8. Moldavia and Wallachia occupied by Russia, September. Watt's first patent for steam-engine. Robertson's *History of Charles V.* published. Births of Napoleon I., Wellington, Alexander von Humboldt, Marshal Ney, Cuvier, Lord Castlereagh, Brunel (the elder), Sir Thomas Lawrence, Mehemet Ali, Sir John Malcolm, and M. de Bourrienne.

1770. Resignation of Grafton; Lord North's administration formed, January 28. The "Boston Massacre," March 5. The French East India Company dissolved by Louis XV., April 8. Act for repeal of certain colonial duties passed, April 12. Liberation of Wilkes, April 17. Marriage of the Dauphin Louis with Marie Antoinette, May 16. Trial of Woodfall, printer of *Junius*, June 13. Austrians enter Poland, about midsummer. Turkish fleet defeated by Russians off Chios, July 5, and burnt in Chesmeh Bay, July 7. General Romanzoff defeats the Turks on the Kaghul, August 1. Prussian troops enter Poland, autumn. New South Wales discovered by Cook. Goldsmith's *Deserted Village* published. Death of Chatterton (born, 1752). Births of Wordsworth, Hegel, John Foster, George Canning, and Thorwaldsen.

1771. Parliament of Paris exiled by Louis XV., January 19. Gustavus III. king of Sweden, February 13. Shah Alum II. enters Delhi, December. The Crimea seized by Russians. Death of Smollett (born, 1721). Births of Sydney Smith, Lingard, Sir Walter Scott, James Moutgomery, Archduke Charles, and Murat. First edition of *Encyclopædia Britannica* published.

1772. Warren Hastings governor of Bengal, April 13. Treaty of St. Petersburg for partition of Poland between Austria, Russia, and Prussia, August 5. New constitution established in Sweden, August 21. Cook's second voyage round the world, 1772–74. Royal Marriage Act passed. Death of Swedenborg (born, 1688). Births of Novalis, S. T. Coleridge, Fourier, and D. Ricardo.

1773. Ahmed IV. sultan, January 21. Ali Bey defeated and captured by Murad Bey, April 13; assassinated a few days later. Constitution of East India Company changed, June. Society of Jesus suppressed by Clement XIV., July 31. Diet of Poland concludes cession with the partitioning powers, September 18. Rohilcund ravaged by Mahrattas. Agitation in Boston, Mass., against the tea tax, December 16. Births of Jeffrey, F. Schlegel, Sismondi, and Thomas Young.

1774. Warren Hastings first governor-general of India, January. Abdul Hamid sultan, January 21. Boston Port Bill passed, March. General Gage appointed governor of Massachusetts, April 2. Louis XVI. king of France, May 10. General Court of Massachusetts closed, June 17. Treaty of Kutchuk Kainardji, between Russia and Turkey, July 21. Congress

opens at Philadelphia, September 5; closes October 26. Death of Pope Clement XIV., September 22. Parliaments of France re-established by Louis XVI., November 12. New Caledonia discovered by Cook. Oxygen discovered by Priestley and by Scheele. Chesterfield's *Letters* published. Goethe's *Leiden des jungen Werther*. The *Wolfenbüttelsche Fragmente*. Births of Southey and Mezzófanti.

1775. Pius VI. pope, February 14. Battle of Lexington, Massachusetts, April 19. Famine riots at Versailles, May. Washington commander-in-chief of continental army, June 5. Battle of Bunker Hill, June 17. Boston invested by Washington, July 2. Montreal taken by General Montgomery, November 12. Code of Catherine II. published. Lavater's *Physiognomy*. Births of Charles Lamb, Turner, Jane Austen, and O'Connell.

1776. Evacuation of Boston by the English, March 17. Canada evacuated by Americans, June 18. Declaration of Independence of the "United States," July 4. Commissioners of United States sent to France, September. British troops enter New York, September 15. Necker's administration (France), November. Battle of Trenton, December 26. Cook's last voyage begun. First vol. of Gibbon's *Roman Empire* published (completed, 1778). Smith's *Wealth of Nations*. Birth of Niebuhr.

1777. National flag of United States adopted, June 14. Execution of Dr. Dodd for forgery, June 27. Battle of Brandywine, September 11. General Howe takes Philadelphia, September 27. Battle of Germantown, October 4. Surrender of General Burgoyne to General Gates, at Saratoga, October 16. Articles of Confederation of United States agreed to, November 15. Suspension of Habeas Corpus Act in Great Britain, December 11. Death of Maximilian Joseph, elector of Bavaria, December 30, followed by dispute as to succession. Howard's *State of the Prisons* published. Births of Oersted, De la Motte-Fouqué, and Thomas Campbell.

1778. Independence of United States recognized by France, January 16; treaty of amity signed, January 30. English ambassador recalled from Paris, March 13. Death of Chatham, May 11. France declares war against England, July 10. Savannah taken by the English, December 28. Sandwich Islands and Owhyhee discovered by Cook. Death of Voltaire. Births of Thomas Brown, Sir Humphrey Davy, De Candolle, and Gay-Lussac.

1779. Admiral Keppel tried by court-martial and acquitted, January–February 11. Captain Cook (born, 1728) killed in Owhyhee, February 14. Peace of Teschen, May 13, ends war of the Bavarian succession. Spain declares war against Great Britain, June 16. Alliance of Spain with United States, July 13. Fleets of France and Spain in the English Channel, August. Protestant Association founded in England. Johnson's *Lives of the Poets* published, 1779–81. The *Olney Hymns*. Births of Moore, Œhlenschläger, Oken, and Berzelius.

1780. Rodney defeats Spanish fleet off Cape St. Vincent, January 16. Charleston surrenders to Sir H. Clinton, May 13. The Gordon riots in London, June 2. Armed Neutrality between Russia, Denmark, and Sweden, July 9 and August 1; joined by States-General, December 24. Arcot taken by Hyder Ali, October 31. Death of Maria Theresa, November 29. Vaccination suggested by Jenner.

1781. The French invade Jersey, and are defeated, January 6. Bombardment of Gibraltar by Spaniards, April 12 to November 26. Conquest of Florida by Spaniards completed, May. Necker resigns, May. The king of Prussia joins Armed Neutrality, May 8. Sir Eyre Coote defeats Hyder Ali near Porto Novo, July 1. Yorktown occupied by Lord Cornwallis, August 1. Sea-fight off the Dogger Bank between English and Dutch, August 5. The emperor joins Armed Neutrality, October 9. Edict of toleration issued by the emperor, October 13. Yorktown capitulates to Washington, October 19. The Barrier Treaty dissolved, November. Uranus (Georgium Sidus) discovered by Herschel. Sunday Schools originated by Robert Raikes. Births of H. F. Clinton, G. Stephenson, and Sir F. Chantrey.

1782. Second Rockingham administration in office, March 27. Victory of Rodney over French fleet off Dominica, April 12. Death of Rockingham, July 1. Shelburne administration, July 10. The "Royal George" sinks at Spithead, August 29. Successful defence of Gibraltar against the allies by General Elliott. Preliminaries of peace between England and the United States, November 30. Charleston evacuated by the English, December 14. Death of Hyder Ali, December 7; Tippoo Saib succeeds him. Poyning's Law (Ireland) repealed. Rousseau's *Confessions* published.

1783. Sovereignty of the Crimea sold to Catherine II., January 20. Coalition ministry of Fox and North, April 2. Definitive treaty of peace between England and the United States signed at Paris September 3. Treaty of peace between Great Britain, France, and Spain, September 3. The Coalition ministry dismissed, December 13. Pitt appointed first lord of the treasury, December 19. Washington resigns his commission, December 23. First experiments with Montgolfier's air balloon. Order of St. Patrick founded. Birth of Bolivar.

1784. Tippoo concludes peace with the English,—restitution of conquests agreed to, March 11. Treaty of peace between England and Holland, June 20. Pitt's India Bill passed, August 13. The Board of Control established. Death of Johnson, December 13. Bramah lock patented. Mitford's *History of Greece*, vol. i., published (completed, 1818).

1785. Resignation of Warren Hastings, February 8. John Adams, first ambassador of United States to England, presented to George III., June 1. Confederation of Saxony, Brandenburg, and Hanover, July 23. Treaty of Fontainebleau between the emperor and the States-General, guaranteed by France, signed, November 8. Expedition of La Perouse to South Seas. Royal Irish Academy incorporated. Death of General Oglethorpe (born, 1696).

1786. Impeachment of Warren Hastings, February. Frederick William II. king of Prussia, August 17. Lord Cornwallis governor-general of India, September. Treaty of navigation and commerce between Great Britain and France, September 26. Sebastopol founded. University of Bonn founded. Wesleyan Methodist Missionary Society instituted. Burns's *Poems* published. Death of Admiral Keppel (born, 1725).

1787. First Assembly of Notables meets at Versailles, February 22; closes May 25. The parliament of Paris exiled, August-September. War between Russia and Turkey renewed, August. The Prussians invade Holland, and restore the stadtholder, September. Eruption of Etna, July to October. Society for suppression of the slave-trade formed in London. Death of Gluck (born, 1712).

1788. First publication of *The Times*, January 1. Death of Prince Charles Edward, January 31. The emperor declares war against Turkey, February 9. Trial of Warren Hastings begins, February 13. Turkish fleet defeated and destroyed, June 26. Russia declares war against Sweden, July 11. Necker recalled, August 24. Temporary insanity of George III.; regency of Prince of Wales, October to February, 1789. Second Assembly of the Notables, November 6–December 12. Oczakoff stormed by Russians under Potemkin, December 17. Penal settlement at Botany Bay. Drainage of the Pontine Marshes completed.

1789. Charles IV. king of Spain, January 17. Selim III. sultan, April 7. Mutiny of the "Bounty," April 28. Washington first president of United States, April 30. First French Revolution; opening of the States-General at Versailles, May 5. National Assembly constituted, June 17. Fall of the Bastille, July 14. Abolition of feudal privileges, August 4. Insurrection in the Netherlands, September. Suwaroff defeats the Turks, September 22. Jacobin Club settles at Paris, about October. The Austrians expelled from the Netherlands, December. Land settlement in India begun. Herschel's great telescope completed. White's *Natural History of Selborne* published. Birth of Neander.

1790. Act of Union of Belgic United Provinces signed at Brussels, January 11. Treaty of alliance between Prussia and the Porte, January 31. Monastic vows abolished in France, February 13. Death of Joseph II., February 20. Defensive alliance between Prussia and Poland, March 29. Titles of honor abolished in France, June 20. Federation Fête of the Champs de Mars, July 14. Peace of Wercla, between Russia and Sweden, signed, August 14. First issue of assignats in France, September 9. Leopold II. elected emperor, September 30. Austrians enter Brussels, December 2. Convention between the emperor and mediating powers; end of the Belgian Republic, December 10. Ismail taken by Suwaroff, December 22. City of Washington founded. Burke's *Reflections on the French Revolution* published.

1791. Death of John Wesley, March 2. Death of Mirabeau, April 2. New Polish Constitution promulgated, May 3. Flight of Louis XVI. from Paris, June 20; he is arrested at Varennes and brought back, June 21. Priestley riots at Birmingham, July 14. Declaration of Pilnitz, August 27. First coalition (between Austria and Prussia) formed, August 27. The constitution completed by National Assembly, September 3; accepted by Louis, September 14. Meeting of National Legislative Assembly at Paris, October 1. Death of Potemkin, October 16. Representative government introduced in Canada. Galvani's discovery of animal electricity published. D'Israeli's *Curiosities of Literature* published.

1792. Peace of Jassy between Russia and Turkey, January 9. Attack on Seringapatam by the English, February 6. Death of the Emperor Leopold II., March 1. Girondist ministry at Paris, March. Gustavus III. of Sweden assassinated by Ankarström, March 16; Gustavus IV. succeeds. Peace concluded between the English and Tippoo; cession of half of Mysore, March 19. The blacks in St. Domingo declared free, April 4. Louis XVI. declares war against the king of Hungary, April 20. Invasion of the National Assembly and the Tuileries by the mob, "procession of the black breeches," June 20. Francis II. elected emperor, July 5. Manifesto of duke of Brunswick, July 25. Death of the earl of Guildford (Lord North), August 5. Attack on the Tuileries; massacre of the Swiss guards, August 10. Louis and his family imprisoned in the Temple, August

13. Invasion of France begins, August 18. The "September Massacres," at Paris, September 2–3. Opening of National Convention, September 21. Abolition of royalty, September 21. The Republic proclaimed, September 22. The Revolutionary calendar adopted, September 22. French occupation of Savoy, September. Battle of Jemappes, November 6. Belgium overrun by the French, November–December. The Scheldt open to all nations, November 22. Fox's Libel Bill passed. Baptist Missionary Society founded. Gas first used for lighting.

1793. Treaty between Russia and Prussia for second partition of Poland, January 4. Alien Bill passed in England, January 4. Execution of Louis XVI., January 21. Invasion of Holland by Dumourier, February. Washington president of United States (second term), March 4. Insurrection in La Vendée, March 10. Revolutionary Tribunal established, March 11. "Reign of Terror." English army sent to Holland, March. Death of Chief-Justice Mansfield, March 20 (born, 1705). Fall of the Girondists, June 2. Assassination of Marat by Charlotte Corday, July 13; execution of Charlotte, July 17. Levy *en masse* of the French ordered, August 23. Pondicherry taken by the English, August 23. Toulon taken by Lord Hood, August 28. Lyons taken by Kellermann, October 9. Execution of Marie Antoinette, October 15; of the Girondists, October 31. Worship of reason introduced, November 10. Toulon retaken, —Napoleon Bonaparte at the siege, December 18, 19. The *Noyades* of Nantes, December. Society of United Irishmen founded.

1794. Insurrection in Poland, Kosciuszko generalissimo, March. Execution of Danton and his followers, April 6. Habeas Corpus Act suspended in England, May 23. Victory of Lord Howe over French fleet, off Brest, June 1. *Fête de l'Être Suprême*, June 8. Battle of Fleurus, June 26. Fall of Robespierre,—end of the Reign of Terror, July 27. Corsica reduced by the English, August 4. Battle of Maciewice; Kosciuszko wounded and captured, October 10. Trials of Hardy, Horne Tooke, and others, October–November. Battle of Praga,—the Poles defeated by Suwaroff, November 4. Warsaw entered by Russians, November 9. The English driven from Holland, December. Chappe's telegraph invented. Godwin's *Caleb Williams* published. Paley's *Evidences*. Goethe's *Wilhelm Meisters Lehrjahre*.

1795. Third partition of Poland arranged between Russia, Austria, and Prussia, January 3. The French enter Amsterdam, January 19. Abolition of the stadtholderate; the Batavian Republic established, February 24. Insurrection at Paris, April 1. Peace of Basel between French Republic and the king of Prussia, April 5. Acquittal of Warren Hastings, April 23. Insurrection at Paris, May 20–21. Treaty of Basel between France and Spain, July 22. The Directory established, August 22. Cape of Good Hope taken by the English, September. Annexation of Belgium to France, October 1. Last sitting of National Convention, October 26. King Stanislas abdicates, November 25. Dutch settlements in Ceylon taken by English. Institute of France and *École Polytechnique* founded. Maynooth College, Ireland, founded.

1796. Irish Insurrection Act passed, March 10. Battle of Lodi, May 10. Milan entered by Napoleon, May 15. Treaty between French Republic and the king of Sardinia for cession of Nice, Savoy, &c., May 15. Bologna entered by Napoleon, June 18. Alliance between France and Spain, August 19. Spain declares war against Great Britain, October 6. Suspension of Habeas Corpus Act in Ireland, October 26. Battle of Arcola, November 15–17. Paul emperor of Russia, November 17. Cispadane Republic founded, December. Attempt of General Hoche on Ireland, December 22–27. Hydraulic press patented by Bramah.

1797. Battle of Rivoli, January 14. Capitulation of Mantua to Napoleon, February 1, 2. Admiral Jervis defeats Spanish fleet off Cape St. Vincent, February 14. John Adams president of United States, March 4. Napoleon declares war on Venice, May 3; and enters the city, May 16. Councils of Five Hundred and of the Ancients established at Paris, May 20. Ligurian Republic established, June. Cisalpine Republic, June 29. Death of Burke, July 9. Death of Burns, July 21. Coup-d'état of 18th Fructidor, September 4. Admiral Duncan defeats Dutch fleet off Camperdown, October 11. Treaty of Campo Formio between France and Austria, October 17. Frederick William III. king of Prussia, November 16. Congress of Rastadt opens, December 9. Insurrection at Rome, December 27. First issue of one-pound notes by Bank of England.

1798. Occupation of Rome by the French, February 10; a republic proclaimed, February 15. Subjugation of Switzerland by the French, January–March. Helvetic Republic proclaimed, April 12. Annexation of Geneva to France, April 26. Rebellion in Ireland breaks out, May 23. Malta taken by Napoleon, June 11. French invasion of Egypt, July 1. Battle of the Pyramids, July 21. Battle of the Nile, August 1–2. General Humbert lands French force at Killala, August; surrenders to General Lake, September 8. Rome occupied by Neapolitans, November 29. Abdication of king of Sardinia, December 9. Alliance between Russia and the Porte, December 23. Treaty between Great Britain and Russia, December 29. Income Tax proposed by Pitt, December. Jenner's *Inquiry* ("Vaccination"; published. Lithography invented by Senefelder. Haydn's *Creation* produced.

1799. Naples entered by the French, January. Capitulation of Ehrenbreitstein to the French, January 29. Invasion of Syria by Napoleon, February. Massacre of Jaffa, March 7. Unsuccessful siege of Acre by Napoleon, March 16–May 21. Invasion of Mysore by the English, March. Congress of Rastadt closed, April 7. Seringapatam stormed by the English under Baird; Tippoo killed, May 4. Second coalition against France formed, June 22. Napoleon defeats Turks at Aboukir, July 25. Ferdinand IV. of Naples restored, July 27. Russians enter Switzerland, August. Death of Pius VI., August 29. Zurich entered by the French, September 26. Retreat of Suwaroff from Switzerland, September 29. Rome recovered from the French, September 30. Overthrow of the Directory, 18th Brumaire, November 9. Napoleon "First Consul," December 24. Death of Washington, December 14. Laplace's *Mécanique Celeste* published (completed, 1825).

1800. Pius VII. elected pope, March 14. Cession of Surat to East India Company, May 13. Passage of the Great St. Bernard by Napoleon, May 17–20. Battle of Marengo, June 14. Legislative Union of Great Britain and Ireland by Act passed July 2. Malta taken by English, September 5. Cession of Mysore to the English, October 12. Battle of Hohenlinden, December 3. The Voltaic pile invented. The *Journal des Débats* founded.

1801. First imperial parliament of United Kingdom meets, January 22. Resignation of Pitt, February 5. Addington first lord of the treasury. Peace of Lunéville, February 9. Thomas Jefferson president of the United States, March 4. Battle of Alexandria; Abercromby mortally wounded, March 21. Kingdom of Etruria erected by Napoleon, March 21. Paul, emperor of Russia, murdered, March 24; Alexander I. succeeds. Victory of Nelson over Danish fleet at Copenhagen, April 2. Cairo surrenders to the English, June 27. Concordat between Pius VII. and Napoleon, July 15. Mecca taken and pillaged by Wahhabees. Evacuation of Egypt by the French, September 2. Peace between Great Britain and France, October 1; between Russia and France, October 8. First Census of Great Britain taken. The asteroid Ceres discovered by Piazzi. Block machinery invented by Brunel.

1802. French expedition against St. Domingo, February. Peace of Amiens, March 27. Napoleon First Consul for life, August 3. Rising of the Swiss under Aloys Reding, summer. Piedmont annexed to France, September 11. The asteroid Pallas discovered by Olbers. *Edinburgh Review* commenced, October.

1803. New constitution imposed on Switzerland by Napoleon's "Act of Mediation," February 19. Cape of Good Hope restored to the Dutch, February 21. Egypt evacuated by the English, March 17. Louisiana sold by Napoleon to United States, April 30. England declares war against France, May 18. Hanover seized by the French, June. Rising in Ireland under Emmett, July 23. Preparations for French invasion of England, summer. War between the English and Sindia begins, August 3. General Lake defeats the Mahrattas near Delhi, and enters the city, September 12. Battle of Assaye, September 23. St. Domingo proclaimed independent, November 29. Treaty with Rajah of Berar, December 17; with Sindia, December 28. Atomic theory propounded by Dalton.

1804. Publication of the *Code Civil* (*Napoléon*), January. Duke of Enghien shot by order of Napoleon, March 21. Surinam taken by the English, April 29. Pitt prime minister the second time, May 12. Napoleon "Emperor of the French," May 18. The Jesuits readmitted to the Two Sicilies, July 30. Francis II. assumes title of hereditary emperor of Austria, August 11. War with Holkar through this year and the next. Coronation of Napoleon I. and Josephine by the Pope at Paris, December 2. Spain declares war against Great Britain, December 12. Asteroid Juno discovered by Harding. British and Foreign Bible Society established. Savings Banks originated. Schiller's *Wilhelm Tell* published.

1805. Siege of Bhurtpore by the English, January. Jefferson president of the United States (second term), March 4. Battle of Bhurtpore, April 2. Third coalition against France, April 11. Death of earl of Shelburne, May 2 (born, 1737). Napoleon crowned king of Italy at Milan, May 26. Genoa and Ligurian Republic incorporated with France, June 3. Impeachment of Lord Melville, June 26. Third coalition against France completed, September 8. Capitulation of General Mack to Napoleon at Ulm, October 17 and 19. Victory and death of Nelson at Trafalgar, October 21. Vienna occupied by the French, November 13. Russian and British forces land in Naples, November 20. Battle of Austerlitz, December 2. Treaty with Holkar, cession of territory to the English, December 24. Peace of Presburg, December 26. British and Foreign School Society founded. Foster's *Essays* published. Scott's *Lay of the Last Minstrel*.

1806. The electors of Bavaria and Würtemberg take the title

of king, January 1. Cape of Good Hope retaken by the English, January 8. Death of Pitt, January 23. Grenville and Fox administration, February. Admiral Duckworth destroys French squadron off St. Domingo, February 6. Prussia concludes treaty with Napoleon I., February 16; ratified March 9. Joseph Bonaparte made king of the Two Sicilies, March 30. Trial of Lord Melville begins, April 29; acquittal, June 12. Louis Napoleon Bonaparte made king of Holland, June 6. Great Britain declares war against Prussia, June 11. Battle of Maida, July 5. Mutiny of Sepoys at Vellore, July 10. Confederation of the Rhine formed, July 12. Dissolution of the Holy Roman Empire, August 6. Death of Fox, September 13. Fourth coalition against France, October 6. Battles of Jena and Auerstadt, October 14. Napoleon enters Berlin, October 27. Flight of Frederick William III., October. Napoleon's Berlin decree declaring the British Isles in a state of blockade, November 21. Occupation of Hamburg by the French, November. War between Russia and Turkey begins, November 23. Elector of Saxony assumes title of king, December 11. The Russians enter Bucharest, December 27. Haileybury College founded.

1807. Battle of Eylau, February 7–8. Sir J. Duckworth forces the passage of the Dardanelles, February 19. Abolition of the slave trade in British empire by Act passed March 25. The Portland administration, April. Dantzic taken by the French, May 26. Sultan Selim deposed by Janissaries, May 29; Mustapha IV. succeeds. Napoleon defeats the Russians at Friedland, June 14. Conference of the emperors Alexander and Napoleon near Tilsit, June 25. Peace of Tilsit, July 7 and 9. Death of the Cardinal York, last of the Stuarts, July 13. Jerome Bonaparte made king of Westphalia, August 18. Bombardment of Copenhagen by English fleet, September 2–5; surrender of Danish fleet. Evacuation of Egypt by British forces, September. French invasion of Portugal, November; Lisbon entered, November 30. The Prince Regent and Royal family of Portugal embark for Brazil, November 29. Rupture between Great Britain and Russia, November–December. French troops enter Spain, December. The kingdom of Etruria seized by Napoleon, December 10. Napoleon publishes the Milan decree, December 18. The asteroid Vesta discovered by Olbers. Zoological Society of London instituted. Hegel's *Phänomenologie des Geistes* published. Moore's *Irish Melodies*.

1808. Napoleon occupies Rome, February 2. A new nobility created in France by Napoleon, March 11. Abdication of Charles IV. of Spain in favor of Ferdinand, prince of Asturias, March 19. Murat enters Madrid, March 23. Insurrection at Madrid, May 2. Treaty of Bayonne between Charles IV. and Napoleon, May 5. Abdication of Ferdinand, May 6. Joseph Bonaparte made king of Spain, June 6. Siege of Saragossa by the French begun, June 15. Murat made king of Naples, July 15. Battle of Baylen, July 21. Sir Arthur Wellesley lands in Spain, August 1. Siege of Saragossa raised, August 4. Battle of Vimeira,—Wellesley defeats the French, August 21. Convention of Cintra. Conference of Alexander and Napoleon at Erfurt, September 27–October 14. Mustapha IV. deposed and murdered, November 15; Mahmoud II. succeeds. Madrid entered by Napoleon, December 4. Abolition of Spanish Inquisition, December 4. Saragossa again bombarded by the French, December 20. Retreat of Sir John Moore begun, December 24. Finland incorporated with Russia. Manby's apparatus for saving life in shipwreck invented. Scott's *Marmion* published.

1809. Treaty of peace between Great Britain and Turkey, January 5. Battle of Coruña; death of Sir John Moore, January 16. Saragossa stormed by the French, January 27. Conduct of the duke of York investigated by parliament, January–March. War between Russia and Turkey, February. The lines of Travancore stormed by English, February 10–21. James Madison president of United States, March 4. Gustavus IV. of Sweden deposed, March 29; Charles XIII. succeeds. Oporto taken by Soult, March 29. Revolt of Tyrol under Hofer, April 8. Invasion of Bavaria by Austrians, April 11. Passage of the Douro by Wellington; occupation of Oporto, May 12. Napoleon enters Vienna, May 13. States of the Church annexed to France, May 17. Battle of Aspern, May 21–22. Charles XIII. king of Sweden, June 6. Napoleon excommunicated by the Pope, June 10. Arrest of the Pope, July 5. Battle of Wagram, July 6. Battle of Talavera, July 27–28. English expedition to Walcheren sails, July 28. Finland ceded to Russia, August 7. Flushing taken by the English, August 16. Peace of Vienna between France and Austria, October 14. Perceval administration formed, October 30. Divorce of the Empress Josephine, December 15. Evacuation of Walcheren by the English, December 23. The *Quarterly Review* commenced (February).

1810. Guadaloupe and Amboyna taken by the English, February. Marriage of Napoleon with Archduchess Maria Louisa, April 1. Sir F. Burdett committed to the Tower, April 9. Silistria taken by Russians, June 23. Holland annexed to France, July 10. Masséna takes Ciudad Rodrigo, July 12. Bernadotte chosen crown prince of Sweden, August 21. Battle of Busaco, September 27. Wellington's army within the lines of Torres Vedras, October 10. Insanity of George III., November. Mauritius taken by English, December 3. University of Berlin founded. Sect of Primitive Methodists founded by Hugh Bourne. Madame de Stael's *De l'Allemagne* published. Hahnemann's *Organon*.

1811. Tortosa taken by Suchet, January 2. The Regency Bill (Great Britain) passed, February 5. Death of Maskelyne, February 9 (born, 1732). Massacre of the Mamelukes at Cairo by Mehemet Ali, March 1. Badajoz surrenders to the French, March 10. Battle of Fuentes d'Onore, May 4, 5. Battle of Albuera, May 16. Java conquered by the English, August 26. Death of Bishop Percy, September 30 (born, 1728). Luddite riots at Nottingham begin, November. Great comet visible for four months. Bell Rock light-house built by Stevenson. National School Society founded. Niebuhr's *Römische Geschichte* published.

1812. Wellington storms Ciudad Rodrigo, January 19; invests Badajoz, March 16; storms the town, April 6. New Spanish constitution promulgated by the Cortes, March 18. Assassination of Mr. Perceval, May 11. Peace of Bucharest between Russia and Turkey,—the Pruth declared the boundary of the two empires, May 28. The Liverpool administration formed, June 8. The United States declare war against Great Britain, June 18. Napoleon declares war against Russia, June 22. Treaties of peace between Great Britain, Sweden, and Russia, July 18. Battle of Salamanca, July 22. Madrid entered by Wellington, August 12. Smolensko taken by the French, August 17. Battle of Borodino (the Moskwa), September 7. Moscow entered by Napoleon, the city burnt, September 14. Moscow evacuated by the French, October 19. Bell's steam-vessel sails on the Clyde. Iodine discovered. Coleridge's *The Friend* published. First two cantos of *Childe Harold*. Hegel's *Logik*.

1813. Fourteen Luddites executed at York, January 10. Concordat between Napoleon I. and Pius VII., January 25. Abolition of Spanish Inquisition by the Cortes, February 12. Fifth coalition against France, March 1. James Madison president of United States (second term), March 4. Battle of Lützen, May 2. Battle of Bautzen, May 20–21. Hamburg seized by Davoust, May 30. Capture of U.S. frigate "Chesapeake" by H.M.S. "Shannon," June 1. Battle of Vittoria, June 21. Battles of the Pyrences, July 25–30. Battles of Dresden, August 24, 25, and 27. St. Sebastian stormed by Wellington, August 31. Treaty of Töplitz; alliance of Russia, Austria, and Prussia, September 9. Wellington passes the Bidassoa, and invades France, October 7. Battle of Leipsic, October 16, 18, 19. Neutrality of Switzerland proclaimed, November 8. The French evacuate Germany, November 22. William, prince of Orange, recalled, December 1. Electric light discovered by Davy. Shelley's *Queen Mab* published. Southey's *Life of Nelson*.

1814. Bolivar chief of republic of Venezuela, January 1. Cession of Norway to Sweden by treaty of Kiel, January 14. Pius VII. dismissed from Fontainebleau, January 22. Death of Fichte, January 27. Battle of Orthez, February 27. Treaty of Claremont, March 1. Capitulation of Paris, March 31. Entry of the allied sovereigns. Deposition of Napoleon by the senate, April 1. Battle of Toulouse, April 10. Abdication of Napoleon, April 11. Louis XVIII. enters Paris (the first Restoration), May 3. Napoleon lands in Elba, May 4. Ferdinand VII. annuls the constitution, May 4; enters Madrid, May 14. The Pope enters Rome, May 24. Peace of Paris, May 30. Invasion of Canada by Americans, July. Annexation of Belgium to Holland agreed to, July 21. The Inquisition re-established in Spain, July 21. Capture and burning of Washington by General Ross, August 24. Hanover erected into a kingdom, October 11. Congress of Vienna opens, November 3. Peace of Ghent between Great Britain and United States, December 24. New Orleans attacked by Sir E. Pakenham, December 27. New Corn Law passed in England. Order of Jesuits re-established by Pius VII. Wordsworth's *Excursion* published. Scott's *Waverley*.

1815. Battle of New Orleans, January 8. Napoleon escapes from Elba, February 26; lands at Cannes, March 1. The kingdom of the Netherlands constituted; William I. proclaimed king, March 16. Napoleon reaches Paris, March 20. "The Hundred Days." Treaty of Vienna between Great Britain, Austria, Russia, and Prussia, March 23. Murat begins war against Austria, March 28; he is defeated at Tolentino, May 2, 3; surrenders the kingdom of Naples to Ferdinand IV., May 20. Napoleon's new constitution accepted, June 1. German Confederation constituted by treaty of Vienna, June 8. Territorial settlement of Europe by Congress of Vienna, June 9. Battles of Ligny and Quatre Bras, June 16. Battle of Waterloo, June 18. Second abdication of Napoleon I., June 22. The allies enter Paris, July 7. Return of Louis XVIII. to Paris (second Restoration), July 8. Surrender of Napoleon to Captain Maitland of H.M.S. "Bellerophon," July 15. Formation of the "Holy Alliance," September 26. Arrival of Napoleon at St. Helena, October 16. Ionian Islands placed under protection of Great Britain, November 5. Second Peace of Paris, No

vember 20. Marshal Ney condemned to death by Chamber of Peers, December 6, and shot at Paris, December 7. The safety lamp invented by Davy. Scott's *Guy Mannering* published. Wordsworth's *White Doe of Rylstone*. *North American Review* begun.

1816. Marriage of Princess Charlotte of England with Prince Leopold of Saxe-Coburg, May 2. Select Committee on Education appointed, May 21. Death of Admiral Lord Hood, June 27 (born, 1724). Bombardment of Algiers by Admiral Lord Exmouth, August 26. Death of Earl Stanhope, December 15 (born, 1753). Electric telegraph invented by Ronalds. University of Warsaw founded. Cuvier's *Règne Animal* published. Scott's *Antiquary* and *Old Mortality*.

1817. James Monroe president of United States, March 4. Suspension of Habeas Corpus Act, March 4. The "Blanket Meeting" at Manchester dispersed by the Military, March 11. The "Derbyshire Insurrection," June 8, 9. Dissolution of the Mahratta Confederacy, June 13. Pius VII. condemns Bible Societies by bull of June 29. Death of Curran, October 14 (born, 1750). Death of Kosciuszko, October 15. Pindaree war begins, October. Death of Princess Charlotte, November 6. Holkar defeated by the English at battle of Mehudpore, December 21. Waterloo Bridge, London, opened. The kaleidoscope invented by Brewster. Shelley's *Revolt of Islam* published. Moore's *Lalla Rookh*. *Blackwood's Edinburgh Magazine* commenced.

1818. The English conclude peace with Holkar, January 6. Repeal of Habeas Corpus Suspension Act, January 31. Bernadotte (as Charles XIV.) king of Sweden, February 6. Congress of Aix-la-Chapelle opens, February 14; closed, November 20. End of the Pindaree war, May. Constitutional charter of Bavaria, May 25. Marriages of duke of Clarence with Princess Adelaide of Saxe-Meinengen, and of duke of Kent with Princess Mary of Saxe-Coburg, July 13. Suicide of Sir Samuel Romilly, November 2. Death of Queen Charlotte of England, November 17. Evacuation of French territory by the army of occupation, November 30. Subjugation of the Wahhabees completed by Ibrahim Pasha. The stethoscope invented by Laennec. Scott's *Heart of Mid-Lothian* published. Hallam's *Europe during the Middle Ages*.

1819. Cession of Florida by Spain to United States, February 22. Kotzebue assassinated at Mannheim, March 23. Birth of Princess Victoria, May 24. Peel's Currency Act passed, June 23. Congress of Carlsbad meets, August 1. Radical Reform meetings at Manchester dispersed by the yeomanry (the "Peterloo" Massacre), August 16. The German Zollverein founded. Macadam's system of road-making published. Electromagnetism discovered by Oersted. Scott's *Bride of Lammermoor* and *Ivanhoe*.

1820. Death of the duke of Kent, January 23. George IV. king of England, January 29. Ferdinand VII. swears to the constitution, March 9. Expulsion of Jesuits from Russia, March 25. Death of Grattan, May 14 (born, 1746). Revolution in Naples, the insurrection of the Carbonari, July 2. Bill of pains and penalties against Queen Caroline introduced in House of Lords, July 6 (abandoned, November 10). Revolt of Ali Pasha of Joannina, August–September. Revolution in Portugal, the Spanish constitution proclaimed, September 15. Congress of Troppau meets, October 20. Congress of Laybach meets, December 17. Astronomical Society of London founded. Byron's *Don Juan* published. Shelley's *The Cenci*. Foster's *Essay on Popular Ignorance*.

1821. Revolutionary movements in Brazil, January. Death of John Keats, February 24 (born, 1796). James Monroe president of the United States (second term), March 4. Insurrection in Greece, March 6. Abdication of Victor Emmanuel I. king of Sardinia, in favor of his brother Charles Felix, March 23. Naples occupied by Austrian army, March 24. The Greek patriarch hung at Constantinople, April 21. The independence of Brazil proclaimed, April 22. Death of Napoleon I. at St. Helena, May 5. Congress of Laybach closed, May 6. Provisional government established in Greece, June 9. Return of John VI. to Lisbon, July. Coronation of George IV., July 19. Death of Queen Caroline, August 7. George IV. visits Ireland, August 15–September 15, and Hanover, October. Republic of Liberia founded by Americans. Scott's *Kenilworth* and *The Pirate* published.

1822. Declaration of independence by the Greeks, January 1. Ali Pasha surrenders to the Turks, and is put to death, February 5. Insurrection Act (Ireland) passed, and Habeas Corpus Act suspended, February 11. Massacre of Scio, April–May. Iturbide proclaimed emperor of Mexico, May 22. Athens taken by the Greeks, June 22. George IV. visits Scotland, August. Suicide of Lord Castlereagh, August 12. Congress of Verona, August 25–December 14. Don Pedro emperor of Brazil, October 12. Caledonian Canal completed. Calculating Machine invented by Babbage. Brown's *Philosophy of the Human Mind* published. Byron's *Cain*.

1823. Abdication of Iturbide, March 20. Invasion of Spain by the French, April 7; Madrid entered, May 23. John VI. of Portugal abolishes the constitution, June 5. Ferdinand VII. declared incapable, and a regency appointed, June 11. Bombardment of Cadiz by the French begins, September 20. Death of Pius VII., August 20. Leo XII. elected pope, September 28. Capitulation of Cadiz, October 1. Great Britain sends consuls to South American States, October 30. British Anti-Slavery Society founded. Catholic Association in Ireland. Mormonism originated by Joseph Smith. Lamb's *Essays of Elia* published. Victor Hugo's *Odes et Ballades*.

1824. Bolivar dictator of Peru, February 10. Death of Eugène Beauharnais, February 21 (born, 1781). War with Burmah, March 5. Death of Lord Byron at Missolonghi, April 18. Rangoon taken by the English, May 11. Iturbide arrested in Mexico and shot, July 19. Singapore acquired by the English, August. Charles X. king of France, September 16. Provisional government formed in Greece, October 12. The Spaniards in Peru finally defeated at Ayachuco, December 9. Angerstein collection of pictures bought by English Government as foundation of a National Gallery. *Westminster Review* established. Godwin's *History of the Commonwealth* published (1824–1828).

1825. Treaty of commerce between Great Britain and La Plata, February 2. Expedition of Ibrahim Pasha against the Greeks, February 28. John Quincy Adams president of United States, March 4. Great earthquake in Algiers, March 2–7. The Catholic Association abolished by Act passed March 9. Treaties of commerce between Great Britain and Columbia, April 18, and between Great Britain and Mexico, April 29. Navarino taken by Ibrahim Pasha, May 18; Tripolitza, June 23. Ports of Dutch East Indies opened to ships of all nations, July 21. The independence of Brazil recognized by Portugal, September 7. Nicholas I. emperor of Russia, December 1. Commercial panic in England, December. The limelight invented by Drummond. First voyage by steam from England to India made. Coleridge's *Aids to Reflection* published. *Pepys's Diary* deciphered and published.

1826. War between Brazil and Buenos Ayres begins, January. Bhurtpore stormed by Lord Combermere, January 18. Capitulation of Callao to Peruvian patriots, January 22; evacuation of Peru by Spaniards. Treaty of navigation between Great Britain and France, January 26. Treaty of peace between English and Burmese, February 24. Death of John VI.; Dom Pedro, emperor of Brazil, becomes king of Portugal, March 10. Death of Weber, June 5. Rebellion and massacre of the Janissaries at Constantinople, June 15. Death of Adams and Jefferson, ex-presidents of the United States, July 4. Don Miguel assumes title of king, July 4. Russia declares war against Persia, September 28. Insurrection in Portugal, October 6. Death of Talma, October 19 (born, 1763). Convention between Great Britain and United States respecting indemnities for damages during the war, November 13. Treaty between Great Britain and Brazil for suppression of slave trade, November 23. Portugal appeals for aid to England, December 3. Death of Flaxman, December 9 (born, 1755). English fleet in the Tagus, December 25. Zoological Society of London founded. London University founded. Menai Suspension Bridge opened. Disraeli's *Vivian Grey* published.

1827. Death of Frederick, duke of York, January 5 (born, 1763). Death of Mitford, February 8 (born, 1744). Death of Pestalozzi, February 17 (born, 1746). Canning administration, April 12. National Guard of France disbanded by Charles X., April 29. Erection of kingdom of Greece by treaty of London, July 6. Death of Canning, August 8. The Goderich administration, August 11. Duke of Portland president of the council, August 17. Death of Ugo Foscolo, October 10 (born, about 1776). Battle of Navarino, October 26. Charles X. dissolves the Chamber of Deputies, November 5. Needle-gun invented by Dreyse. Omnibus introduced at Paris. Overland route to India projected. Keble's *Christian Year* published. Scott's *Tales of a Grandfather*. Arnott's *Elements of Physics*. Simrock's version of the *Nibelungenlied*.

1828. Fall of the Villèle ministry in France, January 4. Resignation of Lord Goderich, January 8. The Wellington administration in office, January 25. Peace of Turkmanchay between Russia and Persia, February 22. Russia declares war against Turkey, April 26. Last of the British troops leave Portugal, April 28. Don Miguel assumes title of king, May 3. Occupation of Bucharest by Russians, May 12. Passage of the Danube by Russians, June 8. Election of O'Connell M.P. for Clare, July 5; he refuses to take the oaths. Silistria invested by Russians, July 23. Peace concluded between Brazil and Buenos Ayres, August 29. The French land in the Morea, August 29. The Dardanelles closed by the Porte, September 18. Evacuation of Greece by Ibrahim Pasha, October 4. Varna taken by the Russians, October 11. The Morea evacuated by Turks, October 28. Siege of Silistria raised, November 10. Death of Lord Liverpool, December 4 (born, 1770). New Corn Law in England; Peel's "Sliding Scale" established. Test Act and Corporation Act repealed. London University opened. The *Athenæum* (literary journal) established.

1829. Death of Leo XII., February 10. Andrew Jackson president of United States, March 4. Duel fought between Wellington and earl of Winchelsea, March 21. Pius VIII.

elected pope, March 31. Catholic Emancipation Act passed, April 13. Capture of Lepanto by the Greeks, May 9. Siege of Silistria resumed, May 17; it surrenders, June 18. General Paskiewich takes Erzeroum, July 9. Prince of Polignao first minister of Charles X., August 8. Adrianople entered by Russians, August 20. Peace of Adrianople signed, September 14. Suttee declared illegal, December 14. Rossini's *Guillaume Tell* produced.

1830. Independence of Greece declared by Allied Powers, February 3; acknowledged by the Porte, April 25. William IV. king of England, June 26. Surrender of Algiers to the French, July 5. Charles X. issues the Six Ordinances, July 26. Paris declared in a state of siege, July 27. Flight of Charles X. from Paris, July 30. Louis Philippe, duke of Orleans, appointed lieutenant-general of the kingdom, July 31. Abdication of Charles X., August 2. Louis Philippe proclaimed king of the French, August 9. Revolution at Brussels, August 25. Insurrection at Dresden, September 9. Disturbances at Berlin, Hamburg, and other German towns. Three days' fighting between Dutch and Belgians at Brussels, September 19–21. Liverpool and Manchester Railway opened, September 15. Independence of Belgium proclaimed, October 4. Antwerp entered by Belgians, October 27; the Dutch bombard the city, October 28. Resignation of the Wellington ministry, November 15. The Grey ministry takes office, November 16. Revolution at Warsaw, November 29. Death of Pope Pius VIII., November 30. Death of Bolivar, December 17. Prince of Polignac, ex-minister of Charles X., convicted of high treason, and sentenced to imprisonment for life, December 21. Independence of Belgium recognized by Allied Powers, December 26. Expedition of the Landers to the Niger. Lyell's *Principles of Geology* published. Tennyson's *Poems*.

1831. Adam Czartoryski president of National Government of Poland, January 30. Gregory XVI. elected pope, February 2. Insurrection at Modena, February 5; suppressed by Austrians, March 10. The Russians defeated by the Poles at Grochow, February 20. Reform Bill introduced by Lord John Russell, March 1. Revolution in Brazil; abdication of the Emperor Pedro, April 7. British parliament dissolved, April 23. Prince Leopold of Saxe-Coburg elected king of Belgium, June 4. Death of Mrs. Siddons, June 8 (born, 1755). Reform Bill re-introduced, June 24. Capture of the Portuguese fleet off Lisbon by French fleet, July 11. New London Bridge opened, August 1. Capitulation of Warsaw to Russians, September 7. Coronation of William IV. and Queen Adelaide, September 9. Reform Bill thrown out by House of Lords, October 7. Ibrahim Pasha undertakes conquest of Syria, October. Assassination of Count Capo d'Istria, October 9. Riots at Bristol, October 29. Treaty of London respecting Belgium, November 15. First appearance of Asiatic cholera in England, November. General Torrijos shot at Malaga, with fifty associates, December 4. Reform Bill introduced a third time, December 12. Negro insurrection in Jamaica, December 22. Hereditary peerage abolished in France, December 29. The British Association founded. Victor Hugo's *Nôtre Dame de Paris* published.

1832. Occupation of Ancona by the French, February 23. Poland declared an integral part of Russian empire, February 26. Death of Goethe, March 22. Resignation of English ministers, May 9. Earl Grey returns to office, May 18. Death of Cuvier, May 13. The Reform Act passed, June 7. Acre taken by Ibrahim Pasha, July 2. Revision of Swiss Federal Pact, July 17. Prince Otho of Bavaria proclaimed king of Greece, August 30. Death of Sir Walter Scott, September 21. Ministry of Marshal Soult formed, October 11. Duchess of Berry imprisoned for sedition, November 7. Siege of Antwerp begun by the French, November 13. Dissolution of British parliament, December 3. Ibrahim Pasha defeats army of the Sultan at Konieh, December 20. Surrender of Antwerp, December 24. Heathcoat's steam-plough patented. The Paris *Charivari* started. The *Penny Magazine* and *Chambers's Edinburgh Journal* begun. Ebenezer Elliott's *Corn-Law Rhymes* published. George Sand's *Indiana*.

1833. First Reform parliament of United Kingdom opened, January 29. King Otho lands at Nauplia, January 31. Mediation of France between the Porte and Mehemet Ali, February 21. Andrew Jackson president (second term) of the United States, March 4. Trial and deposition of Edward Irving for heresy, March 13. Coercion Bill for Ireland passed, April 2. Santa Anna president of Mexican Republic, April 18. Treaty of Kutayeh between Egypt and the Porte, May 14. Death of Edmund Kean, May 15 (born 1787?). Capture of Don Miguel's squadron by Admiral Napier, July 5. Treaty of peace and alliance (of "Unkiar Skelessi") between Russia and Turkey, July 8. Evacuation of Lisbon by Miguelites; Donna Maria proclaimed Queen, July 23. Death of Wilberforce, July 29. Irish Church Temporalities Act passed, August 14. Abolition of slavery in the British Colonies (from August 1, 1834) by Act passed August 28. Death of Hannah More, September 7 (born, 1745). Isabella II. queen of Spain, September 29. Durham University opened. Artesian well opened at Gronolle, 1833–1841. Carlyle's *Sartor Resartus* published. Keble's *Sermon on National Apostasy* preached at Oxford (July). *Penny Cyclopædia* begun (finished, 1843).

1834. Marshal Saldanha defeats the Miguelites at Santarem, February 18. Death of Lafayette, May 20 (born, 1757). Capitulation of Don Miguel, at Evora, May 26. Abolition of monasteries in Portugal, May 28. Shah Soojah defeated by Dost Mahomed, June 29. Resignation of Earl Grey and Lord Althorp, July 9. Lord Melbourne prime minister, July 14. Death of S. T. Coleridge, July 25. Emancipation of slaves in British colonies, August 1. The Poor Law Act passed, August 14. The Houses of Parliament burnt, October 16. The Melbourne ministry dissolved, November 15. Sir Robert Peel first lord of the treasury, December 8. First parliamentary grant for education in England. Oxford *Tracts for the Times* begun. Ranke's *Popes of Rome* published, 1834–1836. Lytton's *Last Days of Pompeii* and *Rienzi*. First volume of Bancroft's *History of the United States*.

1835. Ferdinand I. emperor of Austria, March 2. Death of Wilhelm von Humboldt, April 8 (born, 1767). Resignation of the Peel ministry, April 8. Lord Melbourne again first lord, April 18. Revolt of Texas against Mexico, July. The Foreign Enlistment Bill suspended in favor of the queen of Spain, June 10. Death of William Cobbett, June 18. First battalion of auxiliary legion sails for Spain, July 2. Municipal Corporations (England) Reform Act passed, September 9. Conference of the emperors of Russia and Austria and the king of Prussia at Töplitz, October. Death of James Hogg, the "Ettrick Shepherd," November 21 (born, 1772). Independence of Texas proclaimed, December 22. Revolver patented by Colt. Appearance of Halley's Comet. Strauss's *Leben Jesu* published. De Tocqueville's *Démocratie en Amérique*. Merle d'Aubigné's *Histoire de la Réformation*, vol. i.

1836. Death of Lord Stowell, January 28 (born, 1746). M. Thiers first minister of Louis Philippe, February 22. Occupation of Cracow by Russian and Austrian troops, February. Carlist entrenchments near Hernani taken by the English Legion, May 5. Death of Abbé Sieyès, June 20 (born, 1748). Revolution at Madrid, flight of Isturitz, August 12. Resignation of M. Thiers; M. Molé named president of the council, M. Guizot minister of public instruction, September 7. Revolution at Lisbon, September 9–10. Attempt of Louis Napoleon Bonaparte to excite insurrection at Strasburg, October 29. Death of Charles X. of France, November 6. Siege of Bilbao by Carlists raised by Espartero and the British, December 24. Adelaide, S. Australia, founded. Tithe Commutation Act passed. Dissenters' Marriage Act.

1837. Death of Sir John Soane, January 20 (born, 1753). Martin van Buren president of United States, March 4. Hernani taken by Espartero, May 15. Irun stormed by General Evans, May 17. Victoria queen of England, June 20. The Carlists defeated at Valencia, July 15. The imperial parliament dissolved, July 17. Cholera rages on the continent, July–August. Don Carlos defeats the royal troops near Herrera, August 24. Marshal Saldanha and the duke of Terceira defeated, September 18. The French Chamber of Deputies dissolved, fifty new peers created, October 4. Constantina in Algeria stormed by the French, October 13. The constitution of Hanover abrogated by royal ordinance, November 1. Siege of Herat begun by Persians, November 22. Winter Palace, St. Petersburg, burnt, December 29. Durham University incorporated. Punishment by the pillory abolished in England. Father Mathew's temperance missions begun about this time. Carlyle's *French Revolution* published. The *Pickwick Papers*. *Ingoldsby Legends*. Sara Coleridge's *Phantasmion*.

1838. Royal Exchange, London, burnt, January 10. Death of Lord Eldon, January 13. Death of Talleyrand, May 17. Espartero defeats the Carlists, and takes Penacerrada, June 22. Coronation of Queen Victoria, June 28. The independence of Peru proclaimed, July 29. The siege of Herat raised, September 9. Resignation of Lord Durham, October 9. Death of Mrs. MacLean (Letitia E. Landon), October 15 (born, 1802). Lima evacuated by Chilians, November 10. End of the rebellion in Canada, about November 17. Chartist meetings declared illegal, December 12. International Copyright Act passed. Daguerreotype process discovered. National Gallery, London, opened. First voyage of "Great Western" across the Atlantic. London and Birmingham Railway opened.

1839. Occupation of Aden by troops of East India Company, January 20. The Anti-Corn Law League formed, March 20. Treaty of London respecting affairs of Holland and Belgium, April 19. Occupation of Candahar by Anglo-Indian army, April 26. Death of Lord William Bontinck, June 17 (born, 1774). Death of Lady Hester Stanhope, in Syria, June 23 (born, 1776). Total defeat of Turkish army under Hafiz Pasha by Ibrahim Pasha, on the Euphrates, June 25. Abdul-Medjid sultan, July 1. Chartist riot at Birmingham, July 15. Ghizni stormed by Sir John Keane, July 22. Shah Soojah restored to sovereignty of Cabul, August 7. Passage of the Khyber Pass by Lieut.-Col. Wade, September 3. John Williams, missionary, murdered at Erromanga, November 20. Christian VIII. king of Den

mark, December 3. The Pope prohibits the slave-trade, December 3. Trial and conviction of John Frost and other Chartists for high treason, December 24–31. Copyright in Designs Act passed. First English settlement in New Zealand. Gold discovered in Australia. Committee of Privy Council on Education appointed. Bailey's *Festus* published.

1840. Death of Madame D'Arblay, January 6 (born, 1752). Penny postage in Great Britain comes into operation, January 10. Marriage of Queen Victoria with Prince Albert of Saxe-Coburg, February 10. Ministry of M. Thiers, March 1. Death of Paganini, May 27 (born, 1784). Surrender of Carlist General Morella, May 28. Frederick William IV. king of Prussia, June 7. Insurrection in Syria against Mehemet Ali, June 7. Blockade of Canton by the English, June 28. Capture of Chusan, July 5. Treaty of London between the sultan and Mehemet Ali, July 15; ratified, September 15. Death of Ottfried Müller, August 1 (born, 1797). Attempt of Louis Napoleon to excite insurrection at Boulogne; he is arrested, August 6. Abdication of king of Holland, October 7; William II. succeeds. Death of Lord Holland, October 22 (born, 1773). Marshal Soult again first minister, October 29. Dost Mahomed surrenders to Sir W. Macnaghten, November 2. The remains of Napoleon I. landed at Cherbourg, November 30, and deposited in the Hôtel des Invalides, December 15. The papal nuncio expelled from Spain, December 29. Association for the Repeal of the Union (Ireland) established. Irish Municipal Corporations Reform Act passed. Ozone observed by Schönbein. Coleridge's *Confessions of an Inquiring Spirit* published. Carlyle's *Heroes and Hero-Worship*.

1841. Capture of the Bogue Forts, Canton, by the English, January 7. The sultan concedes hereditary pashalic of Egypt to Mehemet Ali, January 27. Union of Upper and Lower Canada proclaimed, February 10. General Harrison president of United States, March 4. Differences between the sultan and Mehemet Ali arranged, March 5. No. XC. of Oxford "Tracts for the Times" condemned, March 15. Death of President Harrison, April 4; Vice-President John Tyler succeeds. Attack on Canton and capitulation of the Chinese authorities, May 24. Russian campaign against Circassians begins, May. Death of Wilkie, June 1 (born, 1785). Insurrection in Candia, June; suppressed, August. Capture of Amoy, August 26. Resignation of Lord Melbourne, August 30. The second Peel administration formed. Birth of the Prince of Wales, November 9. Attack on the English at Cabul, Sir Alexander Burns and others murdered, November 14. Death of Sir F. Chantrey, November 25 (born, 1781). Assassination of Sir W. Macnaghten at Cabul, December 23. Copyhold Enfranchisement Act passed. Mormon Temple at Nauvoo founded. *Punch* begun. Emerson's *Essays* published.

1842. Retreat of the English from Cabul, January 6; they are massacred in the Khoord Cabul Pass, to January 13. Lord Ellenborough governor-general of India, February 28. Death of Cherubini, March 10 (born, 1760). The Afghans repulsed at Jellalabad by Sir R. Sale, April 7. General Pollock forces the Khyber Pass, April 5–14; and relieves Sale at Jellalabad, April 16. New corn-law passed, April 29. Chartist procession in London, monster petition to parliament, May 2. Great fire at Hamburg, May 5–7. The English enter the Yang-tsze-Keang, June 13–16. Shanghai entered, June 19. Defeat and submission of the Boers of Natal, June 26. Treaty of commerce between Belgium and France, July 16. Ching-Keang-foo taken by Sir Hugh Gough, July 21. The Maine boundary settled by "Ashburton Treaty" between Great Britain and United States, August 9. Treaty of peace between Great Britain and China, August 26 (ratified, December 31). Tahiti taken possession of by the French, September 8. Cabul re-entered by Pollock and Nott, September 15. Death of Channing, October 2 (born, 1780). Cabul evacuated by the English, October 12. Insurrection at Barcelona, Nov. 13; suppressed Dec. 3. Income and property tax imposed in Great Britain. Steam hammer patented. The Walhalla opened by king of Bavaria. Lytton's *Zanoni* published. Macaulay's *Lays of Ancient Rome*. *Illustrated London News* begun.

1843. The stronghold of the Baluches taken by Sir C. Napier, January. Battle of Meeanee, February 17. Occupation of Hyderabad, February 20. Disturbances in Wales ("Rebecca's Daughters"), Feb. Appearance of a great comet, March. Death of Southey, March 21. Disruption of the Church of Scotland; origination of the Free Church, May 18. Annexation of Natal to Cape Colony, May. Sir C. Napier defeats Shero Mahomed and ends the war, June. Annexation of Sinde to British India. Monster repeal meeting on the hill of Tara, August 15. Arrest of O'Connell and other repealers, October 14. The queen of Spain declared of age by the Cortes, November 8. Battle of Maharajpore—defeat of Mahrattas by Sir Hugh Gough, and battle of Punniar, December 29. Occupation of Gwalior. Site of Nineveh discovered by Botta. The Thames tunnel opened. Mill's *Logic* published. Macaulay's *Essays*. Carlyle's *Past and Present*.

1844. Death of Sir Francis Burdett, January 23 (born, 1770). Death of Lord Sidmouth, February 15 (born, 1757). Death of Thorwaldsen, March 24 (born, 1770). Sir Henry Hardinge governor-general of India, May 6. War between France and Marocco begins, May 30. The Mormon prophet, Joseph Smith, murdered, June 27; Brigham Young appointed his successor. Bank of England Charter Act passed, July 19. Death of Joseph Bonaparte, July 28 (born, 1768). Bombardment of Tangiers by Prince de Joinville, August 6. Victory of the French over the Moors at Isly, August 14. Capture of Mogador, August 15. Treaty of peace between France and Marocco, September 6. The *Codex Sinaiticus* discovered by Tischendorf.

1845. Death of Sydney Smith, February 22 (born, 1771). Admission of Iowa and Florida as States of the Union, March 1. James Knox Polk president of the United States, March 4. Death of Thomas Hood, May 3 (born, 1798). Arctic expedition under Sir John Franklin (his last) sails, May 23. Mexico declares war against United States, June 4. General Pelissier suffocates one of the Kabyle tribes in the cave of Dahra, June 20. Maynooth College incorporated and endowed, June 30. Death of Earl Grey, July 17 (born, 1764). Death of Judge Story, September 10 (born, 1779). Squadron of French cavalry cut to pieces by Abd-el-Kader, September 16. Death of Earl Spencer (Lord Althorp), October 1 (born, 1782). Death of Elizabeth Fry, October 12 (born, 1780). Sir Hugh Gough defeats the Sikhs at Moodkee, December 18. Sir Hugh Gough again defeats the Sikhs at Ferozeshah, December 21, 22. Railway mania and panic in England. Failure of potato crop in Great Britain and Ireland. Gun-cotton invented. Lord Rosse's great telescope erected. *Vestiges of the Natural History of Creation* published. Newman's *Essay on the Development of Christian Doctrine*.

1846. The Sikhs routed by Sir H. Smith at Aliwal, January 28. Battle of Sobraon, February 10. Citadel of Lahore occupied by Gough, February 22. Famine in Ireland. Treaty of Lahore, March 8. Narvaez driven from Spain, April 7. General Taylor defeats the Mexicans at Palo Alto, May 8; again at Resaca de la Palma, May 9. Escape of Louis Napoleon from Ham, May 26. Death of Pope Gregory XVI., June 1. Treaty of Washington for settlement of the Oregon boundary, June 15. Election of Pope Pius IX., June 16. Suicide of B. R. Haydon, June 22 (born, 1786). Repeal of English corn laws by Act passed June 26. Resignation of the Peel ministry, June 29. First Russell administration formed, July 6. Death of Louis Bonaparte, ex-king of Holland, July 25. Capture of Santa Fé by Americans, and annexation of New Mexico to United States, August 23. Affair of the Spanish marriages, September. Capture of Monterey, Mexico, by General Taylor, September 24. The Spanish marriages (of the queen and the Infanta) celebrated at Madrid, October 10. Cracow annexed to Austria, November 16. Santa Anna president of Mexico, December 6. Constitutional charter of New Zealand granted, December 29. The "Sonderbund" formed by Catholic cantons of Switzerland. Evangelical Alliance established. Discovery of the planet Neptune. Grote's *History of Greece*, vols. i. and ii. published (completed, 1856).

1847. Frederick William IV. convokes a parliament at Berlin February 3. Mexicans defeated at Buena Vista, February 22, 23. Vera Cruz capitulates to General Scott, March 28. Capture of the Bogue Forts at Canton by the English, April 3. General Scott enters Jalapa, April 19. Death of O'Connell, May 15 (born, 1774). Death of Dr. Chalmers, May 31 (born, 1780). Death of Sir John Franklin near Lancaster Sound, June 11. Earl of Dalhousie governor-general of India, August 4. Expulsion of the Jesuits decreed by Swiss Diet, September 3. Mexico bombarded by General Scott, September 14, 15, and the city taken. Roman Catholic hierarchy established in England, October. Death of Mendelssohn, November 4 (born, 1809). Army of the Sonderbund defeated at Freiburg, November 13. Sonderbund dissolved. Surrender of Abd-el-Kader to the duke of Aumale, December 22. Crime and Outrage Act in force in Ireland, December 23. Manchester erected into a bishopric. Salt Lake city founded by Mormons. Jenny Lind in England. Charlotte Brontë's *Jane Eyre* published.

1848. Disturbances at Milan, January 3. Insurrection at Messina, January 6. Frederick VII. king of Denmark, January 20. Gold discovered in California, January. Riots at Munich, February 9–12. Reform banquet at Paris prohibited, February 21. Death of ex-president John Quincy Adams, February 21. Martial law proclaimed in Lombardy, February 22. Street fighting in Paris, February 23. Attack on the Tuileries, abdication of Louis Philippe, February 24. The Republic proclaimed, February 26. Insurrection at Munich, March 4. Income-tax riots in London, many arrests made, March 6. Revolution at Vienna, flight of Prince Metternich, March 13, 14. Insurrection at Berlin, March 17. Insurrection at Milan, flight of the viceroy, March 18. Abdication of the King of Bavaria, March 21. The Spanish Cortes suspended *sine die*, March 22. Charles Albert, king of Sardinia, invades Lombardy, March 23. Revolt of Schleswig and Holstein, March 25. The Danes defeat the Holsteiners and Prussians near Flensborg, April 10. Chartist demonstration on Kennington Common, April 10. Deposition of King Ferdinand by Sicilian parliament, April 13. The Prussians take

Sohleswig and Flensborg, April 22. Abolition of slavery in the French dominions decreed, April 27. National Assembly opened at Paris, May 4. Flight of the emperor Ferdinand from Vienna, May 17. German "National Assembly" meets at Frankfort, May 18. Treaty between Mexico and United States for cession of California and New Mexico, ratified, May 19. Prussian Constituent Assembly meets at Berlin, May 22. Insurrection renewed at Vienna, May 27. Charles Albert defeats Austrians at Goito, May 29, 30. Insurrection at Prague, May 29. Annexation of Lombardy to Sardinia proclaimed, June 4. Battle of Düppel, June 5, 6. Prince Louis Napoleon elected deputy to National Assembly, June 12. Surrender of Padua to Austrians, June 15. Insurrection at Paris, Juno 23; suppressed by General Cavaignac, dictator, June 24–26. The archbishop of Paris shot while mediating, June 26. Death of Heinrich Zschokke, June 27 (born, 1770). Death of Chateaubriand, July 4 (born, 1768). Revolt of Slavonia and Croatia, under Jellachich, July 9. Suspension of Habeas Corpus Act in Ireland, July 24. Charles Albert defeated, July 27. Insurrection attempted in Ireland under O'Brien, July 29. The Sardinians capitulate to Radetsky at Milan, August 4. Death of Berzelius, August 7 (born, 1779). Return of the emperor to Vienna, August 12. Death of George Stephenson, August 12 (born, 1781). Trials of the Chartists in London begin, August 25; end, September 30. Sir Henry Smith routs the Dutch rebels at the Cape, August 29. Ibrahim Pasha viceroy of Egypt, September 1. Bombardment and capture of Messina by General Filangieri, September 2–7. Bombardment of Mooltan by the English begun, September 12; siege raised, September 22. Prince Louis Napoleon again elected deputy to National Assembly (for six departments), September 20. Death of Lord George Bentinck, September 21 (born, 1802). The Ban Jellachich defeated near Buda by Hungarians, September 29. Insurrection at Vienna, October 6. Flight of the emperor, October 7. Vienna assaulted by Prince Windischgrätz, October 28; taken, November 1. Constitution of French Republic adopted, November 4. Repulse of Sikhs before Mooltan, November 7. General Wrangel enters Berlin and expels Assembly, November 10. Death of Ibrahim Pasha, November 10. Assassination of Count Rossi, first minister to Pius IX. at Romo, November 15. The Pope accepts a democratic ministry. Flight of the Popo in disguise to Gaeta, November 24. Death of Lord Melbourne, November 24 (born, 1779). Abdication of emperor Ferdinand I. in favor of his nephew Francis Joseph, December 2. The king of Prussia dissolves the Constituent Assembly, and publishes a constitution, December 5. Provisional government at Rome appointed by the Chambers, December 11. Jellachich defeats Hungarians at Weisburg, December 18. Louis Napoleon president of the French Republic, December 20. Defeat of Hungarians by General Schlick at Kaschau, December 21; again at Szikszö, December 28; and at Mohr, December 29. Thackeray's *Vanity Fair* published. Lowell's *Biglow Papers*. Mill's *Political Economy*. Mrs. Gaskell's *Mary Barton*.

1849. Mooltan stormed by General Whish, January 2. Buda-Pesth taken by Windischgrätz, January 5. Lord Gough defeats the Sikhs at Chillianwallah, January 13. Constituent Assembly meets at Rome, February 5. Flight of grand duke of Tuscany, provisional government at Florence, February 7. Republic proclaimed at Rome, February 8. Lord Gough routs the Sikhs at Gujerat, February 21. French and English ultimatum to the king of Naples, February 26; accepted, March 4. Gold rush on California, spring. General Taylor president of United States, March 4. Dissolution of Austrian Diet, new constitution published, March 7. The Sicilians reject the ultimatum of mediating powers, March 9. Sardinia resumes hostilities with Austria, March 12. Death of Mezzofanti, March 15 (born, 1774). Radetzky defeats the Sardinians and takes possession of Mortara, March 21; defeats them at Novara, March 23. Abdication of Charles Albert in favor of his son, Victor Emmanuel, March 24. Annexation of the Punjab to British India, March 29. The Grand Duke of Tuscany recalled, April 12. The Danes defeated at Düppeler heights, April 13. Independence of Hungary proclaimed; Kossuth appointed governor, April 14. The Germans enter Jutland, April 20. Siege of Komorn raised, and Buda-Pesth evacuated by Austrians, April. Alessandria occupied by Austrians, April 24. Insurrection at Montreal, April 26. Occupation of Civita Vecchia by French troops under General Oudinot, April 26. Insurrection at Dresden, May 3; city bombarded by Russians and Saxons, May 7; insurrection suppressed, May 10. Leghorn taken by Austrians, May 12, 13; and Bologna, May 16. Buda stormed by Görgei, May 21. Death of Maria Edgeworth, May 21 (born, 1767). Siege of Rome by French begins, June 3. Death of countess of Blessington, June 4 (born, 1789). Barricades and fighting in Paris, June 14. Death of ex-president Polk, June 15. The Russians invade Hungary, June 17. Capitulation of Ancona, June 18. Alessandria evacuated, June 19. Defeat of Görgei at Szered by the Russians, June 21. The Prussians defeat the Baden insurgents and enter Heidelberg and Mannheim, June 23. Carlsruhe occupied by Prussians, Mar. 23. Death of K. G. Zumpt, June 25 (born. 1792). Surrender of Rome, entry of the French, July 3. The Danes defeat the Germans besieging Fredericia, July 6. Bombardment of Pesth begun, July 11. Battle of Waitzen, July 14–17. Restoration of the temporal power of the Popo proclaimed, July 15. Hungarians defeated by Russians at Schässburg, July 31. Judgment in Court of Arches in "Gorham Case," adverse to plaintiff, Aug. 2. Death of Mehemet Ali, August 2 (born, 1769). Treaty of Milan between Austria and Sardinia, August 6. Defeat of Hungarians by Haynau at Temeswar, August 9. Kossuth resigns governorship; Görgei appointed dictator, August 11. Surrender of Görgei and the Hungarian army to the Russians, August 13. Surrender of Venice to Austrians, August 22. Hayti proclaimed an empire under Soulouque, August 26. Riot at Montreal, September 15. The Porte refuses to give up Hungarian refugees demanded by Russia and Austria, September 16. Surrender of Komorn to Austrians, September 28. Execution of Batthyany at Pesth, October 6. Death of E. A. Poe, October 7 (born, 1811). Death of Etty, November 13 (born, 1787). Death of the queen-dowager Adelaide, December 2 (born, 1792). Death of Sir M. I. Brunel, December 12 (born, 1769). Cholera in London. The Queen's Colleges, Ireland, and Encumbered Estates Court, opened. Discovery of Lake N'gami by Livingstone. Macaulay's *History of England*, vols. i. and ii. published (completed, 1862). Lytton's *The Caxtons*. *Notes and Queries* begun.

1850. Blockade of the Piræus by Admiral Sir William Parker, January 18–March 1. Death of Œhlenschläger, January 20 (born, 1779). Death of Francis Jeffrey, January 26 (born, 1773). Treaty for German Union concluded between Austria, Bavaria, Saxony, and Würtemberg, February 27. Judgment in Gorham Case reversed by Judicial Committee of the Privy Council, March 8. Party processions in Ireland prohibited by Act passed March 12. North German parliament opened at Erfurt, March 20. Death of J. C. Calhoun. March 31 (born, 1782). Death of Wordsworth, April 24 (born, 1770). Greek Government submits to English demands, April 25, 26. Tenant Right agitation in Ireland, summer. Death of Sir Robert Peel, July 2 (born, 1788). Peace between Denmark, Prussia, and the German Confederation, July 2. Death of President Taylor, July 9; vice-president Filmore succeeds him. Death of Neander, July 14 (born, 1789.) Cracow burnt, July 18. Victory of the Danes over the Schleswig-Holsteiners at Idsted, July 25. Death of Balzac, August 18 (born, 1799). Death of Louis Philippe, August 26 (born, 1773). Flight of elector of Hesse Cassel, September 13; he is restored, December 27. Victory of the Danes at Missunde, September 13. Pius IX. establishes Catholic hierarchy in England, September 24. Alliance between Austria, Bavaria, Saxony, and Würtemberg, October 4. California admitted a State of the Union. First submarine telegraph between England and France laid. Britannia Bridge, Menai Strait, opened. North-west Passage discovered by M'Clure. Wordsworth's *Prelude* published. Tennyson's *In Memoriam*. Dobell's *The Roman*. Carlyle's *Latter Day Pamphlets*. Thackeray's *Pendennis*. Dickens's *David Copperfield*. Wagner's *Lohengrin* produced.

1851. Death of J. J. Audubon, January 27 (born, 1780). Occupation of Hamburg by Austrians, January 29. Occupation of Lübeck, February 4. Gold-digging commenced in Australia, February. Death of Oersted, March 9 (born, 1777). Insurrection at Lisbon under Saldanha, April 10. The London Great Exhibition opened, May 1 (closed, October 11). Rebellion in South China, June. Evacuation of Cassel by Austro-Bavarian army begun, August 1. Death of J. Fenimore Cooper, September 14 (born, 1789). Return of Prince Metternich to Vienna, September 23. Capitulation of Oribe at Monte Video, October 7; the city entered by Urquiza, October 8. Death of duchess of Angoulême, October 19. Death of Marshal Soult, November 26 (born, 1765). Coup d'État at Paris, December 2, 3. Death of Turner, December 19 (born, 1775). Louis Napoleon elected president of French Republic for ten years, December 20, 21. Dismissal of Lord Palmerston from office, December 22. Ecclesiastical Titles Assumption Act passed. Owens College, Manchester, founded. Herbert Spencer's *Social Statics* published. Ruskin's *Stones of Venice* (1851–1853). Carlyle's *Life of John Sterling*.

1852. New constitution published by Louis Napoleon, January 14. The property of the Orleans family confiscated, January 22. Urquiza defeats Rosas, February 3, and occupies Buenos Ayres, February 4. Holstein evacuated by Austrians, February. Resignation of the Russell ministry, February 21. First Derby administration formed, February 27. Death of Thomas Moore, February 26 (born, 1779). Death of Prince Schwarzenberg, April 5 (born, 1800). Martaban and Rangoon captured by the English, April 5 and 14. Treaty of London respecting Denmark and the duchies, May 8. Pegu taken by the English, June 4. Urquiza provisional director of Argentine Confederation, June 23. Death of Henry Clay, June 29 (born, 1777). Prome taken by the English, July 9, afterwards evacuated; retaken, November 21. Treaty recognizing the independence of Paraguay, July 17. Deposition of Urquiza, September 10. Death of the duke of Wellington, September 14 (born, 1769). Death of Daniel Webster, October 24 (born, 1782). Plébiscite in

France as to re-establishment of the empire, November 21, 22. Louis Napoleon proclaimed emperor as Napoleon III., December 2. Resignation of the Derby ministry, December 17. Annexation of Pegu to British India, December 20. Coalition ministry under the earl of Aberdeen, December 27. Representative constitution granted to New Zealand. University of Sydney opened. Drainage of lake of Haarlem, 1849–1852. *Deutsches Wörterbuch* of J. and W. Grimm begun. Thackeray's *Esmond* published. Mrs. Stowe's *Uncle Tom's Cabin*.

1853. Revolution in Mexico, January. Marriage of Napoleon III. to Eugénie de Montijo, January 29. Termination of the Kaffir war, February 22. General Pierce president of the United States, March 4. Nanking taken by the Taepings, March 21. General Santa Anna president of republic of Mexico, April 1. Death of Tieck, April 28 (born, 1773). Prince Menschikoff presents Russian ultimatum to the Porte, May 5; leaves Constantinople, May 21. Russian army crosses the Pruth, July 2. Cholera breaks out in England, September 4. Shanghai taken by the Taepings, September 7. Death of Arago, October 2 (born, 1786). English and French fleets enter the Dardanelles, October 22. War between Russia and the Porte begins, October 23. Russians enter Danubian principalities, November. Destruction of Turkish fleet at Sinope by Admiral Nachimoff, November 30. Maurice's *Theological Essays* published. Ritter's *Geschichte der Philosophie* completed. Lytton's *My Novel*.

1854. French and English fleets enter the Black Sea, January 4. Declaration of war against Russia by France, March 27, by England, March 28. Death of John Wilson (Christopher North), April 3 (born, 1785). Treaties of alliance between England and France signed, April 10, and between Austria and Prussia, April 20. Bombardment of Odessa by French and English fleets, April 22. Death of marquis of Anglesey, April 29 (born, 1768). Death of James Montgomery, April 30 (born, 1771). Silistria unsuccessfully besieged by Russians, May 17 to June 15. The allies land at Varna, May 29. Treaty of Washington signed, June 7. Opening of Crystal Palace, Sydenham, June 10. Insurrection in Spain under O'Donnell, June 27. Battle of Giurgevo, July 8. Bomarsund taken by allies, August 16. Death of Schelling, August 20 (born, 1775). Occupation of Bucharest by Austrians, September 6. Landing of the allies in the Crimea, September 14. Battle of the Alma, September 20. Occupation of Balaklava by the allies, September 28. Bombardment of Sebastopol begins, October 17. Battle of Balaklava, October 25; of Inkerman, November 5. Death of Charles Kemble, November 12 (born, 1775). Death of Lockhart, November 25 (born, 1794). Treaty of alliance between Austria, England, and France, December 2. Dogma of the Immaculate Conception promulgated at Rome, December 8. Lake dwellings discovered in Switzerland. Armstrong gun made. Murchison's *Siluria* published. George Sand's *Histoire de ma Vie*.

1855. Sardinia joins the allies, January 26. The Palmerston administration in office, February 6. Death of the emperor Nicholas of Russia, March 2. Defeat of the Taepings at Canton, March 6. Death of Charlotte Brontë, March 31 (born, 1816). Universal Exhibition opened at Paris, May 15. Newspaper stamp abolished in Great Britain, June 15. Death of Lord Raglan, June 28 (born, 1788). Death of Sir W. E. Parry, July 8 (born, 1790). Battle of the Tchernaya, August 16. Concordat between Austria and the Holy See, August 18. Storming of the Malakoff and Redan, September 8; south side of Sebastopol evacuated by the Russians. Defeat of the Russians before Kars, September 29. Death of Sir William Molesworth, October 22 (born, 1810). Capitulation of Kars to General Mouravieff, November 28. Visit of King Victor Emmanuel to Queen Victoria, November 30 to December 6. Death of Samuel Rogers, December 18 (born, 1762). Bessemer's process for manufacture of steel patented. Niagara Railway Suspension Bridge completed. Milman's *Latin Christianity* published. Tennyson's *Maud*. Thackeray's *The Newcomes*. *Saturday Review* begun.

1856. Vienna protocol as basis of peace with Russia signed, February 1. Annexation of Oudh to British India, February 7. Death of Heine, February 17 (born, 1800). Lord Canning governor-general of India, February 29. Free State Legislature in Kansas constituted, March 4. Treaty of Paris signed, March 30. Kansas refused admission into the Union, April 11. Death of Sir William Hamilton, May 6 (born, 1788). Death of Augustin Thierry, May 21 (born, 1795). Evacuation of the Crimea by allies, July 12. Death of Schumann, July 29 (born, 1810). Coronation of the czar, Alexander II., September 7. Seizure of a "lorcha" under British flag by Chinese, October 8. Herat taken by Persians, October 13. War proclaimed against Persia by governor-general of India, November 1. Bombardment of Canton by British fleet, November 3. Death of Paul Delaroche, November 4 (born, 1797). Capture of the Bogue Forts, Canton, November 12, 13. Bushire taken by British force, December 10. Death of Hugh Miller, December 24 (born, 1802). Mrs. Browning's *Aurora Leigh* published. Finlay's *History of Greece*. Froude's *History of England*, vol. i. (completed, 1869). Max Müller's *Comparative Mythology*.

1857. Assassination of the archbishop of Paris (Sibour), January 3. Mutinies of Sepoy regiments at Barrackpore, Berhampore, and Lucknow, January–May. General Outram defeats Persians at Khooshab, February 8. Treaty of peace with Persia, March 4. James Buchanan president of the United States, March 4. Abolition of the Sound dues, March 14. Mutiny of Sepoys at Meerut, May 10, 11. The mutineers at Delhi, May 11. Mutiny at Lucknow, May 30. Mutineers under Nana Sahib repulsed at Cawnpore by Sir Hugh Wheeler, June 7. Death of Douglas Jerrold, June 8 (born, 1803). Capitulation of Europeans at Cawnpore to Nana Sahib, June 25. Massacre of women and children at Cawnpore, July 15. Death of Béranger, July 16 (born, 1780). General Havelock enters Cawnpore, July 17. Death of Eugène Sue, August 3 (born, 1804). Visit of Napoleon III. and the empress to Queen Victoria, August 8. Attempt to lay first Atlantic telegraph cable fails, August 11. Death of Comte, September 5 (born, 1798). Delhi stormed by Generals Wilson and Nicholson, September 14–20. Relief of Lucknow by General Havelock, September 25. Meeting of Napoleon III. and Alexander II. at Stuttgart, September 25. The garrison of Lucknow rescued by Sir Colin Campbell, November 22. Death of Sir Henry Havelock at Alumbagh, November 25 (born, 1795). Bombardment and capture of Canton by English and French, December 28, 29. Civil war in Kansas, end of December. Social Science Association founded. Mont Cenis tunnel begun. Tregelles' edition of the *Greek Testament*, 1857–1872. Livingstone's *Missionary Travels* published.

1858. Death of Marshal Radetzky, January 5 (born, 1766). Orsini attempts to assassinate Napoleon III., January 14. Launch of the "Great Eastern," January 31. Resignation of Lord Palmerston, February 20. The Derby ministry installed, February 27. The Livingstone expedition sails, March 10. Siege of Lucknow begins, March 8; the town taken, March 19–21. Minnesota admitted a State of the Union, May 11. Capture of the Peiho forts by English and French, May 19. Great eruption of Vesuvius begins, May 21. Gwalior retaken by Sir Hugh Rose, and Sindia reinstated, June 19. Treaty of Tientsin concluded, June 26. Property qualification of members of parliament abolished by Act passed, June 28. Jews Relief Act passed, July 23. Visit of the queen and the Prince Consort to Napoleon III. at Cherbourg, August 4, 5. Death of George Combe, August 14 (born, 1788). Atlantic cable completed, and first message received, August 20. The Danubian Principalities constituted, August 20. Commercial treaty between Great Britain and Japan signed, August 26. Government of India transferred from the Company to the Crown, September 1. Death of Robert Owen, November 17 (born about 1770). Trial of Count de Montalembert at Paris, November 25. Donati's comet discovered, June 2. Lake Victoria Nyanza discovered by Speke. First vol. of Buckle's *Introduction to the History of Civilization* published (vol. ii., 1861). Tennyson's *Idylls of the King* (first series). Carlyle's *Frederick the Great* (completed, 1865).

1859. Miramon president of Mexico, January 6. Death of Henry Hallam, January 21 (born, 1778). Celebration of centenary of the birth of Burns, January 25. Death of W. H. Prescott, January 28 (born, 1796). Oregon admitted a State of the Union, February 12. Ultimatum of Austria, demanding disarmament of Sardinia, April 23. Death of Dr. Lardner, April 29 (born, 1793). Revolution at Florence, flight of the grand duke of Tuscany, April 27. Declaration of war against Austria by Victor Emmanuel, April 27. The Austrian army crosses the Ticino, April 29. Declaration of war against Austria by Napoleon III., May 3. Death of Alexander von Humboldt, May 6 (born, 1769). Battle of Montebello, May 20. Garibaldi occupies Como, May 27. Battle of Magenta, June 4. Death of David Cox, June 7 (born, 1783). Entry of Napoleon and Victor Emmanuel into Milan, June 8. Annexation of Lombardy to Sardinia proclaimed. Death of Prince Metternich, June 11 (born, 1773). Resignation of the Derby ministry, June 17. Palmerston ministry, June 20. Repulse of French and English squadron on the Peiho, June 24, 25. Battle of Solferino, June 24. Volunteer movement in England, June. Meeting of the Emperors Francis Joseph and Napoleon III. at Villafranca, July 7. Treaty signed, July 11. Confiscation of Church property in Mexico by Juarez, July 13. Acts for establishment of reserve forces of seamen and soldiers passed, August 13. Schamyl captured by the Russians, August 26. Concordat between Rome and Spain, August 26. Death of Leigh Hunt, August 28 (born, 1784). Death of Isambard K. Brunel, September 15 (born, 1806). Death of Robert Stephenson, October 12 (born, 1803). Negro insurrection at Harper's Ferry, Virginia, under John Brown, October 17; Brown hanged, December 2. Spain declares war against Marocco, October 22. Death of Ludwig Spohr, October 22 (born, 1784). Treaty of Zurich signed, November 10. Death of Washington Irving, November 28. Sardinian constitution proclaimed, December 7. Death of De Quincey, December 8 (born, 1786). Death of Lord Macaulay, December 28 (born, 1800). The Victoria Bridge, Montreal, opened. Lake Nyassa explored by Livingstone. George Eliot's *Adam Bede* published. Darwin's *Origin of Species*. Ewald's *Geschichte des Volkes Israel* completed. Sir W. Ham-

ilton's *Lectures on Metaphysics* (completed, 1861). Thackeray's *Virginians*. *Cornhill Magazine* established.

1860. General Prim defeats the Moors at Castillejos, January 1. Count Cavour president of the council in new kingdom of Italy, January 21. Treaty of commerce between Great Britain and France signed at Paris, January 23. Tetuan taken by O'Donnell, February 6. Death of Sir William Napier, February 12 (born, 1785). Ultimatum of Great Britain sent to Chinese Government, March 8. Insurrection in Sicily, March 15. Death of Mrs. Jameson, March 17 (born, 1796). Annexation of Tuscany to Sardinia, March 22. Cession of Savoy and Nice to France by treaty of Turin, March 24. Treaty of peace between Spain and Marocco, April 26. Death of Theodore Parker, May 10 (born, 1810). Japanese embassy received at Washington, May 14. Palermo entered by Garibaldi, May 27. Transfer of Savoy and Nice to the French empire, June 14. First voyage of the "Great Eastern" across the Atlantic, June 17 to 27. Battle of Melazzo, June 20. Massacres of Maronites by the Druses in Syria, May 21 and July 9. Prince of Wales sails for Canada and the United States, July 9. Insurrection at Naples, August 17. Capture of the Taku forts by the allied French and English forces, August 21. Occupation of Tientsin, August 23. Garibaldi enters Naples, September 8, and proclaims Victor Emmanuel, September 9. The allies advance on Peking, September 9. Italian troops enter the States of the Church, September 11. Death of Schopenhauer, September 21 (born, 1787). Capitulation of Ancona to the Sardiniaus, September 29. Garibaldi defeats the Neapolitans at the Volturno, October 1. Summer palace of the emperor of China sacked by the French, October 6. New constitution of the Austrian empire established by imperial diploma, October 20. Treaty of peace signed at Peking, October 24. Death of the earl of Dundonald, October 30 (born, 1775). Annexation of the Two Sicilies to Sardinia announced, November 3. Annexation of territory on the Amur by Russia, November 14. Death of Baron Bunsen, November 28 (born, 1791). Death of Dr. Ferdinand Baur, December 2 (born, 1792). Secession of South Carolina from the Union, December 20. Annexation of the Marches, Umbria, Naples, and Sicily to dominions of Victor Emmanuel, December 26. Spectrum analysis established by Bunsen and Kirchhoff. Discovery of oil-wells in Pennsylvania. The "Warrior," first British ironclad steamer, launched. *Essays and Reviews* published. Mill's *On Liberty*.

1861. William I. king of Prussia, January 2. Famine in North-western provinces of India. Secession of Mississippi from the Union, January 9; followed by that of Florida, Alabama, Georgia, Louisiana, and Texas, January 10–February 1. Kansas admitted a State of the Union, January 29. Cession of Mentone and Roquebrune to France, February 2. Confederate States constituted under presidency of Jefferson Davis, February 4. Capture of Gaeta by General Cialdini, February 13. First Italian parliament meets at Turin, February 18. New constitution of the Austrian empire decreed by patent, February 26. The Territory of Dakota organized, March 2. Emancipation of the serfs in Russia decreed by the Czar, March 3. Abraham Lincoln president of the United States, March 4. Title of king of Italy conferred on Victor Emmanuel, March 17. Annexation of St. Domingo to Spain, March 18. Bombardment and capture of Fort Sumter, Charleston, by Confederates, April 12, 13. Secession of Virginia, April 17. Blockade of Southern ports, April 19. Secession of Arkansas, May 6, of Tennessee, May 8, of N. Carolina, May 20. Death of Count Cavour, June 6 (born, 1810). Paper duty in Great Britain abolished by Act passed June 12. Confederate States recognized as belligerents by Great Britain and France, June 15. Death of Lord Campbell, June 23 (born, 1779). Abdul Aziz sultan of the Ottomans, June 25. Death of Mrs. Browning, June 29 (born, 1809). Juarez president of Mexico, June 30. Confederate congress sits at Richmond, Va., July 20. First battle of Bull Run (Manassas), July 21. Visit of Queen Victoria and the Prince Consort to Ireland, August 21–29. Meeting of Napoleon III. and the king of Prussia at Compiègne, October 6. Seizure of Confederate commissioners on board the British steamer "Trent," November 8; they are surrendered, December 28. Death of Father Lacordaire, November 22 (born, 1802). Italian ambassador leaves Madrid, November 26. Jefferson Davis elected president of Confederate States for six years, November 30. Death of the Prince Consort, December 14 (born, 1819). Ningpo taken by the Taepings, December 23. Principality of Roumania formed by union of Moldavia and Wallachia, December 23. Suspension of cash payments in Federal States, December 31. Post-Office Savings Banks opened in England. Storm warnings begun by Fitzroy. Stanley's *Eastern Church* published. *Hymns Ancient and Modern*. Max Müller's *Science of Language*.

1862. Death of Biot, February 3 (born, 1774). Encounter between the ironclads "Merrimac" and "Monitor" in the James River, March 9. Earl of Elgin governor-general of India, March 12. Japanese embassy received by Napoleon III., April 13. France declares war on Mexico, April 16. Surrender of New Orleans to the Federals, April 24. Japanese embassy reaches England, April 30. Opening of International Exhibition, South Kensington, May 1 (closed, November 1). Battle of Williamsburg, May 5. Ningpo taken by the Allies, May 10. Death of Buckle, May 29 (born, 1822). Battles on the Chickahominy (before Richmond), June 25 to July 1. Treaty of commerce between Great Britain and Belgium, July 23. Death of ex-president Van Buren, July 24 (born, 1782). The "Alabama" Confederate corvette sails from Liverpool, July 29. Garibaldi occupies Catania, August 20. Garibaldi defeated, wounded, and captured at Aspromonte, August 29. Second battle of Bull Run, August 30. Confederates invade Maryland, September 5, 6. Confederates defeated at South Mountain, September 14; and at Antietam, September 17. Suspension of Habeas Corpus Act in United States, September 24. Abdication of Otho, king of Greece, October 24. Death of Uhland, November 13 (born, 1787). Battle of Fredericksburg, December 13. Cotton famine in Lancashire at its height in December. Herbert Spencer's *First Principles* published. Helmholtz's *Die Lehre von den Tonempfindungen*.

1863. President Lincoln proclaims the Confederate States to be in rebellion, and declares their slaves free, January 1. Western Virginia admitted a State of the Union, January 1. Death of Horace Vernet, January 17 (born, 1789). Treaty of commerce between France and Italy, January 17. Ismael Pasha viceroy of Egypt, January 18. Insurrection in Poland, under Langiewicz, January 22; he is defeated, March 19. Rebellion of Maoris in New Zealand, January; they are defeated, July 17 and November 20. Marriage of the Prince of Wales with the Princess Alexandra of Denmark at Windsor, March 10. Prince William George of Denmark elected king of Greece, March 18. Puebla taken by the French, March 31. Death of Sir G. Cornewall Lewis, April 13 (born, 1806). Battle of Chancellorsville, General "Stonewall" Jackson mortally wounded, May 2 (died, May 9). Puebla, Mexico, entered by French under General Forey, May 17. Vicksburg attacked by General Grant, May 19; surrendered, July 4. Capture of Herat by Mahomed Khan, May 26. Death of Dost Mahomed, June 9. General Forey enters the city of Mexico, June 10. Battles of Gettysburg, July 1–3. Death of Mulready, July 7 (born, 1786). Surrender of Port Hudson to the Federals, July 8. Empire of Mexico proclaimed; Maximilian, archduke of Austria, elected emperor, July 10. Abolition of the Scheldt dues, July 16. Chattanooga occupied by Federals, September 10. Battle of Chickamauga, September 19, 20. Death of Jacob Grimm, September 20 (born, 1785). Death of Archbishop Whately, October 8 (born, 1787). Prince of Sonderburg-Glucksburg proclaimed king of Denmark as Christian IX., November 16. Prince Frederick of Augustenburg claims the duchies of Schleswig-Holstein, November 18. Battle of Chattanooga, defeat of Confederates, November 24. First Fenian Convention meets at Chicago, November 25. Death of Thackeray, December 24 (born, 1811). Colenso's *Pentateuch critically examined* published. George Eliot's *Romola*. Renan's *Vie de Jésus*.

1864. Sir John Lawrence viceroy of India, January 12. German ultimatum presented to Denmark, January 16. Austro-Prussian army enters Holstein, January 21. Evacuation of the Dannewerk, February 6. Visit of Garibaldi to England, April 3–27. Seizure of Chincha Islands by Spain, April 14. Capture of Düppel by Prussians, April 18. Russian conquest of Circassia completed. Death of Meyerbeer, May 2 (born, 1794). Suspension of hostilities in Schleswig, May 12. Death of N. Hawthorne, May 19 (born, 1804). Cession of Ionian Islands to Greece, May 28. Arrival of the emperor Maximilian in Mexico, May 29. The "Alabama" sunk by the "Kearsarge," off Cherbourg, June 19. Hostilities resumed in Denmark, June 26. Nanking taken from the Taepings, July 19; end of the rebellion. Repeal of Fugitive Slave Law, U. S., June 23. Belfast Orange riots, August 8–16. Occupation of Atlanta by Federals September 2. Evacuation of Rome by the French in two years agreed to, September 15. Death of W. S. Landor, September 17 (born, 1775). Treaty of peace between Denmark, Prussia, and Austria signed at Vienna, October 30 (ratified, November 16). Nevada admitted a State of the Union, October 31. Death of David Roberts, R.A., November 25 (born, 1796). Savannah occupied by General Sherman, December 21. Geneva Convention for relief of the wounded in war originated. Dynamite introduced by Nobel. Tennyson's *Enoch Arden* published. Newman's *Apologia pro Vita sua*. Taine's *Histoire de la Littérature Anglaise*.

1865. Death of Proudhon, January 19 (born, 1809). Treaty of peace between Spain and Peru, January 25. Occupation of Charleston by General Gillmore, February 17. The first telegram received in London direct from Kurrachee, March 1. President Lincoln enters upon second term of office, March 4. Death of Cobden, April 2 (born, 1804). Richmond entered by General Grant, April 3. Surrender of General Lee, April 9. Assassination of President Lincoln, April 14; vice-president Andrew Johnson succeeds him, April 15. Paraguay declares war on Argentine Confederation, April 16. Alliance between Brazil, Uruguay, and Argentine Confederation, May 1. Capture of President Davis, May 10, and end of American war. Italian seat of government transferred to Florence, May 11. Death of

Isaac Taylor, June 28 (born, 1786). Death of Professor Aytoun, August 4 (born, 1813). Death of Sir William J. Hooker, August 12 (born, 1785). Convention of Gastien, respecting Danish duchies, August 14. Navigation treaty between Great Britain and Prussia, August 16. Rinderpest in England, July–October. Arrest of Fenian loaders in Ireland, September 15. Negro riots at Morant Bay, Jamaica, October 11. Death of Lord Palmerston, October 18 (born, 1784). Earl Russell first lord of the treasury, October 19. Leopold II. king of the Belgians, December 10. Commercial treaty between Great Britain and Austria, Decemher 16. Slavery abolished in United States, December 18. Death of Frederika Bremer, December 31 (born, 1802). Lecky's *Rise and Influence of Rationalism* published. Pusey's *Eirenicon*.

1866. Suspension of Habeas Corpus Act in Ireland, February 17. Death of Dr. Whewell, March 6 (born, 1794). Death of Keble, March 29 (born, 1792). Alliance between Prussia and Italy signed, March 27. Bombardment of Valparaiso by Spanish fleet, March 31. Civil Rights Bill passed by U. S. Congress, April 12. Prince Charles of Hohenzollern elected hospodar of Roumania, April 15. Suspension of Bank of England Charter Act, May 11. Fenian raids into Canada, May 31 and June 7. Suspension of Habeas Corpus Act in Canada, June 8. Prussia withdraws from Germanic Confederation, June 14. Prussians enter Saxony and Hanover, June 15. Austria declares war, June 17; Prussia, June 18; Italy, June 20. Italians defeated at Custozza, June 24. Resignation of the Russell ministry, June 26. Surrender of Hanoverian army, June 29. Prussians defeat Austrians at Sadowa (Königgrätz), July 3. Austria cedes Venetia to France, July 5. The Derby ministry enter office, July 6. Occupation of Frankfort by Prussians, July 16. Battle of Lissa, July 20. Preliminaries of peace signed at Nikolsburg, July 26. Insurrection in Crete, August. Treaty of peace between Austria and Prussia signed at Prague, August 23. Treaty of peace between Austria and Italy signed at Vienna, October 3. North German Confederation formed, August–October. Venetia united to Italy, November 4. Rome evacuated by the French, December 3–11. *Ecce Homo* published. Swinburne's *Poems and Ballads*.

1867. Death of Victor Cousin, January 14 (born, 1792). Schleswig-Holstein incorporated with Prussia, January 24. Hungarian constitution restored, February 7. First passage of a ship through the Suez Canal, February 17. Fenian agitation in Ireland, February–March. Nebraska admitted a State of the Union, March 1. Cession of Russian America to United States, March 13. Evacuation of Mexico by the French, March 16. International Exhibition at Paris opened, April 1 (closed, November 3). Dominion of Canada constituted, March 29. Coronation of the emperor and empress of Austria as king and queen of Hungary, at Pesth, June 8. The Livingstone search expedition sails from England, June 9. The emperor Maximilian of Mexico shot at Queretaro, June 19. North German constitution promulgated, June 25. Sultan visits Paris, June 30; London, July 12. New Reform Bill passed for England, August 15 (for Scotland and Ireland, July 13, 1868). Death of Faraday, August 25 (born, 1791). Prussian garrison withdrawn from Luxembourg, September 8. First detachment of British expedition against Abyssinia leaves Aden, September 28. Juarez re-elected president of Mexico, October. Garibaldi occupies Monte Rotondo, and threatens Rome, October 26. French troops enter Rome, October 30. Italian troops pass Roman frontier, October 30. Garibaldi defeated at Mentana, November 3; arrested, November 4. Annexation of Cochin China to France. Chaucer Society established in London. First vol. of Freeman's *Norman Conquest* published (completed, 1876).

1868. Death of Brewster, February 10 (born, 1781). Occupation of Asuncion, Paraguay, hy the allies, February 21. Resignation of Lord Derby, February 25. Impeachment of President Johnson, February 25. Magdala bombarded and taken hy Sir R. Napier, King Theodore killed, April 13. Death of Marshal Narvaez, April 23 (born, 1800). Death of Lord Brougham, May 7 (born, 1779). Samarcand occupied hy Russians, May 14. Death of ex-president Buchanan, June 1 (born, 1791). Prince Michael III. of Servia assassinated at Belgrade, June 10; Milan Obrenovich proclaimed prince, July 2. Humaita evacuated by Paraguayans, June 25. Cabul recovered by Shere Ali, August 14. Insurrection in Spain, September 18. Death of Dean Milman, September 24 (born, 1791). Battle of Alcolea, September 28. Queen Isabella leaves Spain, September 30. General Prim received at Madrid, October 7. Death of Rossini, November 13 (born, 1792). Resignation of Disraeli, December 2. The Gladstone ministry in office, December 9. Paraguayan army defeated and destroyed at Villeta, December 11. Lord Mayo, governor-general of India, Decemher 20.

1869. Death of Lamartine, February 28 (born, 1792). General Grant president of United States, March 4. Hudson's Bay Territory ceded to the crown, April 9. Marshal Serrano regent of Spain, June 18. Irish Church Disestablishment Act passed, July 26. Valencia seized by Republicans, October 11; stormed by Governmont troops, Octobor 16. Death of Sainte-Beuve, Oct. 13 (born, 1804). Death of the earl of Derby, October 23 (born, 1799). Formal opening of the Suez Canal, November 17. Pacific Railway completed. Lecky's *European Morals* published.

1870. President Lopez, of Paraguay, defeated and killed at battle of Aquidaban, March 1. Death of Charles Dickens, June 9 (born, 1812). Abdication of Isabella II. of Spain, June 25. Spanish crown offered to Prince Leopold of Hohenzollern-Sigmaringen, July 4. Proposal denounced by French Government, July 6. Infallibility of the Pope voted by the Vatican Council, July 18. France declares war against Prussia, July 19. Abrogation of the concordat with Austria, July 30. The Irish Land Act passed, August 1. Attack on Saarbrück by the French, August 2. French defeated at Woerth and Speichern, August 6. Elementary Education Act for England and Wales passed, August 9. Fall of the Ollivier ministry in France, August 9; Count Palikao first minister. Defeat of French at Gravelotte, August 18. Battle of Sedan, September 1. Surrender of Napoleon to the king of Prussia; capitulation of the French army, September 2. Revolution at Paris. Republic proclaimed, September 4. Flight of the empress. Italian troops enter Papal territory, September 17. Paris invested by Germans, September 19. Rome occupied by Italian troops, September 20. Capitulation of Strasburg, September 28. Versailles the headquarters of king of Prussia, October 5. Rome and the Papal States united to the kingdom of Italy, October 9. Orleans taken by General Von der Tann, October 11. Death of General R. E. Lee, October 13 (born, 1808). Fall of Metz, October 28. Communist insurrection at Paris, October 31. Russia throws off obligations of treaty of 1856 respecting neutrality of the Black Sea, October 31. Duke of Aosta elected king of Spain, November 16. Bavaria enters North German confederation, November 23. Death of Alexandre Dumas, December 5 (born, 1803). German empire declared, December 10. Tours surrendered, but not occupied by Germans, Decemher 21. Marshal Prim shot at Madrid, December 28; died, 30. Mont Cenis tunnol completed.

1871. Le Mans occupied by Germans, January 12. King William of Prussia proclaimed emperor of Germany at Versailles, January 18. Battle of St. Quentin, January 19. Bombardment of St. Denis begun, January 21. Capitulation of Paris, January 28. The army of Bourbaki interned in Switzerland, February 1. National Assembly meets at Bordeaux, February 12. M. Thiers chief of the executivo, February 17. Preliminaries of peace signed, February 26; ratified, March 1. Paris entered by Germans, March 1; evacuated, March 3. Communist revolution at Paris, March 18. National Assembly meets at Versailles, March 20. The commune proclaimed at Paris, March 28. Capture of Herat, by Yakoob Khan, son of Shere Ali, May 6. Treaty of Washington, May 8 (ratified, May 24). Definitive treaty of peace between France and Germany, May 10 (ratified, May 21). Trial of the Tichborne case in Common Pleas begins, May 11; ends, March 6, 1872. Death of Sir John Herschel, May 11 (born, 1792). Death of Auber, May 13 (born, 1784). Paris entered by Versailles army, May 22. The Tuileries, Louvre, Palais Royal, &c., burnt by communists, May 24. Archbishop of Paris shot, May 24. End of insurrection, May 28. Seat of Italian Government transferred to Rome, July 1. M. Thiers appointed president of the republic, August 31. Purchase system in British army abolished by Royal Warrant, July 20. Death of Paul de Kock, August (born, 1794). Formal opening of Mont-Cenis tunnel, September 17. Slave emancipation bill passed by senate of Brazil, September 27. Chicago burnt, October 8–10. Alabama Arbitration Commission meets at Geneva, December 18 (award signed, September 14, 1872). British Columbia incorporated with Dominion of Canada. Darwin's *Descent of Man* published. George Eliot's *Middlemarch*.

1872. Assassination of Lord Mayo in the Andaman Islands, February 8 (born, 1822). Lord Northbrook viceroy of India, February 22. Death of Giuseppe Mazzini, March 10 (born, 1805). Dutch possessions on the Gold Coast transferred to Great Britain, April 6. Carlist insurrection in Spain, April 22. Great eruption of Vesuvius, April 24–May 1. Expulsion of Jesuits by German Reichstag, June 19. Death of President Juarez, July 18 (born, 1809). The Ballot Act passed by English parliament, July 18. Extradition treaty between Great Britain and Belgium concluded, July 31. Japanese embassy arrives in England, August 17. Riots at Belfast, August 16–22. Death of Dr. Merle d'Aubigné, October 19 (born, 1794). Public gaming tables, Baden-Baden, closed, October 31. Commercial treaty between France and England, November 5. Island of San Juan evacuated by British troops, according to award of German Emperor, November 22.

1873. Death of Napoleon III. at Chiselhurst, January 9. Death of Lord Lytton, January 18 (born, 1805). Abdication of King Amadeus of Spain, February 11. Republican government adopted by the Cortes. General Grant president of United States (second term), March 4. International exhibition at Vienna opened, May 1. Death of Dr. Livingstone, in Central Africa, May 4 (born, 1813). Death of John Stuart Mill, May 8 (born, 1806). Resignation of M. Thiers; Marshal Macmahon president of the French Republic, May 24. Autonomy of Egypt

conceded by the sultan, June 8. Khiva taken by Russians, June 10. The Ashantees defeated by the English at Elmina, June 13. Visit of the shah of Persia to England, June 18–July 5. First reception of foreign ministers by emperor of China at Peking, June 29. Communist rising in Spain, July 10. Insurrection at Cartagena, July 14. Don Carlos re-enters Spain, July 16. New treaty of commerce between England and France signed, July 23. Payment of Alabama indemnity by England, September 9. Evacuation of French territory by Germans, September 16. Death of Sir Edwin Landseer, October 1 (born, 1802). Trial of Marshal Bazaine begins, October 6; he is sentenced, December 10. Encyclical letter of Pius IX. against "Old Catholics," November 21. Dutch expedition lands at Atchin, November 28. Death of Agassiz, December 15 (born, 1807). Supreme Court of Judicature Act passed.

1874. Coup d'État at Madrid by General Pavia, January 3. Marshal Serrano head of the new Government. Surrender of Cartagena, January 12. Capture of Coomassie by Sir G. Wolseley, February 4. Death of Strauss, February 8 (born, 1808). Resignation of the Gladstone ministry, February 17. Mr. Disraeli prime minister, February 18. The Tichborne claimant, after 188 days' trial, is found guilty of perjury, February 28. Death of Charles Sumner, March 11 (born, 1811). Visit of the czar to England, May 13–21. Death of Van de Weyer, May 23 (born, 1802). Marshal Concha killed in engagement with Carlists near Estella, June 28. Spain declared in a state of siege, July 19. Escape of Marshal Bazaine from prison, August 9. Death of Guizot, September 12 (born, 1787). Cession of Fiji Islands to England, September 30. Death of Tischendorf, December 7 (born, 1815). Prince Alphonso proclaimed king of Spain, December 30. Transit of Venus, December 9. Toughened glass invented. *Supernatural Religion* published.

1875. Deposition of the Gaikwar of Baroda, April 23. The Arctic expedition ("Alert" and "Discovery") sails from Portsmouth, May 29. Great floods at Toulouse, June 24; and at Buda, June 26. Citadel of Seo d'Urgel, last Carlist fortress in Catalonia, surrendered, August 27. Occupation of Khokand by Russians, September 16. Prince of Wales sets out on visit to India, October 11. Purchase by England of Khedive's shares in Suez Canal announced, November 26. Tennyson's *Queen Mary* published. (W. L. R. C.)

CHRONOMETER, a watch of special construction to measure time with great accuracy, chiefly used in determining the longitude at sea. See CLOCKS and WATCHES.

CHRUDIM, a town in Bohemia, Austria, situated on the Chrudimka, a tributary of the Elbe, about 63 miles E.S.E. of Prague. It is the capital of a circle, and has a district court-house. There are five churches in the town, besides a monastery of the Capuchins, a high school, an infirmary, and an alms-house. Calico-printing is carried on to some extent. Population, 9400.

CHRYSIPPUS (*c.* 280–206 B.C.), one of the greatest of the Stoics, was born probably in 280 B.C., at Soli, in Cilicia. Being robbed of his property, he visited Athens, and attended the lectures, possibly of Zeno, and certainly of Cleanthes. The latter he succeeded as recognized chief of the school. He is also said to have been instructed in the doctrines of the Middle Academy by Arcesilaus and Lacydes. Chrysippus was the author of a prodigious number of works, which, though extremely prolix and disfigured by great obscurity and carelessness of style and language, were distinguished by extensive learning and considerable acuteness. But nothing has come down to us except small fragments, and from these it is difficult to discover what doctrines are originally due to Chrysippus. We know, however, that he made considerable emendations on the theory of Zeno and Cleanthes. With regard to the relation of moral to physical science, he reversed their conclusion, adopting the view, which from that time became characteristic of Stoicism, that, as the sole aim of philosophy is to discover man's duty, ethics is the only science that is of real importance in itself, while physics is to be regarded merely as an aid to its study. He improved on the crude theory of perception which had been held by his predecessors, who compared the action of the object on the mind to that of the seal on the wax, arguing that this would do away with the possibility of the simultaneous perception of more than one object, and denying that the mental modification resembles the object. He also finally determined the Stoical theory of the criterion of truth, which, according to him, is irresistible conviction. Much attention was paid by Chrysippus to formal logic. He held that the hypothetical syllogism is the original type of syllogistic inference, and he devoted the most elaborate study to its various forms. He drew up a scheme of the categories,—making the highest Substance (τὸ ὑποκείμενον) the next, Form, or essential attribute; the third, Variety, or that non-essential attribute which is at the same time independent of all but the object itself; the fourth, Variety of Relation, or that non-essential attribute which depends on the relation of the object to some other object. Chrysippus also gave some attention to linguistic, and especially to grammatical investigations.

The explanation of the universe adopted by Chrysippus is that of the rest of his school. The real is the corporeal; man and the world are all that exists. In each there is that which is inert, and also the informing soul or vivifying fire. The soul of the universe is God, or Destiny. Each human soul is part of the universal soul, in which, according to the view originated by Chrysippus, the souls of all, except the wise, are again swallowed up at death. The universe is perfect. So-called physical evil is none. Moral evil is the necessary complement of good, and is turned by Providence into good. All is the result of perfect law. Yet Chrysippus employed all his subtilty to establish the freedom of the will. Another inconsistency was his reliance on divination, which he strove to explain on a theory of natural causation. The stories of the gods Chrysippus regarded as symbolical myths; and of many of them he attempted ingenious explanations.

In morals Chrysippus somewhat modified the extreme theory of the earlier Stoics. He admitted between the good and the bad a third class of things—the indifferent, and even avowed that it is foolish not to desire health, and riches, and honor. In practice a man of unsullied purity, he felt bound to conclude, from the theory that the lower animals live according to nature, that incest and many other crimes, and acts so repulsive as the devouring of the bodies of the dead, are natural, and therefore not to be blamed.

See Diogenes Laertius; Plutarch, *De Stoicorum Repugnantiis;* Peterson, *Philosophiæ Chrysippeæ Fundamenta* (Altona, 1827); Baguet, *Commentatio de Chrysippi vita, doctrina, et reliquiis* (Louvain, 1822); Hagedorn, *Moralia Chrysippea* (1685); Richter, *De Chrysippo Stoico fastuoso* (Leipsic, 1738); Zeller, *Stoics, Epicureans, and Sceptics.*

CHRYSOLORAS, MANUEL (*c.* 1355–1415), a learned Greek who was instrumental in spreading Greek literature in the West, was born at Constantinople, about 1355, of a distinguished family, which had removed with Constantine to Byzantium. While still very young, he was sent by the emperor John Palæologus to implore the aid of the Christian princes against the Turks. After several years he returned to Constantinople; but at the invitation of the magistrates of Florence, about the year 1395, he became professor of the Greek language in that city, where he taught three years. Having visited Milan and Pavia, and resided for several years at Venice, he went to Rome upon the invitation of Aretino, who had been his disciple, and was then secretary to Gregory XII. In 1408 he was sent to Paris on an important mission from Manuel Palæologus, the Greek emperor. In 1413 he was appointed by Pope Martin V. on an embassy to the Emperor Sigismund, of which the object was to fix a place for the assembling of a general council. It was decided that the meeting should take place at Constance; and Chrysoloras was on his way thither, having been chosen to represent the Greek church, when he died suddenly on the 15th of April, 1415. Only two of his works have been printed, viz., his *Erotemata*, which was for some time the only grammar in use in the West, and *Epistolæ III. de comparatione veteris et novæ Romæ;* but many others exist in MS.

CHRYSOSTOM, ST. JOHN (Χρυσόστομος, golden-mouthed), the most famous of the Greek fathers, was born of a noble family at Antioch, the capital of Syria, most probably about 347. At the school of Libanius the sophist he gave early indications of his mental powers, and would have been the successor of his heathen master, had he not been, to use the expression of his teacher, stolen away to a life of piety (like Augustine, Gregory of Nazianzus, and Theodoret), by the influence of his pious mother Anthusa. Immediately after his baptism by Meletius, the bishop of Antioch, he gave up all his forensic prospects, and buried himself in an adjacent desert, where for six years he spent a life of ascetic self-denial and study. His infirmities, however, compelled him to return to the world; and the authority of Meletius gained his services to the church.

On his arrival he was ordained deacon in his thirty-fifth year (381), and afterwards presbyter at Antioch. On the death of Nectarius he was appointed archbishop of Constantinople by Eutropius, the favorite minister of the Emperor Arcadius. He had, ten years before this, only escaped promotion to the episcopate by a very questionable stratagem,—which, however, he defends in his instructive and eloquent treatise *De Sacerdotio*. As a presbyter, he won high reputation by his preaching at Antioch, more especially by his homilies on *The Statues*, a course of sermons delivered when the citizens were justly alarmed at the prospect of severe measures being taken against them by the Emperor Theodosius, whose statues had been demolished in a riot.

On the archiepiscopal throne Chrysostom still persevered in the practice of monastic simplicity. The ample revenues which his predecessors had consumed in pomp and luxury he diligently applied to the establishment of hospitals; and the multitudes who were supported by his charity preferred the eloquent discourses of their benefactor to the amusements of the theatre or of the circus. His homilies, which are still preserved, furnish ample apology for the partiality of the people, exhibiting the free command of an elegant and copious language, an inexhaustible fund of metaphors and similitudes, giving variety and grace to the most familiar topics, with an almost dramatic exposure of the folly and turpitude of vice. His zeal as a bishop and eloquence as a preacher, however, gained him enemies both in the church and at the court. The ecclesiastics who were parted at his command from the lay-sisters (whom they kept ostensibly as servants), the thirteen bishops whom he deposed for simony and licentiousness at a single visitation, the idle monks who thronged the avenues to the court and found themselves the public object of his scorn —all conspired against the powerful author of their wrongs. Their resentment was inflamed by a powerful party, embracing the magistrates, the ministers, the favorite eunuchs, the ladies of the court, and Eudoxia the empress herself, against whom the preacher thundered daily from the pulpit of St. Sophia. A favorable pretext for gratifying their revenge was discovered in the shelter which Chrysostom had given to four Nitrian monks, known as the tall brothers, who, on being excommunicated by their bishop, had fled to Constantinople; and a ready tool was found in Theophilus, bishop of the rival city of Alexandria, who had driven them from their diocese, and had long circulated in the East the charge of Origenism against Chrysostom. By his instrumentality a synod was called to try or rather to condemn the archbishop; but fearing the violence of the mob in the metropolis, who idolized him for the fearlessness with which he exposed the vices of their superiors, it held its sessions in the suburb of Chalcedon, named the Oak, where Rufinus had erected a stately church and monastery. A bishop and a deacon were sent to accuse the archbishop, and presented to him a list of charges, in which pride, inhospitality, and Origenism were brought forward to procure the votes of those who hated him for his austerity, or were prejudiced against him as a suspected heretic. Four successive summonses were signified to Chrysostom, but he indignantly refused to appear until four of his notorious enemies were removed from the council. Without entering into any examination of the charges brought before them, the synod condemned him on the ground of contumacy; and, hinting that his audacity merited the punishment of treason, called on the emperor to ratify and enforce their decision. He was immediately arrested and hurried to Nicæa in Bithynia. As soon as the news of his banishment spread through the city, the astonishment of the people was quickly exchanged for a spirit of irresistible fury. In crowds they besieged the palace, and had already begun to take vengeance on the foreign monks and sailors who had come from Chalcedon to the metropolis, when, at the entreaty of Eudoxia, the emperor consented to his recall. His return was graced with all the pomp of a triumphal entry, but in two months after he was again in exile. His fiery zeal could not blind him to the vices of the court; and heedless of personal danger he thundered against the profane honors that were addressed almost within the precincts of St. Sophia to the statue of the empress. The haughty spirit of Eudoxia was inflamed by the report of a discourse commencing with the words —"Herodias is again furious; Herodias again dances; she once more demands the head of John;" and though the report was false, it sealed the doom of the archbishop. A new council was summoned, more numerous and more subservient to the wishes of Theophilus; and troops of barbarians were quartered in the city to overawe the people. Without examining it, the council confirmed the former sentence, and condemned him afresh for having resumed his functions without their permission. He was hurried away to the desolate town Cucusus, among the ridges of Mount Taurus, with a secret hope, perhaps, that he might be a victim to the Isaurians on the march, or to the more implacable fury of the monks. He arrived at his destination in safety; and the sympathies of the people, which had roused them to fire the cathedral and senate-house on the day of his exile, followed him to his obscure retreat. His influence, however, became more powerfully felt in the metropolis than before. In his solitude he had ample leisure for forming schemes of missionary enterprise; and by his correspondence with the different churches, he at once baffled his enemies, and gave greater energy to his friends. This roused the emperor to visit him with severer punishment. An order was despatched for his instant removal to the extreme desert of Pityus; and his guards so faithfully obeyed their cruel instructions that, before he reached the sea coast of the Euxine, he expired at Comana in Pontus, in the sixtieth year of his age. His exile gave rise to a schism in the church, and the Johannists (as they were called) did not return to communion with the archbishop of Constantinople till the relics of the saint were, 30 years after, brought back to the Eastern metropolis with great pomp, and the emperor publicly implored forgiveness from Heaven for the guilt of his ancestors. The festival of St. Chrysostom is kept in the Greek Church, November 13, and in the Latin Church, January 27.

In his general teaching Chrysostom elevates the ascetic element in religion, and in his homilies he inculcates the need of personal acquaintance with the Scriptures, and denounces ignorance of them as the source of all heresy. If on one or two points, as for instance the invocation of saints, some germs of subsequent Roman teaching may be discovered, there is a want of anything like the doctrine of indulgences or of compulsory private confession. Moreover, in writing to Innocent, bishop of Rome, he addresses him as a brother metropolitan, and sends the same letter to Venerius, bishop of Milan, and Chromatius, bishop of Aquileia. His correspondence breathes a most Christian spirit, more especially in its tone of charity towards his persecutors; and his line of exegesis, if not acutely metaphysical or mystical, is full of good sense and right feeling.

His works are exceedingly voluminous, and consist chiefly of homilies, commentaries, smaller treatises, epistles, and liturgies. Their excellence is powerfully shown in the history of the times, for the illustration of which they afford highly valuable materials. The school of exegesis formed by him, and especially illustrated by such works as his commentaries on the Gospel of St. Matthew, the Book of Acts, the Epistle to the Romans, and other parts of the New Testament, is sound, practical, and may (as Dr. Newman has justly remarked) almost be called "English." It was subsequently adorned by the justly-honored names of Theodoret, Theophylact, Euthymius, and Nicephorus. The best edition is that of Bernard de Montfaucon in 13 vols. fol., 1718–1738, reproduced with some improvements by the Abbé Migne (Paris, 1863); but this edition is greatly indebted to the one issued more than a century earlier (1612) by one of the foremost English scholars of his age, Sir Henry Savile, provost of Eton College, from a press established at Eton by himself. It is in eight volumes, and is said to have cost its editor £8000. Hallam (*Lit. of Europe*, iii. 10, 11) calls it "the first work of learning on a great scale, published in England." Numerous MSS. still remain unedited. Some of the homilies and commentaries are translated in the *Library of the Fathers*, published at Oxford, and the Greek text has been in part re-edited by a scholar who has shown a very special aptitude for the work, the Rev. J. Field of King's College, Cambridge. As authorities for the facts of his life, the most valuable are the ecclesiastical histories of Socrates, Sozomen, and Theodoret; and amongst the moderns, Erasmus, Cave, Lardner, and Tillemont, with the more recent church history of Neander, and his monograph on the *Life and Times of Chrysostom*, translated by J. C. Stapleton. There has also appeared a valuable German biography by Dr. Förster; and a narrative, full of interest

and told with life-like animation, has been given by the late M. Amedée Thierry in the *Revue des Deux Mondes*, and since republished (Paris, 1860) in one volume, entitled *Recits de l'Histoire Romaine au cinquième Siècle.* A graceful and interesting sketch of the concluding scenes of St. Chrysostom's life may be found in Dr. Newman's *Historical Sketches* (London, 1873), though that eminent writer seems not very favorable to the theology of the Antiochene school, or even of Chrysostom himself. Valuable information is given in Professor Bright's *History of the Church* (Oxford, 1864), and in Canon Robertson's *History of the Christian Church* (vol. ii., London, 1874). But the best special contribution to English literature on the subject is *St. Chrysostom: His Life and Times*, by the Rev. W. R. W. Stephens (London, 1872).

CHUB. See ANGLING, vol. ii. p. 39.

CHUBB, THOMAS (1679–1746), a well-known deistical writer, was the son of a maltster, Henry Chubb, and was born in the village of East-Harnham, near Salisbury, on the 29th September, 1679. His father died in 1688, and left in poor circumstances a widow and four children, of whom Thomas was the youngest. All of them were early sent to work; and consequently the education which Thomas received in his boyhood was of a most elementary kind. In 1694 he was apprenticed to a glove-maker in Salisbury; but as the work was afterwards found to be unsuitable for him on account of the weakness of his sight, he entered the employment of a tallow chandler, and his income for many years was derived partly from this source and partly from glove-making. Through energy and perseverance he succeeded in gaining a fair knowledge of mathematics, geography, and some other subjects. Theology, however, was what chiefly commanded the attention of Chubb and his companions, among whom he seems to have been the moving spirit. His intellectual activity, and the eagerness he always displayed to gain clear and distinct views of any question that occupied him, marked him out from the first; and his early habit of committing his thoughts to writing gave him a clear and fluent style which afterwards found much favor with the public. He made his first appearance as an author in the Arian controversy, on the side of Whiston. A dispute having arisen among his friends about Whiston's argument in favor of the supremacy of the one God and Father, Chubb was led to write an essay which bore the title, *The Supremacy of the Father Asserted.* This, passed round his friends in manuscript, created so favorable an impression that the author ultimately submitted it to the judgment of Whiston, who pronounced it well worthy of publication. After a few emendations by Whiston, it was printed in 1715. A number of tracts on various subjects followed, which were published in a collected form in 1730. Chubb was now regarded as a literary phenomenon. Among other persons of eminence, he attracted the attention of Sir Joseph Jekyll, Master of the Rolls, in whose house he lived for several years. The nature of his position there is not precisely known; but there are stories told of his having waited at table as a servant out of livery, and of the amusement caused by his short stout figure standing as steward at his patron's sideboard. His love of independence and retirement drew him back to Salisbury, where by the kindness of friends he was enabled to devote the rest of his days to his favorite studies. He died on the 8th February, 1746. His moral character was excellent, and he is said to have continued a regular attendant on divine worship in the parish church.

Chubb was the author of a very large number of controversial tracts. His principal works are—*A Discourse Concerning Reason* (1731), *The True Gospel of Jesus Christ* (1739), and *Posthumous Works*, 2 vols. (1748). The *Discourse Concerning Reason* aims at showing that reason is, or ought to be, a sufficient guide in matters of religion. After defining the terms of this proposition, he proceeds to argue that if man is accountable to God for his actions, he has a right to possess a power sufficient to discover what he is accountable for, and also to discover such motives to right behavior as will counterbalance those temptations which are unavoidable in the present constitution of things. It will not help the case to say that man, as originally constituted, had such a power, but lost it through Adam's fall; since it matters not to mankind whether Adam had originally such a power or not. Men cannot justly be held accountable if they lost in Adam that power. If the power was only impaired through Adam's sin, and if every man will be judged according to the ability he has, then reason is a sufficient guide in matters of religion. Difficulties which unavoidably arise from the constitution of things are only chargeable upon the author of that constitution. If divine revelation was meant to supply the defect of reason, then millions, whom that revelation has never reached, have been unjustly dealt with. The deficiency being general, the revelation should have been given to the whole species. The sufficiency of reason does not make revelation needless, as reason may be neglected or abused, and revelation may be needed to bring men back to a right use of reason in religion. True, reason could not discover how divine justice is satisfied by the sufferings and death of Christ, and how the sinner is justified by faith in Him; but that is repugnant to reason, and can be no part of the genuine revelation. One unjust action cannot satisfy justice for another. Nor can sin, considered abstractly from the sinner, be the object of favor or displeasure. Only what faith leads to, viz., repentance and turning to God, is the true ground of God's mercy and kindness to men. This is most evident to reason when discovered, and must therefore be discoverable by reason. If, as is allowed, reason is a proper guide in matters of revelation, it should not be less so in matters of religion, for the one seems to be as much within the province of reason as the other. At the close Chubb disavows any intention to injure divine revelation, or to serve the cause of infidelity. *The True Gospel of Christ* is characterized by Lechler, in his *Geschichte des englischen Deismus*, as an essential moment in the historical development of deism. Its leading thought is that Christianity is not doctrine, but life. Jesus requires us to regulate our life according to the eternal and unchangeable law of action which is based on the reason of things. If men, through violation of this law, incur God's wrath, repentance and reformation are the only means of obtaining God's favor and forgiveness. That these truths may make a greater impression, the gospel declares that God has appointed a day of judgment and retribution. The law of nature is thus the essential content of the gospel. It is no historical account of facts, as Christ's death, resurrection, &c., for it was preached to the poor before these events occurred. Nor do the private opinions of the evangelists and apostles form any part of the gospel. Like Tindal, Chubb comes to the conclusion that the true gospel of Christ is identical with natural religion. The greater portion of the *Posthumous Works* is taken up with *The Author's Farewell to his Readers*, in which he comes to a skeptical conclusion regarding a particular providence, the efficacy of prayer, and a future state of existence, although he thinks that man's responsibility affords some probability of the latter. He rejects the Jewish revelation, because it sullies God's moral character. Mahometanism, he thinks, could not have prevailed by the sword alone; "it must have prevailed to a very great degree before the sword could have been drawn in its favor." He believed there was a man Jesus, who collected a body of disciples, and laid a foundation for a new sect among the Jews. His objections against the prophecies and miracles are often far-fetched, and contain nothing beyond what had been urged by previous writers. It lends a special interest to Chubb's representation of primitive Christianity that he insists on the fact that it was a gospel for the poor. There is thus a democratic tendency in the view he takes of the gospel. He represents the rise of deistical notions among the artisan class.

CHUNAR, or CHUNARGHUR, a town and ancient fortress of India, in the district of Mirzapur, in the North-West Provinces, situated on the south bank of the Ganges. The fort occupies a conspicuous site on the summit of an abrupt rock which commands the river. It was at one time a place of great strength, and still contains a magazine, and is fortified with batteries. In the old citadel on the height, the remains of a Hindu palace with some interesting carvings indicate the former importance of the place. The town, which consists of one or two straggling streets, contains a handsome English church. Chunar is first mentioned in the 16th century, when in possession of Sing Joanpore. In 1530 it became the residence of Shere Khan the Afghan, and forty-five years later was recovered by the Emperor Akbar after sustaining a siege of six months. It fell into the hands of the English under General Carnac in 1763 after a prolonged resistance which caused considerable loss to the assailants. A treaty with the nabob of Oudh was signed here by Hastings on behalf of the East India Company, in September, 1781. Population, 11,000.

CHUND, or CHAND, or CHANDRA-BARDAI, a Hindu writer belonging to the 12th century, was court-poet to the last of the Hindu sovereigns of Delhi. His poem is an encyclopædic work of immense size. It includes a history, and especially an account of the exploits of the author and of his master. It is still popular among the Rajputs. An account of Chund, with some translations of his poem, is given by Colonel Tod, in vol. i. of the *Transactions of the Royal Asiatic Society.*

CHUPRAH, a town of India, in the province of Behar, Bengal, situated on the north bank of the Ganges, 35 miles north-west of Patna. The town contains several mosques and pagodas, and some churches. It extends nearly a mile along the Ganges, and is not much above the level of the river. A considerable trade is carried on by the inhabitants in saltpetre, sugar, and cotton. The military station is separate from the town. Population about 30,000.

CHUQUISACA, the capital of Bolivia, also known as La Plata, Charcas, and Sucre. See SUCRE.

CHUR, the capital of the Swiss canton of Grisons, otherwise known by the French form of the name, Coire. See COIRE.

CHURCH. All who call themselves Christians agree in admitting that in the New Testament (and also, though in a more shadowy and less distinct manner, in the Old Testament) there is to be found frequent mention of a corporate body known as the church,—sometimes spoken of more fully as the Church of God, or the Church of Christ. It is referred to by its divine Founder as about to be built upon a rock (Matthew xvi. 18). In the book of Acts it has become a living reality, including apostles, elders, and laity,—holding a council, and making decisions upon most points of doctrine and of practice (Acts xvi. 4–22). In the epistles it is spoken of in terms of great magnificence, akin to the glowing language of prophecy. Christ, in His glorified humanity, is recognized as its head; it is in turn His body, His fulness, and His spouse.

The exact ideas involved in the word church, the questions concerning its powers, its nature and essence and modes of governance and continuance, its relation to Holy Scripture, and its relation to the state—have all been fruitful matters of controversy. These questions have emerged in a marked manner during the controversy with the Gnostics, the controversy with the Novatians and the Donatists, and those arising out of the Reformation. Hence among the writings of the fathers, bearing upon the nature of the church, may be specially named those of St. Irenæus in opposition to the Gnostics, of St. Cyprian against the Novatians, and of St. Augustine against the Donatists. The relations of the church to the state became subjects of discussion directly Constantine had made Christianity the religion of the empire. These relations are illustrated by the history of Arianism, Donatism, and Priscillianism, by the career of St. Chrysostom, and by the fierce conflicts of the Middle Ages between Guelfs and Ghibellines—the former siding with the Pope, the latter with the emperors. The contest between Philip the Fair and Pope Boniface, and that of Philip Augustus of France and John of England against Pope Innocent III. turned upon the same great controversy, again and again renewed during the Middle Ages. Some of the most striking mediæval illustrations of the conflict are to be found in the life of Occam, and in the *Divina Commedia* of Dante. The points in dispute have been keenly discussed by modern historians;—those of the 18th century, as Hume, Henry, Mably, being strongly on the side of the state; those of the 19th, as Guizot, Voigt, Michelet, Palgrave, Arnold, Bridges, Mill, and even Macaulay, and, to some extent, Milman, more or less emphatically advocating the cause of the mediæval church during at least a portion of the struggle.

The Reformation in great measure turned upon both sets of questions,—the relation of the church to the Scriptures and its relation to the state. Consequently, they occupy no small portion both of the controversial literature and of the political history of the 16th and 17th centuries. On the religious side they are illustrated by the lives and writings of Martin Luther, Calvin, Melanchthon, and the Continental Reformers generally, as well by those of Knox and of Cranmer in Britain, and of their Roman Catholic opponents, such as Ignatius Loyola, and in a later age by Cardinal Bellarmine and by Hooker, by Andrewes and others; and on the political side by such events as the Thirty Years' War, the Spanish Armada, the Revolution of 1688. The last two centuries have not witnessed any distinctively religious war. But these questions underlie the numerous "concordats" drawn up between the Church of Rome and various states in Europe and America, the entire history of Gallicanism and Jansenism, the Tractarian controversy commencing in England in 1833 A.D., and the contemporary discussion in Scotland, which ended in the Disruption of 1843 and the formation of the powerful and energetic body of Presbyterians, known as the Free Church. The disestablishment of the Anglican Church in Ireland raised cognate questions, and it is evident that disestablishment, already a fact in the United States, in France, in Ireland, and in some of the British colonies, may at any moment become a question of no slight political importance. Among more modern writers who have treated these questions may be named Bishop Warburton, De Maistre, the Rev. Sir W. Palmer, Rothe, Klee, the Abbé Mignet, Mr. Gladstone, Dr. Arnold, and many more, especially the commentators on creeds and confessions, as Möhler, Bishop Burnet, Bishop Harold Browne.

It remains to mention a few of the more prominent views and definitions prevalent among leading bodies of Christians.

1. As regards the church triumphant there would probably be little or no controversy. The great bulk of Christians would acknowledge it as "the whole body of the glorified, consisting of the holy angels and of the spirits of the just made perfect who have been redeemed by the merits (whether foreseen or actually wrought) of the divine Head of the church, Jesus Christ, the Incarnate Son of God."

2. But concerning the church on earth, definitions vary considerably. In the first place there emerges the important question, whether it is a visible or an invisible body. This is not the place to discuss which is the view set forth in Holy Scripture,—that being of course the very point at issue. It must here suffice to say that the disciples of Calvin (followed herein by a very large number, probably the majority, of purely Protestant communities) maintain that it is invisible; while the Lutherans, the Roman Catholics, the Oriental Christians, and the great bulk of the more famous Anglican divines (in accordance with the Anglican formularies) maintain it to be visible. This latter view is, it need hardly be said, the one all but universally adopted by the fathers and the schoolmen. In one passage, however, of his later writings, St. Augustine employs an expression at variance with his usual tone, and favorable to the Calvinistic view, by calling the church "the society of the predestined."

3. The relations considered to exist between the visible church and Holy Scripture must necessarily be those of co-ordination, or of sub-ordination on one side or the other. An impartial estimate of the Anglican formularies would probably be found to support that view of co-ordinate authority of Scripture and the church which is taken by a large body of her divines, such as Bishops Pearson, Bull, Kay, Dean Jackson, and others; though many of her adherents would undoubtedly incline, more or less completely, to that more Protestant view, which subordinates the church to Scripture, a view held most strongly by those bodies whose confessions of faith (as, *e.g.*, the Westminster Confession) seem to imply that the books of Scripture attest themselves as divine. In the Church of Rome there can be no question but that the church is placed above Holy Scripture; for though Scripture proofs of doctrine are always, if possible, sought by her controversialists, and referred to in her symbolical standards (as, for instance, the Tridentine decrees), yet the traditions preserved in the church are spoken of as to be venerated not merely as comments on the meaning of Scripture, but as deserving equal honor and reverence with Scripture (*Decret. Conc. Trident.*, sessio iv.). On the other hand, the Anglican formularies teach that Holy Scripture contains all things necessary to salvation (Art. vi.), though the church is described as the witness and keeper of Holy Writ and as having authority in controversies of faith (Art. xx.). The school of Anglicanism represented by Field, Hammond, Pearson, Bull, and Bramhall regards a judgment of the church universal, such as that of the Council of Nice against Arius, as "irrevocable, irreformable, never to be altered." (See Sir W. Palmer's *Church of Christ*, part iv. ch. iv.) The Eastern Church seems to place the relation of Holy Scripture to itself in almost the same position as this school of Anglicans, though it would perhaps lay somewhat stronger stress on the insufficiency of Scripture without the voice of the teaching and interpreting church. It may be remarked that in this, as in other matters, belief has from time to time been greatly influenced by the course of events. In the first age of Christianity, before the canon of the New Testament was formed, the church is almost everything (as Reuss and others have observed), and the Bible, which chiefly consisted of the Old Testament, was

subordinate. By about 200 A.D., when the gospels were becoming better known, the relation between Scripture and the church appears in patristic writings much more like one of co-ordination. During the Middle Ages, as the church's political power increased, Holy Scripture became more and more subordinate, until we find Dante complaining of the way in which not merely creeds and fathers but canon law and the decretals are studied instead of the Gospel (*Paradiso*, ix. 133). The Reformation necessarily caused a reaction, built, as it was so largely, on new translations and on the circulation of the Bible; and in the following century we find the successors of the Reformers laying more stress upon what is commonly called the verbal inspiration of the Scripture and its infallible authority than had been done for the most part by the fathers (except perhaps St. Augustine) or by the first Reformers, Luther and Calvin, and their contemporaries, who never seem to have sanctioned the famous *dictum* of Chillingworth, "The Bible, and the Bible only, is the religion of Protestants." Of late years the difficulties arising from science, philology, history, and criticism have tended to modify this view of the supremacy of Scripture. Not only in the unreformed communions and among Anglicans and Lutherans, but even in Calvinistic bodies, is this effect perceived. Thus we find an eminent Presbyterian divine, a minister of the Scottish Establishment, writing as early as 1848, "The living church is more than the dead Bible, for it is the Bible and something more" (*Life of Dr. Norman Macleod*). The comment made by Kant on the inconsistency of those Lutherans who virtually say "Go to the Bible, but do not find anything there except what we find" is well known (*Streit der Facultaten*).

4. Turning to the constitution and government of the church, it is singular that in none of the symbolical utterances of the leading Christian communities is there found such a definition of the church as would really include all that is believed by those respective bodies. Nor is it easy to supply the want by appeal to divines, though many have striven to set forth the "notes" of the true church (see, *e.g.*, Klee, *Dogmatik*, and many others). Neither the Roman Catholic Tridentine decrees nor the Westminster Confession supply any definition, and the one given in the nineteenth of the Articles of the English Church leaves the questions at issue between Rome and the Reformers, between Episcopacy and Presbyterianism, entirely open. For all would claim to represent that "visible church of Christ" which is there described as "a congregation of faithful men, in the which the pure word of God is preached, and the sacraments be duly ministered according to Christ's ordinance in all those things that of necessity are requisite to the same."

Concerning the question of government there are four leading views. The first is, that no form of government was instituted by the divine Founder of the church or His apostles, that there was originally no distinction between clergy and laity, but that officers were in due time appointed as might happen in any human society, for the sake of order and convenience. This view, which is probably that of the majority of Protestants at the present time, has found a thoughtful, devout, and highly gifted exponent in the historian Neander; while the difficulties of reconciling it with the New Testament are all set forth by two independent translators of his work, the Rev. J. H. Rose and Mr. Morrison. A second view is, that a government was in such wise instituted as rightly to claim a *jus divinum*, that this government resides in presbyters, and is handed down by succession through the presbyterate. This view was maintained by many foreign adherents of the Reformation, and in England by Thomas Cartwright, the Puritan opponent of Hooker, and an entire school of his day. They appeal to history, especially that of the Alexandrian Church, and to the fathers, more especially to St. Jerome. The third view resembles this in principle, but assigns the governance to a superior order, that of the bishops, and makes the succession pass through them. The Anglican communion acts upon this view, re-ordaining all ministers not episcopally ordained, but accepting Greek or Roman Catholic ordination; and it has been defended by many of the writers of the High Church school, above named, to whom may be added Bishop Bilson, and the able Scottish controversialist Bishop Sage in his work against Gilbert Rule. (See also Bishop Cotterill's *Genesis of the Church*, and article BISHOP.) This school lays great stress on the decisions of the œcumenical councils, of which it recognizes six or (according to Bishop Andrewes) seven before the division of East and West. This view, though strongly supported by the Eastern churches as well as by an historical and living school of Anglicans, is undoubtedly open to the difficulty, acknowledged by Mr. Gladstone and others, of making the church as a collective body remain silent for some thirteen centuries and still unable to speak. There remains the fourth, the Roman Catholic view, which subjects the entire episcopate to the bishop of Rome, and makes full communion with him of the essence of churchmanship. This view has been supported ever since the Middle Ages with immense zeal and learning by many able Catholic writers. Although a strong case against it has been made out from the fathers, especially the Eastern ones, and although the state of matters just before the Reformation was everywhere one of gross abuses and much superstition, yet the good points of the Papacy have been fully recognized by Protestants and Anglican writers, such as Guizot, Michelet, Comte, Ranke, Sir James Stephen, Dr. Arnold, Archbishop Trench, and Bishop Harold Browne. Nevertheless, the increasing development of the Papal claims has been strongly resisted within the pale of that church by the Jansenists, by the Gallican divines such as Bossuet, and by the entire body of the Port Royalists, including such brilliant names as those of St. Cyran, De Sacy, Arnauld, and above all Pascal. All these display a Calvinistic element in their teaching, and more or less (as for instance Fleury in his famous Church History) modify the distinctively Roman characteristics most opposed by Protestants, and they place a general council far above the Pope. In our own day the counter-theory among Roman Catholics, of which De Maistre was a leading spokesman, has been seemingly ratified by the Vatican Council and the Pope declared infallible. This extreme step has provoked a schism among Roman Catholics, and alienated some of their most eminent men.

Of the different views entertained concerning the relation between church and state, it must be enough to say here that occasional collision seems almost unavoidable. For where two independent societies lay claim to a common ground, those claims, unless precisely defined, will sometimes militate. No state has yet been known to carry out the theory of Locke, and confine its attention purely to the preservation of life and property. But every state which considers public morality to be within its sphere, and legislates on such matters as marriage and education, must of necessity occupy to some extent the same ground as the various Christian communities which claim to be the local church. (J. G. C.)

CHURCH HISTORY. In this article we shall consider (1) The Definition, (2) The Sources, (3) The Method, and (4) The Literature of the subject.

Considered as a department of universal knowledge, church history forms a special section of the religious history of mankind. It is an account of the growth and the transactions of the religious community which is marked out from others by its attachment to Christianity. This definition already excludes from consideration a region of inquiry important in itself, which is sometimes regarded as forming an integral part of the subject. Starting from that idea of the church which is represented etymologically by the undoubtedly false derivations of the word from the German *küren*, to choose, or the Greek *κύριον οἶκος*, the (figurative) house of the Lord, various writers have assumed the church to be that special section of mankind who in any age have enjoyed the true revelation of God as given by himself, and they have in consequence regarded church history as bound to deal first with the Old Testament church and then with the church of the New Dispensation. This, however, involves an amount of dogmatic prepossessions to which history, simply as such, cannot commit itself. Surveying the field of mere objective fact, history can single out, under the general appellation of the church, a great society whose origin can be distinctly traced up to the personal activity of Christ, who, for this society, forms a definite and wholly new historical commencement. Whatever etymology we assign to the word *church* under its various modifications of *kirche*, *kirk*, *kerk*, *cyrkew*, *zerkow*, &c.,—whether we follow the derivation suggested by Walafrid Strabo in the 9th century, and extensively held since, from *τὸ κυριακόν*, the Lord's house, as a term introduced by the Greek missionaries into the language of the heathen

tribes whom they converted, or whether we adopt the not less probable conjecture of Lipsius, and ascribe its origin to "circ" or "cerc" (connected with the Latin *circus*), the local name for the temple of Northern paganism, adopted by ancient and mediæval Christianity, in conformity with its principle of accommodating itself as far as possible to the usages of its proselytes—there can be no doubt that the community and the movement, which, under some form of the name *church* among the Germanic races, and of the name *ecclesia*, such as *église*, *chiesa*, &c., among the Latin nations, succeeded in subjugating the Roman empire, along with extensive regions beyond it on all sides, to a religion whose personal centre is Christ, form a fresh phenomenon in the history of mankind, as distinct and individual in its character as Hellenism, Hinduism, or Mohammedanism. In the view of history proper, therefore, the history of Judaism cannot be taken as forming a part of the history of the church.

For the same reason history cannot take action upon a class of distinctions recognized by many who assume the functions of the church historian. Such writers, adopting some strict and special definition of the church, confine the work of church history to that section of professing Christians whose condition satisfies the terms of their definition, any other so-called division of Christendom coming in for a share of attention only in the narrative of the opposition encountered by the church. History, in the proper sense, cannot undertake to decide questions of this description. To say which among many competing churches is the true church involves a dogmatic deliverance, which is beyond its province. It must do its work in a more rough and general fashion. Under the name church it comprehends all organizations avowedly basing themselves upon Christianity and recognizing Christ as in some sense their head and leader. It undertakes to delineate the story of these in the aggregate; and with regard to the distinctions between them, and their pretensions to condemn and exclude each other, it confines itself to narrative, without attempting adjudication.

Another limitation has to be introduced into the definition of church history, when regard is had to the exact point of time at which it ought to begin. The church did not come into full-formed existence in a moment. Regarded as a community with more or less of an organization upon a Christian basis, and conscious of itself and of its aim in the history of the world, it was the result of the activity of Christ and his more immediate apostles and followers. The history of what they did in giving existence to the church, as such, is a different thing from the history of the church when once existing in that character. The case resembles the difference between embryology and biography in the history of the individual. The precise point of time at which the formative activity of the church founders issues in the actual church is probably to be determined by the emergence of the consciousness of a common Christian life and aim among the separate communities originally established by apostolic labor. By some writers this is placed as low as the destruction of Jerusalem, by others as high as the first rallying of Christ's followers after his own disappearance from the world. In any case church history is relieved of a large amount of work with which it is sometimes burdened, but which does not properly fall to its share.

What church history has to do within the limits thus indicated will perhaps be best understood by considering its province as a department of scientific theology, and its relations to the theological disciplines with which it stands most closely connected, those, namely, of dogmatics and the history of doctrine. Strictly speaking, the history of doctrine is part of the history of the church. To exhaust its task, a history of the church must embrace at least *five* departments of inquiry and narrative,—*one* connected with the external relations of the church to the world at large and its political institutions, the remaining *four* treating of developments and relations internal to the church itself. (1) The PROGRESS of the church must be described, either positively, in respect of its advance, or negatively, with reference to its retrogression, at any given period. To exist at all, it must exist under one or other of these conditions; it must be either attaining or missing, approaching or receding from, its rightful influence on the social condition and political organization of mankind. (2) Its CONSTITUTION must be described. The church exists as such, in virtue of its constitution. It is not the church until it is to some extent organized, and the growth and forms of this organization must be recorded. (3) The DOCTRINE of the church at the various points of its development must be set forth. Doctrine is the full and finished expression of conviction, and since the church owes its existence to certain convictions, some religious, some moral, the history of doctrine occupies the very central position of the church's history. (4) WORSHIP, under one form or another, is an essential development of church life, as well as one of the modes in which it announces its existence, and calls for historical recognition. (5) LIFE, as exhibited in the number and character of the members of the church, completes the division of the matter of its history. Doctrine and worship are directed to certain practical ends, either of making proselytes to the church, or of perfecting the character of those who already belong to it, and any such results must be collected and presented both in their numerical and their moral aspects.

But while the history of the church, in the strict and comprehensive sense, must treat fully these various classes of activity, there is a narrower, if also a somewhat looser sense in which it may be taken, for ends of practical convenience. We may distinguish between the organization and its life, between the church and Christianity. On this view, doctrine, worship, and life fall to be treated collectively by the history of the Christian religion or in separate histories, while the history of the church becomes a narrative of the successes or defeats experienced in the world by the Christian community and the varying forms of its constitutional framework, with only such allusions to the internal and religious side of its life as are necessary to explain its constitutional changes and external fortunes. By this division it becomes possible to treat both the inner and the outer sides of the subject, each for itself, and therefore more fully and vividly. In this way, since doctrine lies at the foundation of worship and life, and even constitution, the history of doctrine becomes the key to the whole history of the church, and the indispensable preliminary to a scientific comprehension of it. The life and action of the church in the world are simply the expression of the ideas by which it is governed; and it is the business of the historian of doctrine to record the vicissitudes and developments of these, whether he writes in the interests of mere knowledge and with absolute impartiality, or, as is more common, though less scientific, with a bias in favor of a certain class of ideas, all divergences from which he chronicles as errors. The difference between church history read in the light of the history of doctrine and apart from it is like the difference which the phenomena of health and disease present to minds that possess or that want an acquaintance with the principles of physiology.

Church history, including or co-ordinate with history of doctrine, stands in an important relation to dogmatics. Dogmatics (which also contributes the formal as well as, in part, the material element in Christian ethics) is charged with the scientific statement and proof of whatever is held to be the true doctrine. In the sphere of statement the history of the church is necessary, both as introduction and commentary. Doctrine is a growth, an evolution of part after part, under the influence of special circumstances at special times. The full meaning of doctrine can therefore often be understood only in the light of its antithesis, and its relative importance as essential or accidental ascertained only from the practical crisis which demanded its declaration,—aids for which recourse must be had to the history of the church and its doctrine. As regards, therefore, the scientific articulation, proportioning, and interpretation of doctrine, church history stands in the position of an essential preliminary to dogmatics.

As regards actual church life, and any new expression of it in worship, constitution, or propagandist effort, that assumes to be based on scientific principle, the history of the church is indispensable, not only for the extended view of present circumstances that may be requisite, but also to enable the church fully to know and judge its own mind. The existing church consciousness is the product of all the past, and cannot be fully understood and criticised except in the light of its history.

2. The SOURCES of church history are either Monumental or Documentary. Monumental sources yield such intimations of past transactions as are to be found on avowed monuments, memorial tablets, gravestones,

churches, and other public edifices or private dwellings, or upon articles of antiquity, seals, crucifixes, furniture, vestments, pictures, coins, weapons, &c. Documentary sources, as their name implies, include all manuscript or printed information, whether originals, copies, or oral traditions committed to record. In point of comparative value, the documentary sources are, of course, the more important, being, from the nature of the case, so immeasurably richer in information. At the same time, within their own range, monumental sources are often more valuable than documentary. Forgery has less chance of success in monuments than in documents; and certain classes of facts are frequently commemorated on them which writers do not think of recording. Dates and names and the like have been fixed by inscriptions on coins, &c., where documents have proved defective or wrong.

Documentary sources may be divided from the point of view of their destination into (1) Public and (2) Private, and from that of their authorship into (3) Direct and (4) Indirect. Under the head of public documents we have all deliverances of an official character, such as decrees of councils, Papal bulls, civil legislation affecting the church, rules of life for monastic institutions, liturgies, confessions of faith, and even sermons, theological treatises, &c. Private documents, again, consist of personal memoirs and journals, letters, secret correspondence, and papers not originally intended for the public eye. Then by direct documentary sources are meant those in which we have the actual word of a writer or actor in any event testifying to the nature of the opinion or transaction about which information is desired. Indirect documentary sources are those in which we obtain information about the opinions of an author or the actions of any historical character, not from statements of his own, but from the testimony of some one else about him. Thus a letter of Constantine would be a direct document in reference to some purpose or performance of his own, while it might be an indirect document in reference to the history or opinions of Athanasius or Arius.

In collecting and sifting these sources so as to place all and only the right materials available before the church historian, recourse must be had to the sciences of antiquities, bibliography, and diplomatics. Antiquities, in its various divisions of numismatics, ecclesiology, heraldry, &c., marshals all the relevant monumental testimony and discriminates the spurious from the genuine; bibliography, taken in its widest sense, as the science which enumerates, classifies, and values all that has been written upon the various heads of human knowledge, states what documentary material is likely to be available at the different stages of inquiry, and where it is to be found; while diplomatics, or the science of documents, defines the genuineness, completeness, and general trustworthiness of the material so indicated.

Besides these more immediate sources there are collateral sources on which church history must draw in fulfilling its task. These are mainly ecclesiastical philology, the general history of Christendom, with ecclesiastical geography, statistics, and chronology. Ecclesiastical philology points to acquaintance with those languages, more particularly Greek and Latin, in which the chief part of the historical materials is expressed, whether as original or translation. The necessity of this is obvious. Besides this, some knowledge of the general history of Christendom is indispensable to an understanding of the history of the church, just as the special history of the church is essential to a comprehension of general history. The events of the church and of the world are so inextricably bound up together that the one are intelligible only in the light of the other. Hence the history of policy, law, philosophy, literature, and art must be laid under contribution in constructing a full history of the church. Clear treatment further requires acquaintance with ecclesiastical geography and statistics, the distribution of the world into Christian and non-Christian sections, divisions by patriarchates, dioceses, parishes, &c., and the physical characteristics and social habits of different localities. And along with this, ecclesiastical chronology, the correct arrangement of persons and events, both in their contemporaneous appearance and in their succession to others, is requisite to complete the list of auxiliaries to church history.

3. After the Sources, the METHOD of dealing with them, so as to produce history, falls to be considered. Method here comprises two main divisions,—(1) Criticism and (2) Construction. In the criticism of the materials two qualities have to be called into exercise,—the judicial faculty and historic insight. The judicial faculty has to determine two questions,—first, How far are the sources to be relied on? and second, If to be relied on, what do they really say? The question how far the sources are to be relied on depends on both the ability and the willingness of the writer to tell the truth. As to his ability, we must consider how far he was in a position to be aware of the facts, and to what extent his judgment and penetration are to be trusted in matters of fact. He may have been credulous, or an incompetent or careless observer, or he may have been so greatly biased by party feeling or personal animosity as to be incapable of forming an impartial opinion. Then, besides the writer's ability to tell the truth, there must be considered further his willingness to tell it. A writer may be perfectly able to tell the truth, if he likes. But he may not like. He may have reasons or motives of his own for withholding the truth, or even for substituting untruth. In using his sources the historian must be able to judge exactly how far they are in these respects to be relied on. Then supposing he has decided that they may be relied on in a given degree, he must next be able to take from them precisely the testimony as to past fact which they convey, neither more nor less. That is to say, he must be impartial,—capable of holding the scales of fairness evenly, of controlling his mind so as to prevent any preferences of his own from weakening or distorting the statement of fact derivable from his authorities, in favor of his own opinions. The historic insight, which, in addition to the judicial faculty, is essential to the thorough criticism of the materials, is the power of fully comprehending the significance and connection of the facts yielded by the sources, by realizing the point of view of the actors or writers to whom the facts dealt with are due, and determining their import as related to a general philosophy of history, and embraces three forms of insight, which may be called philosophic, psychologic, and Christian. Philosophic insight implies, first of all, ability to enter into the various forms of speculative thought, metaphysical, ethical, or whatever else, that have appeared within the church's history, and have in greater or less degree influenced its movements. It implies further an ability to see the whole recorded facts and their connection under the light of the philosophy of history; but as this obviously cannot take place until the facts in themselves have been completely understood, this aspect of philosophic insight will come into play only when the others have discharged their function. By psychologic insight is meant knowledge of human nature affected by scientific observation of mind and its operations. The facts of history are created by individuals, and each of them may be interpreted as an exhibition of the will and intellect, of the general subjective state of some one man or body of men. This subjective state, again, may be accounted for, in part at least, by the action of certain preceding facts upon the mind of the man or men in question, which facts again are to be explained as a manifestation of the mind of some preceding man or men, and so on. In short, history is the product of human nature, affected by and dealing with certain external data, natural or supernatural, furnished by God; so that, to understand it, there is needed the ability to place before the imagination what human nature is at any point in or between the moral extremes of goodness and wickedness, and the intellectual extremes of wisdom and folly. By Christian insight is meant special capacity for sympathizing with the spirit and ideas of Christianity. What we have in the history of the church is centrally the mind and motive of Christ organizing itself in a living institution that it may enter into conflict with the evil of the world, and by persuasion subdue it to willing submission. To comprehend the development of facts produced during the activity of such an institution, there would seem to be requisite at the very outset an understanding of the thought and feeling that constitute its inner life; that is to say, there must be an intelligent sympathy with the spirit of the New Testament, which, as the primitive record of the action of Christ's spirit and career, is, were it on no other ground, the authoritative exposition and medium of the mind of Christ. And not only must there be this acquaintance with the ideas and spiritual impulses of the New Testament, but there would appear to be also necessary

some experience of their power. If Christianity be not merely a series of intellectual propositions, but a spiritual force penetrating to the motives of the soul, it can scarcely be adequately comprehended by any one who has not known what it is to yield in his innermost being to Christian influences. For while many of the greatest occurrences in the history of the church have sprung from the spirit of evil, and are fully intelligible to the historian only in virtue of his own experience of at least germinal evil, a vast number of other events are due to men who were in their degree reproductions of Christ, animated by the single desire to bring about what they believed he would have sought had he been in their circumstances, and ready to submit to any sacrifices that might be demanded as the price of success. To understand fully the genesis of transactions arising out of such a spirit would seem possible only to those who possess the key to their explanation in what is essentially Christian experience.

The historical materials having been subjected to criticism of the kind indicated, the way is open for the actual construction of the history. Construction embraces arrangement, proportion, and style. Under the head of arrangement there falls to be considered how the material of history is to be divided so as to give the most complete and just conception of what has occurred within the time to be dealt with. It is obvious that we cannot take in all the events of so great a narrative at one view. We must break it up into a succession of parts, and study each by itself; and the question is on what principle should this partition of time be made. In history the element of time has to be considered in two phases—succession and contemporaneousness. Biography properly records succession alone. An individual can do only one thing at once; whereas a society like the church, consisting of a number of individuals, can be doing a number of different things at one and the same time. Proselytism, worship, the development of sacred art, the formation of doctrine, the activities of Christian life, may all be in progress simultaneously. Biography is a thread; history is a web, in which time is broad as well as long. In dividing the breadth or contemporaneous movement of the church, no other classification is possible than that natural one, which has already been mentioned, into some such categories as progress, constitution, doctrine, worship, and life. But in dividing history lengthwise, there may be a choice of principles, unless indeed it be denied that events hang together by a causal nexus. The time was when such a denial would have been maintained, when the history of the church was regarded as determined by a series of special interpositions of the Divine will, resulting in a succession of events among which it was not given to human reason to trace the sway of law. That view of things, however, has passed away, and for the modern mind, whatever may be thought of the origin of the church, its history is a sequence of cause and effect, in which the moving forces and tendencies can be accounted for, and their operation traced as the evolution of internal ideas dominating the events of distinct periods, and shaping them into orderly processes. Hence arises the possibility of a natural and an artificial division of history. Arbitrary periods such as centuries or half centuries may be chosen, and an acquaintance with the events of one of such sections acquired before proceeding to those of its successor. This is the artificial mode of division. It has no reference to the nature of the progress made by the church as a growth which is determined by an inner formative thought. But a division in harmony with this latter view of things is possible. There are for instance in the history of the church greater or smaller crises continually occurring, for which the intermediate events are preparations; or there is a certain character stamped upon one era different from that which belongs to another. The conversion of Constantine, or the sitting of the Councils of Nice, Trent, or the Vatican, is an instance of the one; the prevalence of the ancient and patristic, the mediæval and scholastic, the modern and scientific mode of thought is an instance of the other. Divisions of the matter of church history according to such events or characteristics are natural divisions; they correspond with the nature of the thing, and rise out of the subject itself, instead of being imposed upon it from without, like the divisions into centuries and half-centuries, which in many cases may lead to a misconception of the meaning of history, cutting into the very middle of a development before it has reached its climax, so rendering both parts unintelligible, or at all events misrepresenting both. The natural division is thus much better adapted than the artificial to impart a view of the subject as it exists in its real parts. If a framework is to be taken to pieces, with a view to understand its structure, it ought to be separated at the joints, not broken, as it were, across the bones. At the same time, within the great natural periods, once their limits and determining conditions are clearly understood, the subdivision into more or less artificial periods of years facilitates the taking up of all the requisite information as we go along, very much as in a long journey, when once we know the direction or destination of travel, it is necessary to divide the intervening space into such arbitrary stages as are suitable to our footsteps or other modes of progress.

Proportion has to be considered in the construction of church history for two reasons,—one depending on the relative prominence of different phases of church life at different times, the other on the relation of church life to its territorial or sectarian distribution. As regards the first of these reasons, while the categories of progress, constitution, doctrine, worship, and life furnish, in the order of interdependence, a summary of headings under which the movement of the church at any time may be exhaustively described, it is obvious that whichever of these categories represents the main feature of the ecclesiastical condition during any particular period should receive a corresponding prominence and fulness of treatment in the history of the period. At one time the progress of the church in the conquest of adverse religions may be the most striking thing about it, at another it may be the formation of doctrine, at another development of ritual, and so on. To be a faithful reflex of the facts, history must proportion its treatment to the case, assigning the principal place to the principal thing, and grouping the rest around it. The other reason for observing proportion in historical treatment lies in the territorial and sectarian distribution of the church's life. National almost necessarily imply ecclesiastical distinctions. The German, Swiss, French, English, Scottish churches, &c., have all separate domestic histories, so that while one has been growing in one direction, another may have been growing in a direction entirely different. Controversial differences have had the same result. The Eastern and Western churches for example, ever since the period of the final schism, have had in each case a self-contained development. The same remark applies also to Protestantism and Catholicism, in regard to that vast extent of thought and action in which they are separated from one another. This state of things compels many to specialize their work, and to pursue one national or sectional stream of ecclesiastical movement to the end, before exploring another; but wherever church history on anything like the universal scale is attempted, the writer must determine where and how the vitality and force of the church are for the time evolving themselves most characteristically and influentially, and give to such localities or forms the central position in his delineations. Thus in the earlier centuries, the East, the conquest of paganism, and the rise of theology may claim his chief attention; in the Middle Ages, Rome and the Papacy, or scholasticism; in the Reformation period Germany may seem the centre of Christendom; in the modern period the disintegrating influence of philosophy and historical criticism may be regarded as the leading phenomenon, &c.

With respect to style, apart from the general canons on the matter derivable from the science of rhetoric, there are one or two special conditions dictated to the church historian by the nature of his subject. He is engaged on a description of what is a lively and varied panorama of events—his model, therefore, should be the picture, not the inventory. He is dealing with the progress of a divine idea through the ages—he is bound to leave a certain impression of majesty on the mind of his reader. He is handling matters that concern all men, and that have moved the profoundest and the most passionate natures to the very depth of their being—his pages should be alive with genuine biographical interest and every relevant form of human sympathy.

4. The history of the LITERATURE of the subject divides itself naturally into three periods, which may be called the Unscientific, the Transition, and the Scientific periods. Speaking roughly, the Unscientific period may be said to have lasted until the Reformation, the Transition from the

Reformation to the time of Mosheim, and the Scientific since then.

The Unscientific period of church history is marked by the absence of impartiality, of thorough criticism, of natural arrangement, and of what, since the days of Polybius, has been called the pragmatic method, *i.e.*, the treatment of historical phenomena with reference to their causes. The idea of the subjection of history to law had not yet emerged. The church especially was governed by arbitrary divine interpositions, whose effects could not, in any degree, be calculated beforehand; and as the conception of general councils as the organs of the Holy Spirit gained ground, that of ecclesiastical events, and particularly doctrine, as developments in the sequence of ordinary cause and effect vanished more completely if that were possible. History was simply a collection of incidents, often incredibly marvellous, threaded by no connection except that of appearing to intimate the favor of God for the Catholic church, and with no other arrangement than the arbitrary one of years, or decades of years, or of the reigns of emperors or popes. This was simply the period of the collection of materials for subsequent scientific history to sift and work into proper form. During the first six centuries the Greek church furnished almost all that was valuable in church history, but after that it ceased to be productive, and Latin writers took possession of the field. At the head of the Greek School stands Eusebius, bishop of Cæsarea in the earlier part of the 4th century, usually called the father of church history, although that title strictly belongs to Hegesippus, who about the middle of the 2d century wrote certain ecclesiastical memorials, all of which have perished, with the exception of a few fragments mostly preserved by Eusebius himself. The history or chronicle of Eusebius, coming down to 324 A.D., although impaired in value by the writer's avowed resolution to record only what would reflect honor on the church, is rich in material, the archives of the empire having been placed at his command by Constantine, who held him in peculiar esteem. The other Greek historians were simply continuators of Eusebius. Socrates and Sozomen brought down the narrative to 439, and Theodoret to 428. Of these Socrates writes the best style, while Theodoret gives most new documents and information, especially as to the East. Evagrius treated of affairs from 431 to 594, while Philostorgius, most of whose work is lost, wrote, in the Arian interest, a history from the rise of Arianism to 423. The only other Greek historians of any note are Eutychius of Alexandria, about 940, who is chiefly valuable on the relations of Mohammedanism and Christianity, and Nicephorus Callisti of Constantinople, about 1350, who, with the assistance of the documents in the library of St. Sophia, wrote a church history to the end of the 6th century. To these may be added, as completing the Greek sources, the ecclesiastical allusions in the long line of Byzantine civil historians from 500 to 1500.

Among the earlier Latin writers, Rufinus translated Eusebius and added an indifferent continuation of his own to the end of the 4th century. Sulpicius Severus, a terse writer, sometimes called the Christian Sallust, wrote a history from the creation to the year 400. Cassiodorus, in the middle of the 4th century, first a Government official of the Ostro-Gothic empire, and latterly prior of a monastery, caused a condensed translation of Socrates, Sozomen, and Theodoret to be made, which continued to be authoritative until the revival of letters. From this time to the Reformation, a great amount of historical material was produced both in the form of chronicles and of special and general history. Among the chroniclers may be mentioned the venerable Bede, Regino, Otto of Freisingen, Hermannus Contractus, Lambert of Aschaffenburg, Siegbert of Gemblour, with such anonymous chronicles as that of Monte Casino, the great Belgian, the Saxon, &c., to which may be added, although it forms perhaps more of a general history, the *Liber Pontificalis*, or lives of the popes to 885, of uncertain authorship. Of the writers of special historics are worthy of mention—Gregory of Tours, the historian of the French church during the 5th and 6th centuries, and the father of French church history; the venerable Bede, the father of English church history, and its narrator to the middle of the 8th century; Paul the deacon, who did the same office for the same period in the case of the Lombards; Adam of Bremen, the authority for Scandinavian church history from the 9th to the 11th century; and Kranz, who died the year that witnessed the outbreak of the Reformation, and who furnished sources for the ecclesiastical history of Saxony and Westphalia. Of histories of the universal church during this period may be mentioned those of Haymo of Halberstadt in 840, embracing the four first centuries; of Odericus Vitalis, from the Christian era to the 12th century; and of Bartholomew of Lucca to the 14th; while the greatest work of pre-Reformation times on the subject is the *Summa Historialis* of Antoninus of Florence, narrating events from the creation of the world to 1459. All these works, it must be remembered, are full of legends and fables, and exhibit a credulous spirit.

The Transition period in church history may be taken as beginning with the Reformation. It was marked on all sides by a more searching and comprehensive survey of the sources, and on some sides by an absence of the credulity, which accepted tradition as genuine, and every act and utterance of the dominant church as divinely guided. It was, however, still for the most part devoid of the spirit of impartiality and of the idea of law as traceable in the succession of events, and consequently recognized no great and gradually evolved crises in history, naturally dividing it into periods. It was an approach to the scientific, without actually reaching it. It was stimulated and aided by the same causes which assisted the Reformation itself. The spirit of inquiry was abroad. Already, in the field of the history of the church, Laurentius Valla had led the way in the direction of true criticism by discrediting the legend of the donation of Constantine, in which he had been followed to a certain extent even by Antoninus. The rise of humanism, consequent on the fall of Constantinople and migration of Greek scholars to the West, had unlocked the storehouse of material contained in that language, while the invention of printing, by bringing the sources under the eye of an immensely enlarged and practically unlimited circle of observers, increased proportionally the chances of unpledged criticism. It was the shock of the Reformation itself, however, which gave the impetus to the new movement in the construction of church history. As Protestantism had everywhere broken more or less completely with tradition, it was for its interest to show that Catholicism had departed from primitive purity, and that the history of the church had been a steady course of declension, while Catholicism was equally interested in proving the contrary. This polemical animus, if it was prejudicial to impartiality of investigation, added to its keenness and thoroughness; and as the spirit of sectarianism developed, within Catholicism, between Ultramontanism and Gallicanism, Jesuitism and Jansenism, and, within Protestantism, between Lutheranism and Philippism, Calvinism and Arminianism, Presbyterianism and Episcopacy, the zeal of each party to vindicate for itself an exclusive apostolical pedigree, led to an unflinching, if one-sided, sifting of history, especially of primitive antiquity. The way was led in this direction by the *Magdeburg Centuries*, so called from the place of first publication in 1559. This was a work written by a staff of Lutheran scholars in the interest of their phase of Protestantism, under the superintendence of Matthias Flacius, and was, from its own point of view, a performance of great ability and learning, continuing for a century to be the store-house of general Protestant polemics. As its name implies, it adopts the artificial division into centuries, discussing the doctrine, heresies, councils, ceremonies, church rulers, &c., in each. The published portion stops with the 13th century. The *Centuries* evoked on the Catholic side, in 1588, the *Ecclesiastical Annals* of Cæsar Baronius, afterwards cardinal, bringing the history down to the end of the 12th century; and this, with the continuations of Raynaldus and others, and the critical commentary of Pagi, forms, from its richness in documents that would otherwise have remained inaccessible, a very valuable contribution to general church history, although written avowedly to present Catholicism in the most favorable light. These great polemical histories led the way for a train of successors on both sides. Kortholt, Spanheim, Casaubon, and Basnage criticised with learning and vigor the one-sidedness of Baronius. On the Catholic side, a brilliant French school of church history arose, whose chief ornaments were—Alexander Natalis (Noël), whose history (1676), valuable for its learned excursuses, though placed in the Index on account of its Gallicanism, continues under the corrective commentaries of Noncaglia and

Mansi to hold a deservedly high place even in Catholic esteem; Bossuet, whose *History of the Variations of Protestantism* (1688) exhibits the dextrous controversialist not less than his *Discourse on Universal History*, displays the philosophical historian; Fleury, who narrates, with a tinge of Gallicanism, the story of fourteen Christian centuries in a style as popular and flowing as Natalis, is crowded with erudite discussion; and Tillemont, the Jansenist, who in his *History of the Emperors* (to Anastasius) (1690), and his *Memoirs for the Church History of the six first centuries* (1693), has ransacked the whole field of available materials, and presented, with much skill and fidelity, his narrative, in the exact words of his authorities. In the meantime a school of history had developed itself in England, also in answer to controversial wants, of which Jewel (*Apology*, 1562), Pearson (*Vindiciæ*, 1672), Beveridge (*Synodicon*, 1672), Cave (*Primitive Christianity, Lives of the Apostles and Fathers*, 1672–77), and Bingham (*Antiquities*, 1708–22) may be mentioned as leaders in the defence, on historical grounds, of the position of the Anglican Church both against Catholicism and Puritanism.

The Scientific period of church history may be said to commence with the great work of Mosheim in 1755, based on an earlier but inferior performance. Isolated attempts had indeed been made before his time to rise above the heated polemical atmosphere of the Reformation struggle and its results, into a region of calmer contemplation. The celebrated Calixtus of Helmstädt had, during the earlier part of the 17th century, labored hard to show that the tendency to the multiplication of dogma characteristic of his time is foreign to the genius of Christianity, whose essence, in his view, may be reduced to a very few points of faith; and Gottfried Arnold, sometime professor at Giessen, had, in 1699, published his *Impartial History of the Church and the Heretics*, the practical issue of which was to show that the heretics were quite as often in the right as the church; but the only immediate result of their efforts was to raise a violent storm of opposition and abuse against themselves, proving that the time was not ripe for applying the maxim of *audi alteram partem* to ecclesiastical questions. But by the middle of the 18th century, a different state of things had arisen. The living fire had died out of theological and ecclesiastical controversy, leaving behind only confused piles of dogma, charred and cold, to which none thought of repairing for heat. The speculations of Descartes, Spinoza, Leibnitz, Wolf, &c., had given the world something deeper to think about than the disputes of ecclesiastics, and had engendered that spirit of thorough inquiry after reality, which in the theological sphere came to be called rationalism, and in physics the inductive or Baconian method. In the latter form it had exploded the conception of continued arbitrary supernatural interference in the course of events, and established the belief in the reign of law, the statutes against witchcraft having been abolished even in England by 1736, a few years after the last execution there for that imaginary crime.

Mosheim may be called the first fruits of this spirit in the region of church history. His *Institutes of Ecclesiastical History* is constructed avowedly in the interests of science and not of party, with the sole view of stating the facts, fully and exactly as they occurred—ascertaining and declaring the objective reality, independently of subjective partialities or wishes. His fidelity to his principle is conspicuous, and his success in overturning many previous misrepresentations arising from the neglect of it is undoubted. His conception of Christian history as a growth under the law of cause and effect is also unmistakable, although he leaves it to be inferred, not so much from the presence of any avowed pragmatic treatment in his pages, as from the absence of everything else. Although he retains the artificial division into centuries out of deference to custom, he acknowledges its objectionableness, and combines with it a natural division "bounded by great revolutions and changes in the state of the church." Mosheim has had a train of successors on his own line of investigation, whose name is legion, and in whose hands the scientific method has been steadily developed, and has yielded an increasing harvest of results. Only a few can be mentioned. Schröckh, an ornament of the Göttingen school of history, second only to Mosheim himself, whose pupil he was, labored for forty-one years (1768–1809) at a *Universal History of the Church*, and brought it down well through the period of the Reformation, two supplementary volumes by Tzschirner, not unworthy of their place, completing the period. This work, in 45 volumes, a huge monument of erudition, clearness, and fairness, is still the quarry of compilers. Giesceler, improving on the method of Tillemont, which had already been partially followed by Schmidt and Danz, in 1824 began his *Universal History of the Church* on the plan of exhibiting in his text merely such an outline of the results of his researches as should, without discussion, present a rapid and succinct view of the march and evolution of events, giving in ample notes the evidence from the sources on which the statements in the text are based. As a means by which a careful student may rapidly test the value of historical conclusions, Gieseler's work has no superior. A year afterwards, Neander, inspired by Schleiermacher, afterwards epitomized by Guericke, and popularized by Hagenbach, issued the first instalment of his *General History of the Christian Religion and Church*. The distinguishing characteristic of this great work is its emphatic recognition of the function of history to explain events from their causes, as well as to state them in their objective reality. Neander treats ecclesiastical institutions and events as the necessary outgrowth and embodiment of the peculiar condition of Christian ideas and aims at the given time, and his undoubted and profound sympathy with the essential spirit and conception of Christianity, and capacity for tracing these under various forms of manifestation, enable him to throw a light upon the facts of the church's history, and to account for them in ways that are always interesting, sometimes even fascinatingly so, whatever opinion may be ultimately taken of their critical accuracy. Ranke, although his work has been confined to special histories, has exercised a great influence on the course of scientific church history. In his *History of the Popes* (1834–6), and especially in his *German History of the Reformation Period* (1839–47), he has furnished a brilliant example of the method in which ecclesiastical facts in all their relations are to be investigated, arranged, and explained. But probably no writer of the century has left a deeper impress on the method of studying and constructing church history than F. C. Baur, who, from 1835 to his death in 1860, gave to the world a series of works bearing on this subject, and culminating in his great *Church History*, which, for wealth of erudition and variety of genius, gave him a unique position even in the land of great scholars that claims his fame. Whatever may be thought of his special conclusions, it is certain that since his labors, the study of the history of Christianity, especially during the earlier centuries, must be a far more thorough and profound thing than ever it was before. He may, as has been said of him, be too unwilling to admit the possibility of an entirely new germ of spiritual force in the inception of Christianity, he may be too much warped by Hegelian tendency to resolve all historical movements into an alternation of antagonisms and conciliation, but his vast mastery of details and marvellous power of marshalling far-scattered facts in support of a startling and unexpected theory have necessitated a new and more penetrating scrutiny of early sources, which is far from being completed at this hour. Some of his results will probably be found of permanent value, and it is certain that in his conception and working out of the history of dogma he has explained the formation of general ideas in theology, and their power in shaping the course of the church's history, in a way that was needed to counterbalance and supplement at once the objectivity of Gieseler, and the sentimentality of Neander.

In the Roman Catholic Church, of course, scientific church history in the true sense is not to be expected; but there have been movements towards it, and painstaking contributions have been made, which may prove useful in the hands of an unfettered writer. The great collectors of the Acts of Councils, Labbé, Hardouin, and above all, Mansi, we owe to the Catholic Church. Stolberg, Katercamp, Ritter, and Locherer have written the history of their church from separate points of view that are full of interest, while the names of Möhler, Döllinger, and Montalembert do not need to be further characterized. The manuals of Alzog and Krauz are of great value. Hefele's[1] *History of Councils* is a mine of thoroughly sifted information.

Besides the powerful but one-sided ecclesiastical chapters of Gibbon, the original researches of Routh and Bur-

[1] [Karl J. von Hefele (1809–89), a Würtemberger, Tübingen professor of history, bishop of Rottenburg (1869), opposed papal infallibility in Vatican Council, declined archbishopric of Freiburg—an eminent scholar.—Am. Ed.]

ton, and the splendid works of Milman on Christianity and Latin Christianity, replete with critical sagacity, graphic power, and philosophic insight, Great Britain has not produced anything that deserves to be set beside the Continental masterpieces. Much valuable material in the form of historical monographs, biographies, and archæological issues by individuals and societies has been produced both in England and Scotland, but nothing that deserves the name of a great church history, whether special or universal. The tractarian movement has stimulated a certain amount of antiquarian research, and Canon Robertson of Canterbury has compiled a useful history of the church to the period of the Reformation.

For the full bibliography of the subject, reference may be made to such manuals as those of Hase and Kurtz, which have been translated, and more particularly to the latest edition of Hagenbach's *Encyklopädie u. Methodologie der Theologischen Wissenschaften*, as also to the same author's article "Kirchengeschichte," in Herzog's *Real-Encyklopädie*, and Hefele's in Wetzer and Welte's *Lexicon*. (R. W.)

CHURCHILL, Charles (1731–1764), the satirist, was born in Westminster, where for many years his father held the curacy and lectureship of St. John's. At eight years of age he was sent to Westminster School, where he made no figure except by his irregularities. At nineteen he applied for matriculation at Oxford, but was rejected. He was afterwards admitted to Trinity College, Cambridge, which he quitted immediately, and to which he never returned. A Fleet marriage contracted about this time obliged him to retire, first to his father's house, and afterwards to Sunderland, where he began to study for the church. In 1756 he was ordained priest, and officiated in his clerical capacity at Cadbury, in Somersetshire, and at Rainham, in Essex, at which latter place he was obliged to eke out his living by teaching. On his father's death in 1758, Churchill succeeded to his curacy and lectureship, and officiated for some time, employing his leisure in reading the classics at a ladies' boarding school and with private pupils. But his innate Bohemianism was too strong to allow of such a quiet way of life for long together. He gave himself over, in conjunction with Lloyd the poet, who afterwards died in the Fleet, to every kind of loose living, ran into debt, was pursued, and had a composition of five shillings in the pound paid by the father of his boon companion. Part of the experience gained during this period he used in his first published poem, *The Rosciad* (1761), a reckless but amusing satire on the artists of the several London theatres, which was issued anonymously. The success of this work was astonishing; Churchill was not backward in avowing its authorship; and the same year he avenged himself on its critics in *The Apology*, a poem in which he adopted the systematic and scurrilous personality that was to make him rich and famous. He was at this time in his thirtieth year, and in the plenitude of his powers. His conduct, which had scandalized his parishioners, drew down the censure of his dean. The satirist at once resigned his charges, discarded his cassock and bands, and appeared *en viveur*. He separated from his wife, and apologized in the poem of *Night* (1762), which is a sufficiently impudent piece of irony; and in the same year he published, at irregular intervals, four books of Hudibrastic doggerel called *The Ghost*, in which Samuel Johnson and his associates are ridiculed with some point and much brutality. An acquaintance with John Wilkes, which seems to have ripened rapidly into friendship, gave occasion for two of Churchill's strongest efforts, *The Prophecy of Famine*, a violent attack on the Scottish influence and character, and *The Epistle to Hogarth*,—the latter, which is said to have hastened the great artist's death, being a reply to Hogarth's two caricatures of Wilkes and his friend. In 1763 appeared *The Conference*, a second apology; *The Duellists*, three books of loose octosyllabics, called forth by the duel between Wilkes and Martin; and *The Author*, a satire of more general scope. These were followed in 1764 by *Gotham*, another piece of indiscriminate censure; by *The Candidate*, an attack on Lord Sandwich; by *The Times*, the last of Churchill's successes; and by *The Farewell* and *Independence*, which are worth little except as proofs of their author's decay. In the October of the same year he accompanied Humphrey Cotes to Boulogne, where Wilkes was then in exile, and died there of fever in a few days. He left some property, the proceeds of his writings, and bequeathed the editorship of his poems, with the material for illustrations and notes, to John Wilkes, who contrived to elude the bequest.

Churchill was a literary bravo, a man who liked broils and beating, and who was at the same time not indifferent to the rewards earned by the conflict. His satires are generally rough and loose in texture, disjoined in structure, and insolent in tone. They are full of good metal, it is true, but the ore lies heaped over with too much schist to repay research. His extreme facility of composition is perhaps a reason for this, as it is a reason why, writing from day to day, he should have gained and kept the public favor. Cowper praised him, but at best he was but an admirer and imitator of Dryden.

See Churchill's *Complete Works*, London, 1774, 3 vols. The best edition of the poems is that of Tooke, London, 1804, 2 vols., which has been reprinted (1844) in the Aldine Poets.

CHURCHILL, John, first duke of Marlborough. See Marlborough.

CHURCHYARD, Thomas (1520–1604), "the Nestor of the Elizabethan heroes," was born at Shrewsbury in 1520, and was educated at Oxford. At seventeen he went to court, where he roistered through such money as he had. He then became attached to the earl of Surrey, applying himself during his three or four years of service to books, music, and the practice of poetry. He served his first campaign in Flanders (1542–1544) against the French, and his second (1547) in Scotland. He fought at Pinkie, but was captured next year at St. Monance, and did not return to England till 1550. A tract called *David Dicar's Dream*, written at this time, not only involved Churchyard in a fierce quarrel with a contemporary scribbler, but brought down on him the censure of the Privy Council; he only escaped the pillory through the interest of his patron, the duke of Somerset. A third campaign took him to Ireland, whence he returned in 1552. Having been unsuccessful in a love suit, he once more betook himself to the Continent, to serve his fourth campaign, at Mentz and elsewhere, under the great emperor. His absence extended over three years. On his return he began writing harder than ever, dedicating two of his works to Queen Mary. The war with France made him a lieutenant in the English army, and at Guines he acted as mediator between the besieged and the besiegers. He next addressed a poetical appeal to Elizabeth; he got nothing, however, but fair words, and had to write his *Tragedie of Lord Mowbray*, a contribution to the *Mirrour for Magistrates*. He fought at the leaguer of Leith in 1560; he again attempted fortune as a courtier; and he went off to Ireland, campaigning under Henry Sidney. In 1566 he wandered to Antwerp, where he headed a great force of religious partisans; but he speedily had to fly the country by reason, he says, of his extreme moderation. Next year he went back as one of Oxford's agents, returning to England in 1569, when he married. In 1593, after another journey to Scotland, where he witnessed Morton's execution, Elizabeth gave him a pension; and eleven years later, immediately after the publication of his last work, *Blessed Balm to Search and Salve Sedition*, he died. Churchyard seems to have been an active, garrulous, and cheerful adventurer. Strype praises him as a good soldier and poet and a man of honest principles. Of his multifarious publications the *Legend of Jane Shore* is most highly esteemed, while the *Worthinesse of Wales* (1587) and *Churchyard's Chippes* (1575) have been reprinted,—the former in 1776, the latter, by Mr. Chalmers, in 1817. See D'Israeli, *Calamities of Authors*, and Minto, *Characteristics of English Poets*.

CHUSAN, the principal island of a group situated off the eastern coast of China, in 30° N. lat. and 122° E. long., and belonging to the province of Che-keang. It lies N.W. and S.E., and has a circumference of 51 miles, the extreme length being 20, the extreme breadth 10, and the minimum breadth 6 miles. The island is beautifully diversified with hill and dale, and well watered with numerous small streams, of which the most considerable is the Tung-keang, falling into the harbor of Tinghae. Most of the surface is capable of cultivation, and nineteen-twentieths of the inhabitants are engaged in agriculture. Wherever it is possible to rear rice every other product is neglected; yet the quantity produced is not sufficient for the wants of the inhabitants. Millet, wheat, sweet potatoes, yams, and tares are also grown. The tea plant is found almost everywhere, and the cotton plant is largely cultivated near the sea. The

capital, Tinghae, stands about half a mile from the southern shore, and is surrounded by a wall nearly three miles in circuit. The ditch outside the wall is interrupted on the N.W. side by a spur from a neighboring hill, which projects into the town, and forms an easy access to an attacking force. The town is traversed by canals, and the harbor, which has from 4 to 8 fathoms water, is land-locked by several islands. Temple (or Joss-house) Hill, which commands the town and harbor, is 122 feet high close to the beach. The population of the town and suburbs of Tinghae, which at the commencement of 1843 was about 27,500, had increased in 1846 to above 35,000. The population of the entire island is estimated at 250,000, of which the capital contains about 40,000. Chusan has but few manufactures; the chief are coarse cotton stuffs and agricultural implements. There are salt works on the coast; and the fisheries employ a number of the inhabitants. In Tinghae a considerable business is carried on in carving and varnishing, and its silver wares are in high repute. The principal exports are fish, coarse black tea, cotton, vegetable tallow, sweet potatoes, and some wheat. Chusan was occupied by the Japanese during the Ming dynasty, and served as an important commercial entrepôt. It was taken by the British forces in 1840 and 1841, and retained till 1846 as a guarantee for the fulfilment of the stipulations of the treaty. It was also occupied by the English in 1860. See plan in *Jour. of Royal Geogr. Soc.*, 1853.

CHUTIÁ (or CHOTÁ) NÁGPUR, a division or commissionership of British India, under the lieutenant-governor of Bengal, comprising the districts of Hazáríbágh, Lohárdágá, Mánbhúm, and Sinhbhúm, and the seven tributary states which constitute the South-West Frontier Agency, lies between 21° and 25° N. lat. and 82° and 87° E. long. It is bounded on the N. by the province of Behar, E. by the Bengal districts of Bánkurá and Midnapur, S. by the Orissa Tributary States and the Central Provinces, and W. by the independent State of Rewá. Of its area of 43,901 square miles a large portion is occupied by hills and jungle, and the population is very sparse. The most important peak, Paresnáth, with its Jaina temples, has a height of 4400 feet. The Chutiá Nágpur plateau is an offshoot of the great Vindhyan range, and its mean elevation is upwards of 2000 feet above the sea level. In the W. it rises to 3600 feet, and to the E. and S. its lower steppe, from 800 to 1000 feet in elevation, comprises a great portion of the Mánbhúm and Sinhbhúm districts. The whole is about 14,000 square miles in extent, and forms the source of the Barákhar, Dámodar, Kásái, Subanrekhá, Baitaraní, Bráhmaní, Eb, and other rivers. *Sál* forests abound. The principal jungle products are timber, various kinds of medicinal fruits and herbs, lac, *tasar* silk, and *mahuá* flowers, which are used as food by the wild tribes and also distilled into a strong country liquor. Coal exists in large quantities, but is at present only worked on a small scale on the Hazáríbágh district. Formerly gold was washed from the sands in the bed of the Subanrekhá River, but the operations are now almost wholly abandoned. Iron-ores abound, together with good building stone. The population in 1872 was 3,825,571, residing in 25,766 villages or townships and 752,287 houses. Of these the Hindus numbered 2,567,292, or 67·1 per cent.; Muhammadans, 169,006, or 4·4 per cent.; Christians, 15,798, or ·4 per cent.; persons of unspecified religion, 1,073,475, or 28·1 per cent. These last consist of non-Aryan tribes who were driven from the plains by the Hindus and took refuge in the mountain fastnesses of the Chutiá Nágpur plateau. The principal of them are Kols, 292,036 in number; Santáls, 220,096; Uráons or Dhángars, 208,343; Mundás, 190,095; and Bhumij, 128,289. These tribes were formerly turbulent, and a source of trouble to the Muhammadan governors of Bengal and Behar; but the introduction of British rule has secured peace and security, and the aboriginal races of Chutiá Nágpur are now peaceful and orderly subjects. Of late years missionaries have worked hard among them, and several thousands of the Kols and Santáls have accepted the Christian faith. Only six towns contain upwards of 5000 inhabitants, viz., Ránchí, 12,086; Hazáríbágh, 11,050; Ichak, 8999; Chatra, 8818; Puruliá, 5696; and Raghunáthpur, 5380. The principal agricultural products are rice, Indian corn, pulses, oil-seeds, and potatoes. A small quantity of tea is grown in Hazáríbágh and Lohárdágá districts. Lac and *tasar* silkcloth are largely manufactured. The revenue of the British portion of Chutiá Nágpur in 1870 was £101,651, the expenditure £79,472. Of the total revenue the receipts from land amounted to £23,698. The police of the British districts consisted in 1872 of 1590 officers and men of the regular force, maintained at a cost of £31,131; 172 officers and men of the municipal police, costing £981; 15,104 men of the village watch, costing £17,592; the total strength being 16,866 officers and men, and the total cost of £49,705. In 1872–73, the Educational Department inspected 571 schools attended by 15,871 pupils, and the total cost of Government for the education of the people was £2371. The climate of Chutiá Nágpur is dry and healthy.

CHUTIÁ (CHOTÁ) NÁGPUR TRIBUTARY STATES. These are seven in number,—Sirgujá, Udaipur, Jashpur, Gangpur, Bonái, Koriá, and Chang Bhakár. At the decline of the Marhattá power in the early part of this century these estates came under British protection. They are now under the political superintendence of the commissioner of Chutiá Nágpur, and the charge of them constitutes what is known as the South-West Frontier Agency. Before the rise of the British power in India their chiefs exercised almost absolute sovereignty in their respective territories. The Rájás now pay a light tribute to the British Government, and are invested with magisterial authority to punish offenders by fine not exceeding £5 or by imprisonment not exceeding two years. The states are mountainous, thinly cultivated, and inhabited for the most part by wild aboriginal tribes. They cover an area of 15,419 square miles, the largest states being Sirgujá and Gangpur. Their aggregate population amounts to 405,980 souls, giving an average of 26 persons to the square mile. No towns exist in the Tributary States, and only three villages contain more than 1000 inhabitants. The following is a brief description of each of the States:—

(1.) Sirgujá, the largest, lies between 22° 30′ and 24° N. lat., and 82° 35′ and 84° 10′ E. long. It is bounded on the N. by the independent state of Rewá and the districts of Mirzápur and Lohárdágá, on the E. by the district of Lohárdágá, on the S. by the Biláspur district of the Central Provinces and the states of Udaipur and Jashpur, and on the W. by the state of Koriá. It is very hilly, with elevated table-lands affording good pasturages, and cut up by numerous ravines. The rivers are the Kanhar, Rer, Mahán, Son, and Santch, the last being formerly known as the Diamond River. Hot springs exist in the state. Extensive *sál* forests cover a large area, affording shelter to herds of wild elephants, antelopes, bisons, buffaloes, and many sorts of deer, and also to tigers, bears, and other beasts of prey. The area is 6103 square miles; the population in 1872, 182,831 souls, residing in 1295 villages and 36,463 houses:—classified according to religion—Hindus 68,789, or 37·6 per cent.; Muhammadans 1370, or ·8 per cent.; aborigines of the Dravidian stock 73,256, of the Kolarian stock 39,416, total 112,672, or 61·6 per cent. The principal agricultural products are rice, Indian corn, and other inferior cereals, pulses, oilseeds, and cotton; the articles of export—clarified butter, grain, oilseeds, lac, gums, jungle silk cocoons (*tasar*), &c.; imports—brass and pewter vessels, piece goods, and ornaments. The places of trade are Bisrámpur, the capital of the state, Pratáppur, and Jhilmilí. The total revenue of the estates in Sirgujá in possession of the different members of the chief's family is £7000; the rental of the personal estate of the Rájá, £3000; the expenditure on administration, £212. A small body of police is maintained by the Rájá, and he can at a short notice put himself at the head of 1000 fighting men. Sirgujá pays a tribute of £189 to the British Government.

(2.) Udaipur lies between 22° 3′ and 22° 50′ N. lat., and 83° 5′ and 83° 50′ E. long., and is bounded on the N. by the Mainpát plateau in Sirgujá, on the E. by Jashpur, on the S. by Ráigarh, and on the W. by Biláspur in the Central Provinces. Country hilly, diversified with plains, and possessing one of the most extensive coal-fields in India. Principal river, Maud. Area, 1051 square miles, of which 121 are cultivated. Population—27,708:—Hindus, 7351; Muhammadans, 118; aborigines, 20,239. Principal villages—Rábkob, the capital, and Dorkí. Exports—cotton, resinous gums, oilseeds, rice, wild arrowroot, iron, and a small quantity of gold, obtained by washing. Udaipur came under the British protection in 1817, and now pays an annual tribute of £53.

(3.) Jashpur, the most populous of the states, lies between 22° 20′ and 23° 15′ N. lat., and 83° 30′ and 84° 30′ of E. long., and is bounded on the N. and E. by the district of Lohárdágá, the S. by the states of Gangpur and Udaipur, and on the W. by the state of Sirgujá. The country is divided almost equally into high and low lands. The only river of importance is the Eb, in the bed of which diamonds are found, and from time immemorial its sands have been washed for gold. Jashpur

iron, smelted by the Kols, is highly prized. Jungles of *sál* forests abound, harboring elephants, bisons, and other wild beasts. Jungle products—lac, silk-cocoons, and beeswax, which are exported. Area, 1947 square miles; population, 66,926:—Hindus, 11,498; Muhammadans, 423; aborigines, 55,005. Principal villages—Jashpur Nagar, the capital, and Sanoá. Agricultural products—rice, barley, Indian corn, and other inferior crops, pulses, oilseeds, hemp, flax, &c. The Rájá possesses an income of about £2000, and pays through the Sirgujá state a tribute of £77, 10s. to the British Government. Jashpur came under the protection of the British Government in 1818.

(4.) Gangpur extends from 21° 50′ to 22° 30′ N. lat., and 85° 10′ to 85° 40′ E. long., and is bou ˜ l on the N. by Lohárdágá district, E. by the Sinhbhúm district, S. by Sambalpur and Bámrá, and W. by Ráigarh in the Central Provinces. The country is for the most part an undulating plain, broken by detached ranges of hills, one of which, the Mahávíra range, possesses a very remarkable and imposing appearance, springing abruptly from the plain in an irregular wall of tilted and disrupted rock, with two flanking peaks. The rivers are the Eb and the Bráhmaní, formed hero by the union of the Sankh and the Koel, both navigable by canoes. Tho Eb was formerly famous on account of diamonds found in its bed, and its sands are still explored for gold. One of the largest coal fields in India extends into the state. Jungle products—lac, silk cocoons, catechu, and resin, which are exported. Wild animals—bisons, buffaloes, tigers, panthers, leopards, hyenas, wolves, jackals, wild dogs, and many sorts of deer. Area, 2484 square miles; population, 73,637, viz., Hindus, 28,192; Muhammadans, 231; aborigines, 45,214. Principal village, Suádí, the residence of the Rájá. The soil is exceedingly fertile, yielding sugar cane, tobacco, rice, and other cereals, pulses, oilseeds, and cotton. The chief enjoys a revenue of about £200, out of which he pays £50 pounds as tribute to the British Government, the connection of which with the state dates from 1803.

(5.) Bonái extends from 20° 10′ to 21° 10′ N. lat., and from 84° 30′ to 85° 25′ E. long., and is bounded on the N. by the Gangpur state and the Sinhbhúm district, on the E. by the state of Keunjhar in Orissa, and on the S. and W. by the state of Bámrá in the Central Provinces. It is for the most part covered with a mass of uninhabited hills, except the central part, through which the Bráhmaní river passes, forming a fine fertile valley along its course. Principal heights—Mánkarnáchá, 3639 feet; Báddingarh, 3525; Kámrátar, 3490; Cheliátaká, 3308; and Kondádhar, 3000. Products—almost the same as Gangpur. Area, 1297 square miles; population, 24,832, viz., Hindus, 10,416; Muhammadans, 32; and aborigines, 14,384. The chief enjoys an income of about £600, and he pays an annual tribute of £20 to the British Government. In 1803 the British Government entered into treaty relations with Bonái.

(6.) Koriá lies between 22° 58′ and 23° 49′ N. lat., and 82° and 82° 59′ E. long., and is bounded on the N. by the Rewá state, E. by Sirgujá, S. by Biláspur district of the Central Provinces, and on the W. by Chang Bhakár. Country extremely hilly; highest point, 3370 feet. Rivers—Heshto or Hasdo, Gopath, and other minor streams which feed either the Son on the N. or the Mahanuddy on the S. Jungle and agricultural products—same as the other states. Mineral product—iron. Tigers commit great havoc in the villages, and wild animals abound. Area, 1631 square miles; population, 21,127, viz., Hindus, 10,807; Muhammadans, 140; aborigines, 10,180. Principal village—Sonhát, the residence of the Rájá, which contains a mud fort. The Rájá enjoys an income of about £700, and pays a tribute of £40 to the British Government. The relations of the British Government with this state commenced in 1818.

(7.) Chang Bhakár state protrudes like a spur into the Rewá territory, which bounds it to the N., W., and S., the eastern side being bounded by the state of Koriá, of which it was formerly a fief. The natural scenery of the country consists of hills, ravines, and plateaus, covered with forests of *sál*, with small villages at distant intervals in the jungle. Herds of wild elephants commit sad havoc on the crops, which has caused the desertion of several villages. Area, 906 square miles; population, 8919, viz., 2728 Hindus, 34 Muhammadans, and 6157 aborigines. The chief has an income of about £300, and pays a tribute of £38 12s. (W. W. H.)

CHUTTERPUR, a city of British India, in the province of Bundelcund, 180 miles S.E. of Agra, and 140 S.W. of Allahabad. It was established by the Rajah Chutter Sal, the founder of the short-lived independence of Bundelcund, and the resolute opponent of the Mogul empire in the 17th century. Situated but a short distance from the diamond mines of Pannah, and forming an important entrepôt in the trade between the Deccan and Benares, it soon grew into a very flourishing city. It is still a thriving place, but it maintains its prosperity less by its transit trade than by its manufactures, of which the most important are paper and coarse cutlery. It is irregularly built, and contains but few buildings of individual interest. The palace is a modern structure of hybrid character, combining the features of an Italian villa with those of a Rajput castle. There was formerly a political agent of the British Government in the city, but he has been transferred to Nowgong. The territory of which the town is the capital contains an area of 1240 square miles, with a population of from 200,000 to 300,000. The revenue is stated at not more than twenty lacs of rupees per annum. As the Rajah Pertaub Singh had no male issue, the territory on his decease would have lapsed to the paramount power; but in acknowledgment of his fidelity and the beneficial results of his administration, the British Government recognized a successor in the person of his grand-nephew Juggut Singh.

CIBBER, or Cibert, Caius Gabriel (1630–1700), sculptor, was born at Flensburg in Denmark. He was the son of the king's cabinetmaker, and was sent to Rome at the royal charge while yet a youth. Nothing further is known of his earlier life, save that he came to England during the Protectorate, or during the first years of the Restoration. By his second wife, Miss Colley of Glaiston, a son was born to him afterwards to be known as Colley Cibber. Besides the famous statues of Melancholy and Raving Madness ("great Cibber's brazen brainless brothers"), once in old Bethleham Hospital and now at South Kensington, Cibber produced the bas-reliefs round the Monument on Fish Street Hill. The several Kings of England and the Sir Thomas Gresham executed by him for the Royal Exchange were destroyed with the building itself in 1838. Cibber was long employed by William fourth earl of Devonshire, and many fine specimens of his work are to be seen at Chatsworth. Under that nobleman he took up arms in 1688 for William of Orange, and was appointed in return carver to the king's closet. He died rich, and, according to Horace Walpole, built the Danish church in London, where he lies buried beside his second wife, to whom he erected a monument.

CIBBER, Colley (1671–1757), actor, dramatist, and laureate, was the eldest son of Caius Cibber, and was born in London. Sent in 1682 to the free school at Grantham, he distinguished himself by passing through all its grades, from lowest to highest, and by producing an "Oration" on the death of Charles II.—whom he had seen feeding his ducks in the park—and an "Ode" on the accession of James II., with whom he had sat at worship in Whitehall Chapel. He was removed in 1687 on the chance of election into Winchester College. Caius Cibber, however, had not then presented that institution with his statue of William of Wykeham, and his son's claim was ignored. The boy went to London, and amused himself with the theatre, for which he had a passion. It was presently decided, on his own recommendation, that he should not return to school, but that he should go straight to Cambridge, for certain colleges in which university the sculptor was then executing commissions; meantime he was invited to Chatsworth, the seat of his father's patron. On his way thither, the Revolution broke out, and father and son met at Nottingham, where Colley Cibber was received, at the instance and in the place of Caius Cibber, into Devonshire's company of volunteers. He served in the bloodless campaign that resulted in the coronation of the Prince of Orange, and on its conclusion, at his father's request, presented a Latin petition to the earl—afterwards duke—imploring his interest and protection. By that nobleman's desire the young man returned to London, and ere long his craze for things histrionic enrolled him in Betterton's grand company of actors. After playing "full three quarters of a year" without salary, as was then the custom of all apprentice actors, he began to be paid ten shillings a week. His rendering of the little part of the chaplain in Otway's *Orphan* procured him a rise of five shillings; and a subsequent impersonation, on an emergency, and at the author's request, of Lord Touchwood in the *Double Dealer*, advanced him, on Congreve's recommendation, to a pound a week. On this he contrived to live with his wife and family, and to produce a play—*Love's Last Shift*. Of this comedy, highly praised by Southern and Dorset, Congreve said that it "had only a great many things that were like wit in it;" Vanbrugh honored it by writing his excellent *Relapse* as a sequel. In 1697 Cibber was included by Collier among the reprehensible in the famous *Short View*. In 1704 he brought out, for himself and Mrs. Oldfield, his best play, the *Careless Husband*, the most striking scene in which is said to have

been suggested by an episode in the life of the notorious Mrs. Brett (better known as the Countess Macclesfield) to whom the MS. had been submitted. In 1711, with Collier, Wilks, and Dogget, he became a patentee of Drury Lane theatre, where, in 1712, Addison's *Cato* was produced under his management. In 1715, on the occasion of the Rebellion, Cibber adapted the *Nonjuror* from Molière's *Tartuffe;* the play, a mere *pièce de circonstance,* ran eighteen nights, and the author received from George I., to whom it was dedicated, a present of two hundred guineas. In 1726 he pleaded the cause of the patentees against Sir Richard Steele (who had succeeded Collier as manager of Drury Lane) before Jekyll, Master of the Rolls, and won his case. In 1730 Mrs. Oldfield died, and her loss was followed in 1731 by that of Wilks; Cibber, who had been named laureate on the death of Eusden, sold his share in the theatre, and retired from the stage, and only appeared thereafter on rare occasions. In 1742 occurred the quarrel with Pope, which resulted in the exclusion of Theobald and the elevation of Cibber as the hero of the *Dunciad.* At seventy-four he appeared on the stage for the last time as Panulph in his own poor tragedy of *Papal Tyranny.* His conversation (of which Johnson said that "taking from it all that he ought not to have said, he was a poor creature") was agreeable to the last, and he died as full of worldly honors as of years.

Cibber's reputation has suffered greatly from the acrid censure of Pope and the rough scorn of Johnson. There can be no doubt that he was by no means an unamiable character, and that he was deficient neither in wit, sense, tact, nor feeling. The little passages of dramatic criticism and reflection scattered through his *Apology,* while they prove his extreme perspicuity and excellence of experience, are perhaps the most delicate and subtle of their kind in the literature of his time; while the fact that his version of *Richard III.* should have kept the stage for a century is of itself no mean proof that his scenic sagacity and instinct were remarkable. As a dramatist, he has neither the broad humor and strong comic vein of Vanbrugh, nor the fine English and the masterfulness of Congreve, nor the frolicsome gayety and airy fancy of Farquhar. His characters are flat; his plots are neither natural nor well conducted; his dialogue is often flippant. He attempted, moreover, to extract a highly moral end from his sympathetic studies of social weakness and impurity, and the result (particularly in his continuation of Vanbrugh's unfinished *Journey to London*) is not happy. His *Odes,* the subject of several of Johnson's keenest pleasantries, are wretched. His best work is the *Apology for his Life,* a book which the same critic declared to be a standing proof that any man might do well who was able and willing to keep to his own ground.

See *An Apology for the Life of Colley Cibber, Comedian* (London, 1822); Cibber, *Dramatic Works* (London, 1777, 5 vols.); Boswell, *Life of Samuel Johnson, LL.D.;* and Isaac D'Israeli, *Quarrels of Authors.*

CICACOLE, a town of British India, in the presidency of Madras and district of Ganjam, about 58 miles N.E. of the town of Vizagapatam, on the left bank of the River Nagawalli or Naglandi, a few miles from its mouth. It is an irregular mud-built place, but possesses several mosques and bazaars of some importance. Its principal manufactures are cotton goods and excellent muslins. There is a military cantonment a short distance from the now dismantled fort, and a small English church occupies the corner of the parade ground. A school where English is taught is supported by the London Missionary Society. The town formerly gave its name to one of the five Northern Circars. Its population is about 12,800.

CICERO, Marcus Tullius, born at Arpinum (Arpino) on the northern border of the Volscian territory, 3d January, 647 A.U.C., 106 B.C. His family was of equestrian rank, and his father, though living in retirement, was intimate with some of the public men of the day. The orator Crassus took an early interest in the young M. Cicero and his brother Quintus, and directed their education. As an orator, a statesman, and a man of letters Marcus became the most consummate specimen of the Roman character under the influence of Hellenic culture. He was first placed under the tuition of the Greek poet Archias, a teacher at Rome, with whom he read the poets and orators of Greece, composed in the Greek language, and also wrote Latin verse. This literary training he combined with study under the two Scævolas, the augur and the pontifex, and from these Roman masters he imbibed the spirit of the national law and ritual. His aim was to prepare himself by liberal as well as technical training for the career of an advocate; but the Roman institutions required him to serve in the field also, and he took part in the campaign of Sulla against the Italian confederates in the year 87. Returning to the city he betook himself once more to the pursuits most congenial to him, and attended on the teaching of Philo the chief of the Academics, of Diodotus the Stoic, and of Molo a philosopher of Rhodes. Many teachers had been driven at that moment from the schools of Greece by the invasion of Mithridates. Cicero, at the age of twenty-six, pleaded a civil cause in the speech *pro Quinctio* (81 B.C.), and again in a criminal action against Roscius Amerinus in the following year. After these efforts, which brought him some distinction, he suddenly withdrew to Athens, on the plea of weak health, but probably to avoid the displeasure of the dictator Sulla. Here he studied under Molo and others, with a special view to the practice of declamation, and the management of his physical powers in a profession which made severe demands upon them. He travelled also through the Roman province of Asia, and stored up a vast amount of information in a mind singularly acquisitive and endowed with extraordinary facility of arrangement and expression, but with comparatively little fertility of invention or breadth and strength of character. Cicero was from the first an imitator and an adapter rather than an original thinker. He was throughout a follower rather than a leader in action as well as in speculation. His mental training disposed him specially to admire past models or cling to existing institutions, and he was always too easily subjected to the influence of characters stronger than his own. His position, indeed, as a new man, or a struggling candidate for political honors which neither his birth nor his means could naturally command, made it necessary for him to attach himself to the leaders of party; but his versatile talents soon rendered him a valuable adherent, and it speaks well for the times in which his lot was cast, amidst the deep corruption which pervaded them, that his honest and enlightened patriotism was on the whole appreciated and rewarded.

It was from policy, but partly also from his own kindly feelings, that the young orator, on resuming his profession, preferred to distinguish himself in defence rather than in attack. This course impressed the good-natured public in his favor. Moreover, the class from which the judices were taken, conscious that the position of defendants in a criminal suit might at any time be its own, was often glad of an excuse for screening public delinquents. It may be said that even the impeachment of Verres was rather a defence of the injured Sicilians than a hostile attack upon an individual, who was allowed to withdraw quietly from the city. Cicero's triumph in this famous cause (70 B.C.) raised him to the pinnacle of reputation. He had already attained the questorship (77 B.C.). He succeeded to the ædileship in 69, and became prætor in 68, a year memorable in his career for the passing of the Manilian law, which he warmly supported, by which Pompeius was constituted commander against Mithridates with extraordinary powers, in the place of Lucullus. Pompeius was at this period accepted by the oligarchy as their leader, though not without reluctance and distrust. Cicero gladly attached himself to their cause, and flattered himself with the hope of reconciling the senate with the knights by a more liberal and genial policy. Meanwhile he hoped, by favor of the dominant party, to attain the consulship. He found himself a candidate for that magistracy along with Catiline, a man of ruined character and already under suspicion of plotting against the state. Nevertheless he did not hesitate to combine with him in his canvass, and to undertake his defence on a charge of malversation. Cicero obtained the consulship; Catiline was defeated, and thereupon betook himself to treasonable machinations. It was the business of his late ally to track these intrigues and defeat them. The vigor and courage with which Cicero conducted himself at this crisis won for him by popular acclamation the title of "Father of his Country" (63 B.C.). But the nobles ill requited the service he had done them. They now felt themselves secure in their ascendency. They affronted Pompeius, they made light of Cicero, and allowed him to be treated contumeliously by a tribune, who, under pretence that he had condemned citizens unheard, forbade him to

make the usual declaration of the services he had performed in his consulship. Cicero, in laying down his office, was only permitted to exclaim—"I swear that I have saved the state." Cæsar, at the head of the popular party, countenanced this affront; while Pompeius, perhaps a little jealous of the rising statesman, on his return from the East vouchsafed him no cordial support. The real weakness of his position was made painfully manifest to him. He would not consent, however, to remove to a distance, and declining to sue for the government of a province, devoted himself for a time mainly to literary pursuits, composing among other things a poem on the glories of his own consulship. Meanwhile the enemies he had made became more emboldened. Clodius, a worthless demagogue, assailed him with a formal charge for putting citizens to death summarily without appeal to the people. In vain did he assume the garb of mourning, and traverse the streets as a suppliant. The magnates stood coldly aloof, and the factions arrayed against him did not scruple to menace his scanty defenders with violence. Cicero was obliged to seek safety in flight, and withdrew to Thessalonica. Clodius obtained a decree of the people for his banishment 400 miles from the city, and the destruction of his house on the Palatine, the site to be devoted to the erection of a temple of Liberty (58 B.C.).

Pompeius and Cæsar had suffered Cicero to undergo this humiliation for their own purposes, but they were not disposed to submit to the arrogance of the upstart Clodius, who was now making himself generally obnoxious. In the following year they let it be understood that the persecution should cease. The partisans of Clodius raised tumults in the city, but they were speedily put down, and a resolution for the exile's recall was carried in the assembly of the people. Cicero had betrayed much weakness under banishment. The exultation with which he triumphed on his return was hardly more dignified. The senate, however, complimented him, by coming forth to meet him, and the state undertook the restoration of his mansion. The armed opposition of Clodius was met by a counter demonstration on the part of Milo, a no less turbulent instrument of the oligarchy. But Cicero now felt himself powerless in the presence of chiefs of armies and leaders of factions. He attached himself more closely to Pompeius, and devoted his eloquence to the defence of his patron's creatures, while he courted more and more the pursuit of literature in retirement. The attainment of a seat in the college of augurs on the death of Crassus (53 B.C.) placed him in a position of dignity well suited to the taste of a constitutional antiquarian. But Cæsar, though now absent in Gaul, was rapidly becoming a great power in the state, and Cicero did not fail to pay court to him also, proposing to celebrate his British wars in an epic poem. The death of Clodius (52 B.C.), whose slayer, Milo, he defended, relieved him from the apprehensions he had never yet shaken off. He accepted, though not without reluctance, the lot which assigned him the government of Cilicia for the year following. His conduct in this post seems to have been highly meritorious. He checked the corruption of his officials while he preserved his own purity, and distasteful as warlike affairs were to his studious and quiet temper, he did not shrink from leading his troops against the restless mountaineers. His vanity induced him to pretend to a triumph for his success in these trifling operations; but in those degenerate days greater victories than his would have failed to secure such an honor, unless backed by the influence of the leaders of party, and neither Pompeius nor Cæsar was disposed to indulge him.

The civil war between these two rivals was now imminent. Cicero naturally threw himself into the ranks of the senatorial or conservative party, which was blindly following the lead of Pompeius; but he was coldly received by the violent men who ruled it, to whom his old-fashioned patriotism was utterly distasteful. Reluctantly and with much misgiving he quitted Italy in the train of the senate and consented to set up a shadow of the commonwealth on a foreign shore; while Cæsar attached to himself in the city, as dictator and consul, both the substance and the forms of constitutional power. After the disaster of Pharsalia and the rout of the senatorial forces, Cicero quickly threw aside his arms and returned to Italy, where Cæsar had left Antonius in command. He was soon relieved from apprehensions for his own safety by kind assurances from the victor, and while Cæsar was occupied in Egypt, Africa, and Spain, he withdrew altogether from public life. With his wife Terentia he had never lived happily; but he now took the step of repudiating her, which according to the ideas of the times caused no unfavorable remark, nor was it made matter of reflection upon him that he straightway married again his own ward Publilia, wealthy as well as beautiful. The young bride seems, however, to have contributed nothing to his domestic happiness, and her, too, he soon repudiated for the satisfaction she had seemed to evince at the death of his much-loved daughter Tullia. During this period, however, he abstained from making advances to Cæsar, and did himself honor by composing a panegyric upon Cato, to which Cæsar condescended to make an ill-tempered reply. But the conqueror's clemency to Marcellus at last won his heart, and now, after the death of Pompeius, Cato, and Scipio, with all the other chiefs of his party, he could not refrain from declaring warmly in favor of the new ruler. Cæsar felt the compliment, and repaid it by sparing at his instance the life of Ligarius. The conduct of Cicero at this critical moment was undoubtedly the most truly politic. Other republicans, such as Brutus and Cassius, who had espoused the senatorial cause with feverish zeal or angry factiousness, did not scruple to give their actual support to the new government, and to accept office under it, while they secretly chafed against it and threw themselves into a conspiracy against the life of their master. The difference between their spirit and that of Cicero is marked by the fact that in a plot which numbered, it was said, as many as eighty men of public note, Cicero himself was not included. The covert assassins dared not consult with men of true honor. When the deed was done, indeed, Cicero might fairly take part with its perpetrators in the name of the free state which in his sanguine view might still be restored. When, however, the liberators, as they called themselves, repaired to the provinces to strengthen their party against the Cæsarians, Cicero declined to undertake active service. He remained in Italy, and employed himself in guiding, as he thought, the conduct of the young Octavius, the nephew and heir of the dictator. This crafty dissembler promised well, and Cicero expected to be able to use him as a convenient opponent to Antonius. It must be confessed that the veteran statesman was himself playing a part, and dissembling with the youth whom he meant eventually to get rid of. It was a game on both sides, and Octavius won it. He looked on with satisfaction while Cicero excited the passions of the citizens against Antonius in the series of orations to which he gave the name of Philippics, while he armed the consuls Hirtius and Pansa to overthrow him. The orator, now advanced in years, showed at this crisis all the vigor with which he had encountered Catiline twenty years earlier. To him the people entrusted the government of the city, and while all the forces of the republic were concentrated under various leaders on the Cisalpine, he might fancy himself for a moment the real controller of affairs. But after the deaths of Hirtius and Pansa in the battles before Mutina, and the discomfiture of the republicans under Decimus Brutus, Octavius, Antonius, and Lepidus formed a compact, and assumed to be a triumvirate, or a board of three special officers for the regulation of the commonwealth. Their arrival at Rome was followed by bloody proscriptions of their public and private enemies. Antonius demanded the head of Cicero, and Octavius yielded it. The orator fled, together with his brother, but he could not endure to abandon Italy, and after some weeks' delay, which seems to show that the pursuit was not keen, he was overtaken at the door of his Formian villa and his throat cut by the bravo Popilius. His head and hands were cut off and sent to Rome, where Antonius caused them to be affixed to the rostra, and Fulvia, the widow of Clodius and the wife of Antonius, pierced with her needle the tongue which had declaimed against both her husbands. Cicero perished at the close of the year 43, at the age of sixty-three. Octavius, in his later years, as the Emperor Augustus, could coolly say of the great statesman and patriot to whose murder he had consented, "He was a good citizen, who really loved his country." The saying was indeed well deserved, but it should have come from purer lips.

Cicero was indeed not only a good citizen, but a good man; he loved not his country only but mankind in general; he loved them not merely from a kindly nature, but from reflection and self-discipline. As a specimen of the highest culture of the ancient world both moral and intel-

lectual he must ever stand pre-eminent. He was a wiser if not a more sincere patriot than Cato; his private virtues were subjected to a severer test than those of M. Aurelius. His intellectual superiority is sufficiently attested by the important place he attained, in the face of many disadvantages, in the conduct of public affairs. But a large portion of his multifarious writings still remains, and constitutes an enduring monument to his fame, which has been recognized through all ages. The great bulk of these works may be conveniently classed as (1) political, (2) philosophical, (3) personal. The first division comprises a collection of fifty-six speeches professing to have been delivered in the forum or the curia, though some of them certainly, as for instance that for Milo and the greater number of the Philippics, were written for publication but not actually delivered. The genuineness of that for Marcellus, and of the four which refer to the orator's return from exile, has been much questioned. Besides the speeches themselves, Cicero produced several treatises on the subject of oratory, which as part of the Roman training for public life may be regarded as political. Of these the principal are the *de Oratore*, the *Orator*, and the *Brutus*. The origin of the strictly technical treatises *de Inventione* and *Rhetoricorum* is involved in much perplexity. To this division belong still more strictly the important works *de Legibus* and *de Republica*, which contain valuable references to the events of early Roman history. To our second division belong the famous treatises on philosophy, from which we derive all our knowledge of the Greek systems which succeeded to the schools of Plato and Aristotle, and in which it became the fashion to affect an interest at Rome. Of these the *Academica*, the *Tusculanæ*, the *de Finibus*, and others which have been lost were devoted to speculative questions; the *de Divinatione* and *de Natura Deorum* refer more strictly to theological traditions; while the book *de Officiis* is an elaborate treatise on moral obligations. The smaller works, *de Senectute*, *de Amicitia*, *de Consolatione*, and probably the lost essay *de Gloria*, may also be ranged more or less definitely under the head of practical philosophy. The third division embraces Cicero's letters in two series, the one those to his friend Atticus, the other (*ad familiares*) to his correspondents generally. To these may be added a collection of letters addressed to his brother Quintus. These together give an account of the writer's life almost from day to day; they are the most valuable of his works for the historical information they afford us, as well as for the insight they give us into the character not of the writer only but of many of the leading personages of the day. In both these respects they stand unique among the remains of antiquity, and few men of historical note even in recent times have been so fully presented to us in their correspondence as Cicero, whose life acquires thereby its transcendent interest for all students of human nature. It may be added that the great philosopher and orator amused himself further with more than one ambitious flight in poetry. His verses on his consulship attracted some attention from his countrymen, and a specimen of them has come down to us. He made also a Latin translation of the astronomical poem of Aratus, and proposed at least, as has been above mentioned, to execute an epic on the invasion of Britain by Cæsar.

The latest critical and complete edition of Cicero's works is that of J. Caspar Orellius, printed at Zurich (1826–1838). The text, accompanied by a full apparatus of various readings, is followed by a collection of the ancient scholiasts, an elaborate Onomasticon, and other valuable supplements. This edition is comprised in eight, but may be more conveniently bound in twelve large octavo volumes. (C. M.)

CICOGNARA, Leopoldo, Count (1767–1834), archæologist and writer on art, was a native of Ferrara. At an early age he evinced strong predilections for the subjects on which he was to become so high an authority. Mathematical and physical science diverted him a while; but his bent was decided, and not even the notice of such men as Spallanzani and Scarpa could make a savant of him. A residence of some years at Rome, devoted to painting and the study of the antiquities and galleries of the Eternal City, was followed by a visit to Naples and Sicily, and by the publication, at Palermo, of his first work, a poem of no merit. The island explored, he betook himself to Florence, Milan, Bologna, and Venice, acquiring a complete and perfect knowledge of these and other cities from the point of view of an archæologist and connoisseur. In 1795 he took up his abode at Modena, and was for twelve years engaged in politics, becoming a member of the legislative body, a councillor of state, and minister plenipotentiary of the Cisalpine Republic at Turin. Napoleon decorated him with the Iron Crown; and in 1808 he was made president of the Academy of the Fine Arts at Venice, a post in which he did good work for a number of years. In 1808 appeared his treatise *Del Bello Ragionamenti*, dedicated in glowing terms to Napoleon. This was followed (1813–1818) by his *magnum opus*, the *Storia della Scultura dal suo Risorgimento in Italia al Secolo di Napoleone*, in the composition of which he had been encouraged and advised by Giordano and Schlegel, while the great emperor to whom it was dedicated had assisted the publication pecuniarily,—an example which the Bourbons did not follow. This book, designed to complete the works of Winckelmann and D'Agincourt, was the result of many years of meditation and comparison; it is illustrated with 180 plates in outlines, and if imperfect, is yet of great value. In 1814, on the fall of Napoleon, Cicognara was patronized by Francis I. of Austria, and published (1815–1820), under the auspices of that sovereign, his *Fabbriche più cospicue di Venezia*, two superb folios, containing some 150 plates. Charged by the Venetians with the presentation of their gifts to the Empress Caroline at Vienna, Cicognara added to the offering an illustrated catalogue of the objects it comprised; this book, *Omaggio delle Provincie Venete alla Maestà di Carolina Augusta*, printed for private circulation at the author's own expense, has since become of great value to the bibliophilist. Reduced to poverty by these splendid editorial speculations, Cicognara contrived to alienate the imperial favor by his political opinions. He left Venice for Rome; his library was sent to market; and in 1821 he published at Pisa a *catalogue raisonné*, rich in bibliographical lore, of this fine collection, the result of thirty years of loving labor, which in 1824 was purchased *en bloc* by Pope Leo XII., and added to the Vatican library. The other works of Cicognara are—the *Memoire Storiche de' Litterati ed Artisti Ferraresi*, 1811; the *Vite de' più insignia Pittori e Scultori Ferraresi*, MS.; the *Memoire spettanti alla Storia della Calcografia*, 1831; and a large number of dissertations on painting, sculpture, engraving, and other kindred subjects. (See Papoli, in No. 11 of the *Exile*, a print written and published by Italian refugees.)

Cicognara's reputation is principally founded on his *Storia della Scultura*. This is a valuable book, but it is disfigured and weakened by the enthusiasm that led the author to sacrifice almost all the lights of modern sculpture to the reputation of his friend Canova, to whom the seventh part of the book is devoted. His work as president of the Academy at Venice was also excellent; to him are attributed the increase in number of the professors, the improvement in the courses of study, the institution of prizes, and the foundation of a gallery for the reception of Venetian pictures.

CID, The, Rodrigo Diaz de Bivar, the favorite hero of Spain, and the most prominent figure in her literature, has a name so obscured by myth and fable as scarcely to belong to history. So extravagant are the deeds ascribed to him, and so marvellous the attributes with which he has been clothed by the fond idolatry of his countrymen, that by some he has been classed with the Amadises and the Orlandos whose exploits he emulated. The Jesuit Masdeu stoutly denies that he had any real existence, and this heresy has not wanted followers even in Spain. The truth of the matter, however, has been expressed by Cervantes, through the mouth of the Canon in *Don Quixote* "There is no doubt there was such a man as the Cid, but much doubt whether he achieved what is attributed to him." The recent researches of Professor Dozy,[1] of Leyden, have amply confirmed this opinion. There is a Cid of history and a Cid of romance, differing very materially in character, but each filling a large space in the annals of his country, and exerting a singular influence in the development of the national genius.

The Cid of history, though falling short of the poetical ideal which the patriotism of his countrymen has for 700 years cherished, is still the foremost man of the heroical period of Spain—the greatest warrior produced out of the long struggle between Christian and Moslem, and the perfect type of the Spanish Goth of the 12th century. Rodrigo Diaz, called de Bivar, from the place of his birth, better known by the title given him by the Arabs as the *Cid*

[1] [Reinhart (1820–83), born and died in Leyden, was an Arabic scholar, especially as to Spanish Islam, of which he was an authoritative historian. He translated *Al-Makkari*.—Am. Ed.]

(*El Seid*, the lord), and *El Campeador*, the champion *par excellence*, was of a noble family, one of whose members in a former generation had been elected judge of Castile. The date of his birth cannot be fixed with any certainty, but it was probably between 1030 and 1040. As Rodrigo Diaz de Bivar he is first mentioned in a charter of Fernando I. of the year 1064. The legends which speak of the Cid as accompanying this monarch in his expeditions to France and Italy must be rejected as purely apocryphal. Fernando, a great and wise prince under whom the tide of Moslem conquest was first effectually stemmed, on his deathbed, in 1065, divided his territories among his five children. Castile was left to his eldest son Sancho, Leon to Alphonso, Galicia to Garcia, Zamora and Toro to his two daughters Urraca and Elvira. The extinction of the Western Caliphate and the dispersion of the once noble heritage of the Ommiades into numerous petty independent states, had taken place some thirty years previously, so that Castilian and Moslem were once again upon equal terms, the country being almost equally divided between them. On both sides was civil war, urged as fiercely as that against the common enemy, in which the parties sought allies indiscriminately among Christians and Mahometans. No condition of affairs could be more favorable to the genius of the Cid. He rose to great distinction in the war between Sancho of Castile and Sancho of Navarre, in which he won his name of *Campeador*, by slaying the enemy's champion in single combat. In the quarrel between Sancho and his brother Alphonso, Rodrigo Diaz espoused the cause of the former, and it was he who suggested the perfidious stratagem by which Sancho eventually obtained the victory and possession of Leon. Sancho having been slain in 1072, while engaged in the siege of Zamora, Alphonso was taken from his prison and raised to the vacant throne. One of the most striking of the passages in the Cid's legendary history is that wherein he is represented as forcing the new king to swear that he had no part in his brother's death; but there was cause enough without this for Alphonso's animosity against the man who had helped to despoil him of his patrimony. For a time the Cid, already renowned throughout Spain for his prowess in war, was even advanced by the king's favor and entrusted with high commissions of state. In 1074 the Cid was wedded to Ximena, daughter of the count of Oviedo, and granddaughter, by the mother's side, of Alphonso V. The original deed of the marriage-contract is still extant. Some time afterwards the Cid was sent on an embassy to collect tribute from Motamid, the king of Seville, whom he found engaged in a war with Abdallah, the king of Granada. On Abdallah's side were many Castilian knights, among them Count Garcia Ordoñez, a prince of the blood, whom the Cid endeavored vainly to persuade of the disloyalty of opposing their master's ally. In the battle which ensued under the walls of Seville, Abdallah and his auxiliaries were routed with great slaughter, the Cid returning to Burgos with many prisoners and a rich booty. These fresh proofs of his prowess only served to kindle against him the rancor of his enemies and the jealousy of the king. Garcia Ordoñez accused him to Alphonso of keeping back part of the tribute received from Seville, and the king took advantage of the Cid's absence on a raid against the Moors to banish him from Castile. Henceforth Rodrigo Diaz began to live that heroic-picaresque life which has made him famous, sometimes fighting under the Christian banner, sometimes under Moorish, but always for his own hand. At the head of a band of 300 free lances he offered his services first to the count of Barcelona; then, failing him, to Moctadir, the Arab king of Saragossa, of the race of the Beni Houd. Under Moctadir, and his successors Moutamin and Mostain, the Cid remained for nearly eight years, fighting their battles against Mahometan and Christian, when not engaged upon his own, and being admitted almost to a share of their royal authority. He made more than one attempt to be reconciled with Alphonso, but his overtures being rejected, he turned his arms against the enemies of the Beni Houd, extending their dominions at the expense of the Christian states of Aragon and Barcelona, and harrying even the border lands of Castile. Among the enterprises of the Cid the most famous was that against Valencia, then the richest and most flourishing city of the Peninsula, and an object of cupidity to both Christian and Moslem. The Cid appeared before the place at the head of an army of 7000 men, for the greater part Mahometans. In vain did the Valencians implore succor from the emir of Cordova, and from their co-religionists in other parts of the Peninsula. In defiance of an army which marched to the relief of the beleaguered city under Yussuf the Almoravide, the Cid took Valencia after a siege of nine months, on the 15th of June, 1094—the richest prize which up to that time had been recovered from the Moors. The conditions of the surrender were all violated—the cadi Ibn Djahhaff burnt alive, a vast number of the citizens who had escaped death by famine slaughtered, and the possessions divided among the Campeador's companions. In other respects the Cid appears to have used his victory mildly, ruling his kingdom, which now embraced nearly the whole of Valencia and Murcia, for four years with vigor and justice. At length the Almoravides, whom he had several times beaten, marched against him in great force, inflicting a crushing defeat at Cuença upon the Cid's army, under his favorite lieutenant, Alvar Fañez. The blow was a fatal one to the aged and war-warn Campeador, who died of anger and grief in July, 1099. His widow maintained Valencia for three years longer against the Moors, but was at last compelled to evacuate the city, taking with her the body of the Cid to be buried in the monastery of San Pedro at Cardeña, in the neighborhood of Burgos. Here, in the centre of a small chapel, surrounded by his chief companions in arms, by Alvar Fañez Minaya, Pero Bermudez, Martin Antolinez, and Pelaez the Asturian, rest, after frequent disturbances from friend and foe, the bones of the mighty warrior, the truest of Spanish heroes, the embodiment of all the national virtues and most of the national vices. Philip II. tried to get him canonized, but Rome objected, and not without reason. Whatever were his qualities as a fighter, the Cid was but indifferent material out of which to make a saint,—a man who battled against Christian and against Moslem with equal zeal, who burnt churches and mosques with equal zest, who ravaged, plundered, and slew as much for a livelihood as for any patriotic or religious purpose, and was in truth almost as much of a Mussulman as a Christian in his habits and his character. His true place in history is that of the greatest of the *guerrilleros*—the perfect type of that sort of warrior in which, from the days of Sertorius to those of El Empecinado, the soil of Spain has been most productive.

The Cid of romance, the Cid of a thousand battles, legends, and dramas, the Cid as apotheosized in literature, the Cid invoked by good Spaniards in every national crisis, whose name is a perpetual and ever-present inspiration to Spanish patriotism, is a very different character from the historical Rodrigo Diaz—the freebooter, the rebel, the consorter with the infidels and the enemies of Spain. He is the Perfect One, the Born in a Happy Hour, "My Cid," the invincible, the magnanimous, the all-powerful. He is the type of knightly virtue, the mirror of patriotic duty, the flower of all Christian grace. He is Roland and Bayard in one. In the popular literature of Spain he holds a place such as has no parallel in other countries. From an almost contemporary period he has been the subject of song; and he who was chanted by wandering minstrels in the 12th century has survived to be hymned in revolutionary odes of the 19th. In a barbarous Latin poem, written in celebration of the conquest of Almeria by Alphonso VII. in the year 1147, we have the bard testifying to the supereminence of the Cid among his country's heroes:—

> "Ipse Rodericus *Mio* Cid semper vocatus,
> De quo cantatur quod ab hostibus haud superatus,
> Qui domuit Mauros, comites domuit quoque nostros."

Within a hundred years of his death the Cid had become the centre of a whole system of myths. The *Poema del Cid*, written in the latter half of the 12th century, has scarcely any trace of a historical character. Already the Cid had reached his apotheosis, and Castilian loyalty could not consent to degrade him when banished by his sovereign:—

> "Dios, que buen vassalo si oviese buen señor!"

cry the weeping citizens of Burgos, as they speed the exile on his way.

The Poem of the Cid is but a fragment of 3744 lines, written in a barbarous style, in rugged assonant rhymes, and a rude Alexandrine measure, but it glows with the pure fire

of poetry, and is full of a noble simplicity and a true epical grandeur, invaluable as a living picture of the age. The ballads relating to the Cid, of which nearly two hundred are extant, are greatly inferior in merit, though some of them are not unworthy to be ranked with the best in this kind. Duran believes the greater part of them to have been written in the 16th century. A few betray, not more by the antiquity of their language than by their natural and simple tone, traces of an earlier age and a freer national life. They all take great liberties with history, thus belying the opinion of Sancho Panza that "the ballads are too old to tell lies." Such of them as are not genuine relics of the 12th century are either poetical versions of the leading episodes in the hero's life as contained in the *Chronicle*, that *Chronicle* itself having been doubtless composed out of still earlier legends as sung by the wandering *juglares*, or pure inventions of a later time, owing their inspiration to the romances of chivalry. In these last the ballad-mongers, not to let their native hero be outdone by the Amadises, the Esplandians, and the Felixmartes, engage him in the most extravagant adventures—making war upon the king of France and upon the emperor, receiving embassies from the Soldan of Persia, boarding the Pope at Rome, and performing other feats not mentioned even in the Poem or the Chronicle. The last and the worst of the Cid ballads are those which betray by their frigid conceits and feeble mimicry of the antique the false taste and essentially unheroic spirit of the age of Philip II. As for the innumerable other poems, dramas, and tales which have been founded on the legend of the Cid, from the days of Guillen de Castro and Diamante to those of Quintana and Trueba, they serve merely to prove the abiding popularity of the national hero in his native land.

The chief sources from which the story of the Cid is to be gathered are, first, the Latin chronicle discovered by Risco in the convent of San Isidro at Leon, proved by internal evidence to have been written before 1258; the *Cronica General*, composed by Alphonso X. in the second half of the 13th century, partly (so far as relates to the Cid) from the above, partly from contemporary Arabic historics, and partly from tradition; the *Cronica del Cid*, first published in 1512, by Juan de Velorado, abbot of the monastery of San Pedro at Cardeña, which is a compilation from the last, interlarded with new fictions due to the piety of the compiler; lastly, various Arabic manuscripts, some of contemporary date, which are examined and their claims weighed in the second volume of Professor Dozy's *Historie de la littérature de l'Espagne au moyen âge*. Huber, Müller, and Ferdinand Wolf are among the leading authorities in the history and literature of the Cid. M. Damas Hinard has published the poem, with a literal French translation and notes, and John Hookham Frere has rendered it into English with extraordinary spirit and fidelity. The largest collection of the Cid ballads is that of Duran, in the *Romanccro General*, in two volumes, forming part of Rivadencyra's *Biblioteca de Autores Españoles*.

(H. E. W.)

CIDER, an alcoholic beverage obtained by the fermentation of the juice of apples. The manufacture is chiefly carried on by the cultivators of the fruit, and it has been conducted from very remote times in Hereford, Worcester, Gloucester, Somerset, and Devonshire in England, and in Normandy in Francc. Cider is also largely prepared and consumed in Upper Austria, Wurtemberg, in the districts of the Maine and the Moselle, and in Holland; and it is besides a common beverage in the New England and Western States of America. In the south-west of England the most esteemed varieties of apple cultivated for cider-making are the Royal Wilding, the Foxwhelp, White Normandy Beech, Yellow Styre, Handsome Mandy, and Skyrme's Kernel. For a superior quality of cider the large well-matured apples of several varieties are selected, and are ground up to a fine pulp either in an old-fashioned cider-mill, or in one of several newer machines which have been introduced for pulping the fruit. The old form of mill consists of a circular trough around which a huge heavy stone wheel or runner, weighing about a ton, is drawn by a horse. Into the trough a charge of apples, to the amount of from 8 to 10 bushels, is thrown, and the mill is kept in motion till the whole mass is reduced to a fine uniform pulp, which is technically called "the cheese." The old-fashioned mills are now generally superseded by modern inventions, of which Coleman's cider-press may be taken as the type. It consists of two pairs of rollers mounted in a strong wooden frame. The first and upper pair are of hard wood, studded with iron teeth or knives, set immediately under a hopper into which the fruit is fed. In passing between the first pair the fruit is sliced into small pieces which fall between the second pair of rollers, placed immediately below. These consist of heavy cylinders of stone set quite close so that the opposing surfaces press against each other, and the sliced apples in passing between them are bruised to a fine pulp which is received into a trough placed directly under. The pulp or cheese is, or ought to be, laid aside for at least a night to allow fermentation to set in before the juice is expressed. By this means the aromatic oil contained in the seeds is extracted, communicating its aroma to the mass, and a richer, fuller-flavored beverage is the result. The cheese is placed in hair-cloths in a strong framed box for expressing the juice, an operation which must be gently and carefully performed, so that the liquid may be obtained as pure and clear as possible. The juice ought to have a specific gravity of from 1·07 to 1·08, and should contain 10 or 11 per cent. of sugar and 0·6 to 0·7 per cent. of malic acid. The liquor is strained and placed for fermenting either in large vats or in separate casks. In the fermentation which ensues an abundant sediment is thrown to the bottom and a scum rises to the surface. In a week or ten days this action should leave the liquid clear and bright if the fermentation has continued steady and moderate. The liquid is then racked off into casks, as free as possible from scum and sediment, and excluded from atmospheric influence to stop the further action of the ferment. If in the early part of the following spring it is found to be still clear, nothing further is required except to cask it up for the market; but should it have become thick and ropy it must be "fined" either by means of isinglass or with stewed and mashed apples. It is frequently found necessary, in order effectually to stop fermentation, to expose the liquor to the influence of sulphurous acid gas, which is done by burning a sulphur-tipped stick inside a cask half filled with cider, and shaking the cask so as to make the liquor absorb the acid gas. Such "matched" cider is readily detected by connoisseurs. The artificial coloring of cider, when practised, is done either with burnt sugar, the juice of red beet, logwood, or cochineal; and in Germany a flavor is sometimes communicated to the beverage with elder flowers, cinnamon, cloves, or other aromatics. The following analysis of a pint of common cider such as is supplied to agricultural laborers in Somersetshire is by Dr. Voelcker:—

Water	8292·41 grs.
Alcohol	367·69
Grape Sugar	31·67
Gum and extractive matter	45·05
Albuminous compounds	1·94
Malic Acid	44·86
Ash	18·38
	8802·00 grs.

Cider is very prone to undergo acetous fermentation, and develop a rough, sharp, vinegary taste; and in that condition its consumption readily causes diarrhœa and colic. Roughness may be much reduced by treatment with various compounds prepared for the purpose which contain lime, or by the addition of a quantity of hops boiled with treacle or honey to the acetified cider. When sound it is a wholesome, agreeable, and refreshing stimulant beverage. In Germany a spirit, apple brandy, is distilled from cider.

CIENFUEGOS, Nicasio Alvarez de (1762–1809), poet and publicist, was born at Madrid. He studied with distinction at Salamanca, where he sat at the feet of the poet Melendez Valdez. The year 1778 saw the first of his poems published, and the attention of his countrymen was immediately attracted. He was appointed editor of the Government organs, the *Gaceta* and *Mercurio*, and an article on Napoleon published in the former drew down on him the heavy hand of Murat. Cienfuegos was condemned to death; he refused submission, and would assuredly have been executed but for the prayers of his friends. At their instance the sentence was commuted into one of deportation into France. Worn out with grief and fatigue, he died at Orthez in the following year. His verses are imitated from those of Melendez Valdez; they are by no means deficient in science or passion, but they are too often disfigured by a spurious sentimentality and by an affectation of the flimsy philosophy of the age. He was

blamed for an unsparing use at once of archaisms and of novelties, which some regarded with approval, but others denounced him as a traitor to the glorious traditions of Castilian art, and as bent on Frenchifying the noble Castilian idiom. His plays—*Pitaco, Zoraida, La Condesa de Castilla,* and *Idomeneo,* four tragedies on the pseudo-classic French model, and *Las Hermanus Generosas,* a comedy—have been long forgotten both in the closet and on the stage. See Ticknor, *History of Spanish Literature,* vol. iii.; and Cienfuegos, *Obras Poeticas,* 2 vols., Madrid, 1816.

CIGAR, a form in which tobacco is prepared for smoking without the use of a pipe. Cigars consist of certain portions of small and broken leaf tobacco rolled together in the form of a short stick or rod tapering to a point at one end called the curl or twist, and firmly wrapped round with one or two wrappings of whole leaf tobacco. The manufacture of cigars is conducted by hand-labor, and the various operations are performed with great dexterity. The selected leaves to be used for wrapping are first damped and stripped or freed from the midrib, by which each leaf is torn into two halves. These are smoothed out and pressed to remove any creases, and with a sharp knife the workman cuts each into the proper shape to form a wrapper. On each wrapper so prepared a sufficient quantity of small and broken leaf is placed, and the whole is then wrapped up in the form of a cigar. An external wrapper of fine uniform leaf is added and secured in a peculiar kind of knot at the smaller end. The thick end is trimmed by placing the cigar in a gauge and cutting it to a definite size. After finishing the cigars are dried on trays either by exposure to the sun or in artificial heat, and when thoroughly dry they are packed in boxes for sale. *Cheroots* differ only in form from ordinary cigars, sloping gradually from the thick to the thin end, which instead of finishing in a point, is cut and trimmed the same as the thick end. *Cigarettes* are small cigars, sometimes consisting of fine cut tobacco wrapped up in thin paper or inserted in straw tubes. Cigars are sold under an immense variety of names, derived either from the country of their manufacture, from the kind of tobacco used, or from the fancy of the manufacturer. The finest cigars are obtained from Havana in Cuba, and in them the thick ends are left untrimmed by the knife; but although this is characteristic it is obviously no test of genuineness. Cheroots come principally from Manila in the Philippine Islands. See Tobacco.

CIGNANI, Carlo (1628–1719), was born at Bologna, where he studied under Battista Cairo, and afterwards under Albani. Though an intimate friend of the latter, and his most renowned disciple, Cignani was yet strongly and deeply influenced by the genius of Correggio, as a comparison of his drawing and of his manner of treating light and shadow with that of the painter of Parma will prove. His greatest work, moreover, the Assumption round the cupola of the church of the Madonna della Fuoca at Forli, which occupied him some twenty years, and is in some respects one of the grandest and most remarkable works of art of the 17th century, is obviously inspired from the more renowned fresco of Antonio Leti in the cupola of the cathedral of Parma. Cignani had some of the defects of his masters; his elaborate finish, his audacious artificiality in the use of color and in composition, mark the disciple of Albani; but he imparted to his work a more intellectual character than either of his models, and is not without other remarkable merits of his own. In private character Cignani was eminently amiable, unassuming, and generous. His success, however, made him many enemies; and the envy of some of these is said to have impelled them to deface certain of his works. He accepted none of the honors offered him by the duke of Parma and other princes, but lived and died an artist. On his removal to Forli, where he died, the school he had founded at Bologna was fain in some sort to follow its master. His most famous pictures, in addition to the Assumption already cited, are—the entry of Paul III. into Bologna; the François I. Touching for King's Evil; a Power of Love, painted under a fine ceiling by Agostino Caracci, on the walls of a room in the ducal palace at Parma; an Adam and Eve; a Temptation of Joseph, in the Florentine Palazzo Arnoldi; and a Sampson, in the Bolognese Palazzo Zambeccari.

CIGOLI, or Civoli, Luigi Cardi da (1559–1613), painter, architect, and poet, was born at Cigoli in Tuscany. Educated under Allori and Santo di Titi, he formed a peculiar style by the study at Florence of Michelangelo, Correggio, Andrea dal Sarto, and Pontormo. Assimilating more of the second of these masters than of all the others, he labored for some years with success; but the attacks of his enemies, and intense application to the production of a wax model of certain anatomical preparations, induced an alienation of mind which affected him for three years. At the end of this period, he visited Lombardy, whence he returned to Florence. There he painted an Ecce Homo, in competition with Passignani and Caravaggio, which gained the prize. This work was afterwards taken by Bonaparte to the Louvre, and was restored to Florence in 1815. His other pictures of importance are—a St. Peter Healing the Lame Man, in the church of St. Peter's at Rome; a Conversion of St. Paul, in that of San Paolo fuori le Mura, and a Story of Psyche, in fresco, at the Villa Borghese, in the same city; a Martyrdom of Stephen, which earned him the name of the Florentine Correggio, a Venus and Satyr, and a sacrifice of Isaac, at Florence; and a Stigmata of St. Francis, at Foligno. Cigoli, who was made a knight of Malta at the request of Pope Paul III., was a good and solid draughtsman and the possessor of a rich and harmonious palette. He died, it is said, of grief at the failure of his last fresco (in the Roman church of Santa Maria Maggiore), which is rendered ridiculous by an abuse of perspective.

CILICIA, one of the most important provinces in the ancient division of Asia Minor, partly represented by the modern province of Adana. It comprised a large part of the southern coast of that country, extending from Pamphylia on the W. to Mount Amanus and the frontiers of Syria on the E. Throughout this extent it was bounded by the central ridge of Mount Taurus on the N. and by the Mediterranean on the S., so that its form was long and narrow, having a length in a direct line of nearly 270 English miles, while its breadth hardly anywhere exceeds 68 miles. It is divided by nature into two portions of a very different character;—the westernmost, known in ancient times as Cilicia Trachea or Tracheotis (the modern Itsch Ili), the Rugged Cilicia, a well-deserved epithet, as almost the whole region is occupied by a rugged mountain tract, formed by the branches and offshoots of Mount Taurus, which descend for the most part quite to the sea, while the interior is furrowed by deep and narrow valleys, leaving but scanty spaces fit for cultivation; the easternmost, on the contrary, called Cilicia Pedias, or "of the Plains," presenting a broad expanse of level alluvial plains round which the lofty chain of Mount Taurus sweeps in a semicircle, forming a great mountain barrier that encloses it like a wall on the north and east, and separates it from the extensive upland plains of Lycaonia and Cappadocia.

Towards the west the limit between Cilicia and Pamphylia was an arbitrary one; the first place that is assigned by Strabo to Cilicia being Coracesium, a remarkable fortress on a projecting rocky headland, now called Alaja. The whole of this rugged mountain district indeed abounds in such projecting headlands, with small sheltered coves or harbors beneath them,—a character that has peculiarly fitted it, both in ancient and in modern times, for affording shelter to pirates. At the same time the difficulty of communication with the interior has prevented any of the towns on the coast from rising into important centres of trade. Notwithstanding these disadvantages there were in ancient times a considerable number of towns surrounding the coasts of Cilicia Trachea; among which may be mentioned (proceeding from W. to E.) Selinus, afterwards called Trajanopolis; Anemurium, near the promontory of the same name, which is the southernmost point of Asia Minor; Celenderis, still called Kelenderi, and used as a place of passage to the Island of Cyprus, though now a poor decayed village; and Seleucia, termed for distinction's sake Seleucia ad Calycadnum, from its position at the mouth of the river of that name. The Calycadnus, now known as the Gök Su, or "Blue River," is indeed the only river of any importance in Cilicia Trachea, which it traverses nearly through its whole length, rising but a short distance from the sea, and flowing through a very winding valley, but with a general direction from W. to E. The only towns in the interior of this western part of Cilicia—Mout, which occupies the site of Claudiopolis, and Ermenek (Germanicopolis)—are situated in the valley of the Calycadnus, but

they are places of little importance. The whole of this mountain tract is still covered with extensive forests, which in ancient times supplied timber for the navies of the Egyptian and Syrian kings, but are now almost entirely neglected.

The small river Lamus still called Lamas Su was considered by ancient geographers as constituting the limit between the two different provinces of Cilicia. From that point the mountains begin to recede from the coast, and leave a narrow strip of alluvial plain between them and the sea, which, beyond Soli to the east, opens out into the broad level expanse that gave name to Cilicia Pedias. The whole of this extensive plain, spreading out in some parts to more than 30 miles in width, is composed of alluvial deposits brought down by the rivers that intersect it. It has consequently a soil of great natural fertility, and would be capable of the richest cultivation; but it is for the most part a desolate uncultivated tract, in which the towns of Tarsus and Adana, with their surrounding gardens and fruit-trees, appear like oases in the midst of a desert. The surrounding plains are the abode in winter of numerous hordes of Turcomans and Kurds, who wander over them freely with their flocks and herds; while in summer they are rendered pestilential by the noxious miasmata produced by the marshes formed by the rivers that flow through them, so that at this season they are almost wholly uninhabited.

The plains of eastern Cilicia are traversed by three considerable rivers. Of these the Cydnus, which flows by Tarsus, though much the most celebrated in ancient times, is the least considerable. It is formed by the junction of three streams, all of which rise on the southern slope of the Bulghardagh, as the portion of Mount Tarsus immediately north of Tarsus is called; and it has consequently but a short course from thence to the sea. But it is a deep and rapid stream, and was celebrated in antiquity for the coolness and clearness of its waters, a bath in which nearly cost Alexander the Great his life. The other two rivers, the Sarus and Pyramus, now known as the Sihun and Jihun, are much more important. Both of these take their rise in the upland plains of Cappadocia, beyond the range of Mount Taurus, through which they force their way to the Cilician plains below. On arriving in these they spread out into stagnant pools and marshes, through which the main streams are continually changing their courses, and cutting out for themselves new channels. These changes have caused much confusion in reconciling the accounts given by ancient writers with the present geography of the country. It appears certain that in ancient times the Sarus joined the Pyramus near its mouth, and both together fell into the sea immediately to the west of the small rocky headland called Karatasch Burun, near the site of the ancient city of Mallus; but at the present day the Sihun holds a separate course from Adana towards the south-west, flowing into the sea within a few miles of the mouth of the Cydnus, while the Jihun, as it approaches the sea, takes a sudden turn to the east, and flows into the Gulf of Scanderoon, between the site of Mallus and that of the ancient Ægæ, now known as Aias.

Imperfectly as the plains of this part of Cilicia are cultivated, they produce cotton, wheat, barley, tobacco, and sesame in sufficient quantities to show of what they would be capable if properly drained and tilled; while the gardens around the towns of Tarsus and Adana are planted with palms, orange-trees, figs, and other fruit trees, which flourish with the utmost luxuriance. The climate in summer is intensely hot; and the plains at that season are burnt up and parched; but the abundant means of irrigation at hand, if properly utilized, would effectually remedy that disadvantage. These extensive plains are frequented by numbers of gazelles and jerboas, as well as bustards, francolins, and other game. Buffaloes also abound in the marshy tracts near the sea. In the ranges of Mount Taurus, leopards, for which the province was noted in the time of Cicero, are still found not unfrequently.

Besides Tarsus and Adana, which retain their ancient names as well as sites, there were in ancient times several other important cities in the eastern portion of Cilicia. Among these Soli (afterwards called Pompeiopolis, from its having been repeopled and rebuilt by Pompey the Great) was situated at the western extremity of the great plain, a few miles west of Mersina, the modern port of Tarsus; while Mallus occupied the promontory now called Karatasch Burun, at its eastern extremity. In the interior were Mopsuestia (now Missis) on the River Pyramus, and Anazarbus (still called Aïn Zarba) higher up the valley of the same river, which, under the Roman and Byzantine empires, became one of the most flourishing cities of Cilicia. In modern times Adana, which is the capital of the pashalic or vilayet that comprises all Cilicia, is much the most important town in the province, and is estimated to contain 18,000 inhabitants, while Tarsus does not possess more than 7000 or 8000.

Mersina, the port of Tarsus, though still but a small place, is gradually becoming the seat of a considerable trade, being the only outlet for the productions of the interior.

Cilicia is bounded on the east (as already stated) by Mount Amanus, one of the most considerable of the branches or offshoots of Mount Taurus. But the range to which this name was given by ancient geographers is in fact a double one, which forks into two branches about midway between Marasch and the sea, and sends down two arms,—the one in a south-west direction, ending in the Cilician plain before reaching the sea; the other running nearly due south till it curves round the Gulf of Scanderoon, and ends in the lofty mountain promontory of Ras el Khanzin, the Rossicus Scopulus of Ptolemy. Between these two ranges lies the deep bay or inlet called in ancient times the Gulf of Issus, and now known as the Gulf of Scanderoon, from the seaport of that name; this is above 50 miles long and about 20 miles wide at its entrance. On its shores were situated in ancient times the towns of Ægæ (now Aias) on the western side, and Issus, Myriandrus, and Rhosus on the eastern; but after the foundation of Alexandria on the same side of the gulf, these last towns sank into comparative insignificance. Alexandria still survives under the name of Alexandretta, or Iskenderun (commonly corrupted into Scanderoon) as it is called by the Turks, and is a place of considerable trade.

The southern branch of Mount Amanus unquestionably constitutes the natural limit of Cilicia, and hence Strabo correctly assigns all the towns north of the promontory of Rhosus to Cilicia, and those on the other side of it to Pieria in Syria. But for political purposes the limit was fixed at a point some miles north of Alexandria, where there was a fortified pass called the Syrian Gates. The name of Pylæ Syriæ or Syrian Gates was also given, however, to the mountain pass across the range of Mount Amanus, now known as the Pass of Beilan, which has in all ages formed the direct route from Asia Minor into Syria. It was to its command of these passes, as well as that called the Cilician Gates on the north, leading directly across the chain of Mount Taurus, that Cilicia owed much of its importance in a military and political point of view.

History.—Though the boundaries of Cilicia, as above defined, were generally recognized in ancient times, the people of that name appears to have been in early days much more widely spread, and occupied a considerable extent of country north of Mount Taurus, as well as in the mountain regions extending towards Armenia. Thus Herodotus extends the name of Cilicia to the Euphrates, and must have comprised a large portion of Cappadocia under that appellation. There can be no doubt that the Cilicians, as well as the Cappadocians, were of Semitic or Aramaic descent, and belonged to the same stock as the Syrians, from whom, however, they were from a very early period politically separate. Cilicia appears as an independent kingdom under a monarch named Syennesis, in the time of Alyattes, king of Lydia, 610 B.C. (Herod., i. 74), and even after it passed under the Persian empire it continued to be governed by its own kings, all of whom appear to have borne the name, or rather appellation, of Syennesis. From its position Cilicia attracted much attention during the expedition of the younger Cyrus (401 B.C.), as well as in that of Alexander, whose first great victory over the Persian king was fought at Issus, in the narrow pass between Mount Amanus and the sea (333 B.C.).

Cilicia now passed under the Macedonian rule, and was subject to the Seleucidan kings of Syria. But owing to the feeble and unsettled character of the government under the later monarchs of that dynasty, the western portion of the country, or Cilicia Trachea, became the stronghold of numerous pirates, who carried their depredations to such an extent as to compel the Romans to wage regular war upon them. It was not till 66 B.C. that they were finally subdued by Pompey, and Cilicia was regularly constituted as a Roman province, which, however, comprised, in addi-

tion to Cilicia properly so called, Pamphylia, Pisidia, Isauria, Lycaonia, and a large part of Phrygia. This was the extent of the province when it was governed by Cicero as proconsul (51–50 B.C.), who obtained some successes against the mountain tribes of Mount Amanus, of which he was immoderately proud.

Under the Roman empire Cilicia was again reduced to its natural limits, but did not receive its final constitution as a province till the time of Vespasian. It retained its condition as such under the Roman and Byzantine empires till it fell, with the rest of Asia Minor, under the Seljukian Turks in the 11th century. After the break-up of the Turkish monarchy Cilicia was seized by the Armenians, who from the mountain districts of Mount Amanus and Taurus gradually made themselves masters of the whole country, of which they retained possession, notwithstanding frequent struggles with the Lusignans — the lords of the neighboring island of Cyprus—till both were expelled by the Ottoman Turks in the 15th century. From that period Cilicia has continued to form part of the Turkish empire, with the exception of the brief interval from 1833 to 1840, during which it was annexed to his dominions by Mehemet Ali, viceroy of Egypt; but after the defeat of that ruler by the allied powers he was compelled to evacuate Cilicia, which was reunited as before with the Ottoman empire.

The ancient geography of Cilicia is well described by Strabo (bk. xiv. ch. 5). Its coasts were first visited and were described in detail by Captain Beaufort in his *Karamania*, 8vo, Lond., 1818. A more complete examination of the whole country was made by M. Langlois in 1852–58 (*Voyage dans la Cilicia et dans les Montagnes du Taurus*, 8vo, Paris, 1861). (E. H. B.)

CIMABUE, Giovanni (1240 to about 1302), painter, was born in Florence of a creditable family, which seems to have borne the name of Gualtieri, as well as that of Cimabue (Bullhead). He took to the arts of design by natural inclination, and sought the society of men of learning and accomplishment. Vasari, the historian of Italian painting, zealous for his own native state of Florence, has left us the generally current account of Cimabue, which later researches have to a great extent invalidated. We cannot now accept his assertion that art, extinct in Italy, was revived solely by Cimabue, after he had received some training from Grecian artists invited by the Florentine Government to paint the chapel of the Gondi in the church of S. Maria Novella; for native Italian art was not then a nullity, and this church was only begun when Cimabue was already forty years old. Even Lanzi's qualifying statement that Grecian artists, although they did not paint the chapel of the Gondi, did execute rude decorations in a chapel below the existing church, and may thus have inspirited Cimabue, makes little difference in the main facts. What we find as the general upshot is that some Italian painters preceded Cimabue—particularly Guido of Siena and Giunta of Pisa; that he worked on much the same principle as they, and to a like result; but that he was nevertheless the most advanced master of his time, and, by his own works, and the training which he imparted to his mighty pupil Giotto, he left the art far more formed and more capable of growth than he found it. The undoubted admiration of his contemporaries would alone demonstrate the conspicuous position which he held, and deserved to hold. For the chapel of the Rucellai in S. Maria Novella he painted in tempera a colossal Madonna and Child with Angels, the largest altarpiece produced up to that date; before its removal from the studio it was visited with admiration by Charles of Anjou, with a host of eminent men and gentle ladies, and it was carried to the church in a festive procession of the people and trumpeters. Cimabue was at this time living in the Borgo Allegri, then outside the walls of Florence; the legend that the name Allegri (Joyous) was bestowed on the locality in consequence of this striking popular display is more attractive than accurate, for the name existed already. Of this celebrated picture, one of the great landmarks of modern and sacred art, some details may be here given, which we condense from the *History of Painting in Italy* by Messrs. Crowe and Cavalcaselle. "The virgin in a red tunic and blue mantle, with her feet resting on an open-worked stool, is sitting on a chair hung with a white drapery flowered in gold and blue, and carried by six angels kneeling in threes above each other. A delicately engraved nimbus surrounds her head, and that of the infant Saviour on her lap, who is dressed in a white tunic, and purple mantle shot with gold. A dark-colored frame surrounds the gabled square of the picture, delicately traced with an ornament interrupted at intervals by thirty medallions on gold ground, each of which contains the half-figure of a saint. In the face of the Madonna is a soft and melancholy expression; in the form of the infant, a certain freshness, animation, and natural proportion; in the group, affection—but too rare at this period. There is sentiment in the attitudes of the angels, energetic mien in some prophets, comparative clearness and soft harmony in the colors. A certain loss of balance is caused by the overweight of the head in the Virgin as compared with the slightness of her frame. The features are the old ones of the 13th century; only softened, as regards the expression of the eye, by an exaggeration of elliptical form in the iris, and closeness of the curves of the lids. In the angels, the absence of all true notions of composition may be considered striking; yet their movements are more natural and pleasing than hitherto. One indeed, to the spectator's right of the Virgin, combines more tender reverence in its glance than any that had yet been produced. Cimabue gave to the flesh-tints a clear and carefully-fused color, and imparted to the forms some of the rotundity which they had lost. With him vanished the sharp contrasts of hard lights, half-tones, and shadows." In a general way, it may be said that Cimabue showed himself forcible in his paintings, as especially in heads of aged or strongly characterized men; and, if the then existing development of art had allowed of this, he might have had it in him to express the beautiful as well. He, according to Vasari, was the first painter who wrote words upon his paintings,—as, for instance, round the head of Christ in a picture of the Crucifixion, the words addressed to Mary, *Mulier ecce filius tuus.*

Other paintings still extant by this master are the following:—In the Academy of Arts in Florence, a Madonna and Child, with eight angels, and some prophets in niches, —better than the Rucellai picture in composition and study of nature, but more archaic in type, and the color now spoiled (this work was painted for the Badia of S. Trinita, Florence); in the National Gallery, London, a Madonna and Child with Angels, which came from the Ugo Baldi collection, and had probably once been in the church of S. Croce, Florence; in the Louvre, a Madonna and Child, with twenty-six medallions in the frame, originally in the church of S. Francesco, Pisa. In the lower church of the Basilica of S. Francesco at Assisi, Cimabue, succeeding Giunta da Pisa, probably adorned the south transept,—painting a colossal Virgin and Child between four Angels, above the altar of the Conception, and a large figure of St. Francis. In the upper church, north transept, he has the Saviour Enthroned and some Angels; and, on the central ceiling of the transept, the Four Evangelists with Angels. Many other works in both the lower and the upper church have been ascribed to Cimabue, but with very scanty evidence; even the above-named can be assigned to him only as matter of probability. Numerous others which he indisputably did paint have perished,—for instance, a series (earlier in date than the Rucellai picture) in the Carmine church at Padua, which were destroyed by a fire.

From Assisi Cimabue returned to Florence. In the closing years of his life he was appointed capomaestro of the mosaics of the Cathedral of Pisa, and was afterwards, hardly a year before his death, joined with Arnolfo di Lapo as architect for the Cathedral of Florence. In Pisa he executed a Majesty in the apse,—Christ in glory between the Virgin and John the Evangelist, a mosaic, now much damaged, which stamps him as the leading artist of his time in that material. This was probably the last work that he produced.

The debt which art owes to Cimabue is not limited to his own performances. He was the master of Giotto, whom he found a shepherd boy of ten, in the pastures of Vespignano, drawing with a coal on a slate the figure of a lamb. Cimabue took him to Florence, and instructed him in the art; and after his death Giotto occupied a house which had belonged to his master in the Via del Cocomero. Another painter with whom Cimabue is said to have been intimate was Gaddo Gaddi.

It had always been supposed that the bodily semblance of Cimabue is preserved to us in a portrait-figure by Simon Memmi painted in the Cappella degli Spagnuoli, in S. Maria Novella,—a thin hooded face in profile, with small beard, reddish and pointed. This is now extremely dubious.

Simone Martini of Siena (commonly called Memmi) was born in 1283, and would therefore have been about nineteen years of age when Cimabue died; it is not certain that he painted the work in question, or that the figure represents Cimabue. The Florentine master is spoken of by a nearly contemporary commentator on Dante (the so-called Anonimo, who wrote about 1334) as *arrogante e disdegnoso;* so "arrogant and passionate" that if any one, or if he himself, found a fault in any work of his, however cherished till then, he would abandon it in disgust. This, however, to a modern mind, looks more like an aspiring and fastidious desire for perfection than any such form of "arrogance and passion" as blemishes a man's character. Giovanni Cimabue was buried in the cathedral of Florence, S. Maria del Fiore, with an epitaph written by one of the Nini:—

> "Credidit ut Cimabos picturæ castra tenero:
> Sic tenuit vivens; nunc tenet astra poli."

Here we recognize distinctly the suggestion of the first clause in the famous triplet of Dante:

> "Credette Cimabue nella pintura
> Tener lo campo; ed ora ha Giotto il grido,
> Sì che la fama di colui s'oscura." (W. M. R.)

CIMAROSA, Domenico (1749–1801), an Italian musical composer, was born at Aversa, in the kingdom of Naples. His parents were poor but anxious to give their son a good education; and after removing to Naples they sent him to a free school connected with one of the monasteries of that city. The organist of the monastery, Padre Polcano, was struck with the boy's intellect, and voluntarily instructed him in the elements of music, as also in the ancient and modern literature of his country. To the influence of the same worthy monk Cimarosa owed a free scholarship at the musical institute of Santa Maria di Loreto, where he remained for eleven years, studying chiefly the great masters of the old Italian school. Piccini, Sacchini, and other musicians of repute are mentioned amongst his teachers. At the age of twenty-three Cimarosa entered the lists as a composer with a comic opera called *Le Stravaganze del Conte*, first performed at the theatre dei Fiorentini at Naples in 1772. The work met with approval, and was followed in the same year by *Le Pazzie di Stellidanza e di Zoroastro*, a farce full of humor and eccentricity. This work also was successful, and the fame of the young composer began to spread all over Italy. In 1774 he was invited to Rome to write an opera for the *stagione* of that year; and he there produced another comic opera called *L'Italiana in Londra.*

The next thirteen years of Cimarosa's life are not marked by any event worth mentioning. He wrote a number of operas for the various theatres of Italy, residing temporarily in Rome, in Naples, or wherever else his vocation as a conductor of his works happened to call him. From 1784–1787 he lived at Florence, writing exclusively for the theatre of that city. The productions of this period of his life are very numerous, consisting of operas, both comic and serious, cantatas, and various sacred compositions. The following works may be mentioned amongst many others:—*Caio Mario;* the three Biblical operas, *Assalone*, *La Giuditta*, and *Il Sacrifico d'Abramo;* also *Il Convito di Pietra;* and *La Ballerina Amante*, a pretty comic opera first performed at Venice with enormous success. None of these works have survived, and their individual merits hardly give us cause to regret their loss. Excessive productiveness of this kind cannot but become mechanical. But this is no fault of Cimarosa's. The enormous demand of the Italian stage has become fatal to the genius of some of the most gifted composers of that country both in the last and in the present century. Looking at Cimarosa's works collectively, it may be said that they represent a style of considerable individuality and a perfect mastership of dramatic effect, so far at least as the vocal part is concerned. Cimarosa's orchestra, like that of most Italian composers, is somewhat meagre, but here also the comparatively primitive stage of orchestration at the time he wrote ought to be taken into account. Cimarosa seldom succeeds in the highest walks of his art. His comic operas are infinitely superior to those in which a tragic subject compelled him to attempt dramatic pathos. As far as grace and melodious charm are concerned, Cimarosa was surpassed by none of his contemporaries, not even by Paesiello, with whom he shared for a long time the leadership of the Italian school.

In 1787 Cimarosa went to St. Petersburg by invitation of the Empress Catherine II. At her court he remained four years and wrote an enormous number of compositions, mostly of the nature of *pièces d'occasion.* Of most of these not even the names are on record. In 1792 Cimarosa left St. Petersburg, the northern climate of Russia proving hurtful to the native of Italy. By invitation of the Emperor Leopold II. he went to Vienna, and it was there that he produced the masterpiece on which his claim to immortality must mainly rest. *Il Matrimonio Segreto* ranks amongst the highest achievements of light operatic music. In Italy it is surpassed by Rossini's *Barbieri* alone. After the lapse of more than eighty years it evinces its vitality at theatres and concert halls wherever the whole opera or detached pieces are heard. Its humor is founded on human nature itself, and is therefore independent of local and temporal conditions. 1793 Cimarosa returned to Naples, where *The Secret Marriage* and other works were received with great applause Amongst the works belonging to his last stay in Naples, the charming opera *Le Astuzie Feminili* may be mentioned. This period of his life is said to have been embittered by the intrigues of envious and hostile persons, amongst whom one is sorry to meet with Paesiello his old rival. During the occupation of Naples by the troops of the French Republic, Cimarosa joined the liberal party, and on the return of the Bourbons, was like many of his political friends condemned to death. By the intercession of influential admirers his sentence was commuted into banishment, and the composer left Naples with the intention of returning to St. Petersburg. But his health was broken, and after much suffering he died at Venice in 1801 of inflammation of the intestines. The nature of his disease led to the rumor of his having been poisoned by his enemies, which, however, a formal inquest proved to be unfounded. He worked till the last moment of his life, and one of his operas, *Artemizia*, remained unfinished at his death. (F. H.)

CIMBRI, or Cimbrians (Greek, Κίμβροι), an ancient nation of unknown affinity, which was one of the most formidable enemies of the Roman power, and has proved one of the most difficult subjects for the historical investigator. About 113 B.C., in company with the Teutones, they defeated the consul Papirius Carbo near Noreia in Styria; and in 109 B.C. they routed another army under the consul Silanus. By the latter success they opened their way to Gallia Narbonensis; and in 105 B.C. they began to threaten the Roman territory itself. They were joined by the Gauls from all quarters; and the Roman army sent against them under Cæpio and Manlius was almost exterminated. Only ten men with two generals are said to have escaped; and, in accordance with a vow which they had made before the battle, the conquerors destroyed all the spoil. The gold and silver they flung into the Rhone; they drowned the horses and put all the prisoners to death. The Romans were thrown into consternation; but a new army was raised with all expedition, and the command was bestowed on Marius, who at that time enjoyed a high reputation on account of his victories in Africa. The Cimbri were approaching over the eastern Alps, and the Teutones and the other allies over the western. He first attacked and defeated the latter division at Aquæ Sextiæ, and then returned to face the Cimbri, who had meanwhile seen the backs of the soldiers of Catullus and Sylla. The vast host attacked the Romans with the utmost fury in the Campi Raudii near Vercellæ (101 B.C.); but, unaccustomed to the heats of Italy, they soon began to yield and were easily overcome. They had put it out of their own power to fly; for, that they might the better keep their ranks, they had, like true barbarians, tied themselves together. It is said that 120,000 were killed on the field of battle and 60,000 were taken prisoners. The people of the Italian districts known as the Sette Communi in Vicenza and the Tredeci Communi in Verona have a belief that they are descended from the remnants of the Cimbrian army, but it is much more probable that they are the posterity of German settlers introduced by the bishops of Trent. Be this as it may, it is certain that after the victory of Marius the Cimbri were no longer of much importance as antagonists of Rome.

Two great questions have claimed the attention of the

historian in regard to this people; but to neither of them has anything like a definite answer been obtained. The first has to do with their local habitation, and the second with their ethnographical connection. Cæsar, Sallust, Cicero, and Diodorus Siculus seem to have regarded them as Gauls, and assign them a position within the Gallic area; whereas Strabo, Velleius Paterculus, and Tacitus treat them as Germans and locate them beyond the Rhine. The modern district of Jutland was familiarly known as the Cimbric Chersonese, and mention is made in the *Mon. Ancyranum* of an embassy from the Cimbrians of that peninsula to Augustus. Beyond this our ancient authorities do not carry us, and modern discussion has done little but maintain a continual oscillation of opinion. That they were closely connected with the Teutones is evident, and that the Teutones at least were Germanic was for a time regarded as certain; but more elaborate investigation shows that even this is open to dispute, and can afford no support as an argument. The ancient identification of the people with the Cimmerii and the modern identification with the Cymry are well-nigh exploded, and probably owe their origin to mere similarity of names.

See Cellarius, *De Cimbris et Teutonibus;* Joh. von Müller, *Bellum Cimbricum,* 1776; Schiern, *De Cimbrorum Origine et Migrationibus,* 1842; Latham, Appendix to edition of the *Germania* of Tacitus; and a paper read by Canon Rawlinson before the Anthropological Institute, May, 1876.

CIMMERII, or CIMMERIANS, a nomadic people of antiquity who dwelt near the Palus Mæotis or Sea of Azoff, in the Tauric Chersonese or Crimea, and in the Asiatic Sarmatia or the country of the lower Volga. They are said to have desolated Asia Minor prior to the time of Homer; and in their second invasion they penetrated as far westward as Æolis and Ionia, captured Sardis the capital of Lydia in the reign of Ardys, and continued in possession till they were driven out of Asia by Alyattes, the grandson of that sovereign. The fears of the Ionians are commemorated in the elegiac fragments of Callinus.

The name Cimmerii is also given to a mythical people, represented by Homer as inhabiting a remote region of mist and darkness, but localized by later writers near Lake Avernus, or in the Tauric Chersonesus, or in Spain. Their country was fabled to be so gloomy, that the expression "Cimmerian darkness" became proverbial; and Homer, according to Plutarch, drew his images of hell and Pluto from the dismal region they inhabited.

CIMON, an Athenian statesman, was the son of Miltiades. His father died in disgrace, leaving the fine which had been imposed on him unpaid. After a time it was paid by Cimon, who, according to one account, also took his place in prison. Distinguished by military ability, by a gentle and agreeable temper, and by the most open-handed liberality, Cimon gradually rose to the front rank among his contemporaries. His victorious attacks on the Persians, his ostracism, his request for leave to fight at Tanagra, and his recall on the motion of his rival Pericles are matters of history. (See GREECE.) He died while besieging Citium, 449 B.C.

CINCHONA, the generic name of a number of trees belonging to the natural order *Rubiaceæ,* but which, with a few allied genera, have been by some authorities established as a distinct order under the name *Cinchonaceæ.* Botanically the genus includes trees of varying size, some reaching an altitude of 80 feet and upwards, with evergreen leaves and deciduous stipules. The flowers are arranged in panicles, white or pinkish in color, with a pleasant odor, the calyx being 5-toothed superior, and the corolla tubular, 5-lobed, and fringed at the margin. The stamens are 5, almost concealed by the tubular corolla, and the ovary terminates in a fleshy disk. The fruit is an ovoid or sub-cylindrical capsule, splitting from the base and held together at the apex. The numerous seeds are flat and winged all round. According to the enumeration of Bentham and Hooker, 36 species have been distinguished, but of these not more than about a dozen have been economically utilized. The plants are natives of the western mountainous regions of South America, their geographical range extending from 10° N. to 22° S. lat.; and they flourish generally at an elevation of from 5000 to 8000 feet above sea level, although some have been noted growing as high up as 11,000 feet, and others have been found down to 2600 feet.

The trees are valued solely on account of their bark, which as cinchona bark, Jesuits' bark, or Peruvian bark is, and long has been, the source of the most valuable tonic and febrifuge medicines that have ever been discovered. The earliest well-authenticated instance of the medicinal use of cinchona bark is found in the year 1638, when the countess of Chinchon, the wife of the governor of Peru, was cured of an attack of fever by its administration. The medicine was recommended in her case by the corregidor of Loxa, who was himself said to have practically experienced its supreme virtues eight years earlier. The name *Cinchona* is due to the connection of the countess of Chinchon with the introduction of the remedy; and it is argued by Mr. Markham and others that therefore the term should be written *Chinchona.* A knowledge of the virtues of the bark was disseminated throughout Europe by members of the Jesuit brotherhood, whence it also became generally known as Jesuits' bark. According to another account, this name arose from its value having been first discovered to a Jesuit missionary who, when prostrate with fever, was cured by the administration of the bark by a South American Indian.

The procuring of the bark in the dense forests of New Granada, Ecuador, Peru, and Bolivia is a work of great toil and hardship to the Indian *Cascarilleros* or *Cascadores* engaged in the pursuit. The trees grow isolated or in small clumps which have to be searched out by the experienced Cascarillero, who laboriously cuts his way through the dense forest to the spot where he discovers a tree. Having freed the stem from adhering parasites and twining plants, he proceeds, by beating and cutting oblong pieces, to detach the stem bark as far as is within his reach. The tree is then felled, and the entire bark of stem and branches secured. The bark of the smaller branches, as it dries, curls up, forming "quills," the thicker masses from the stems constituting the "flat" bark of commerce. The drying, packing, and transport of the bark are all operations of a laborious description conducted under most disadvantageous conditions.

The enormous medicinal consumption of these barks, and the wasteful and reckless manner of procuring them in America long ago caused serious and well-grounded apprehension that the native forests would quickly become exhausted. The attention of European communities was early directed to the necessity of securing steady and permanent supplies by introducing the more valuable species into localities likely to be favorable to their cultivation. The first actual attempt to rear plants was made in Algeria in 1849; but the effort was not successful. In 1854 the Dutch Government seriously undertook the task of introducing the trees into the island of Java, and an expedition for that purpose was fitted out on an adequate scale. Several hundreds of young trees were obtained, of which a small proportion was successfully landed and planted in Java; and as the result of great attention the cultivation of cinchona plantations in that island is now highly prosperous and promising. The desirability of introducing cinchonas into the East Indies was urged in a memorial addressed to the East India Company between 1838 and 1842 by Sir Robert Christison[1] and backed by Dr. Forbes Royle; but no active step was taken till 1852, when, again on the motion of Dr. Royle, some efforts to obtain plants were made through consular agents. In the end the question was seriously taken up, and Mr. Clements R. Markham was appointed to head an expedition to obtain young trees from South America and convey them to India. In 1860 under Mr. Markham's superintendence a first consignment of plants was shipped from Islay in Peru, and planted in a favorable situation in the Neilgherry Hills. For several years subsequently additional supplies of plants of various species were obtained from different regions of South America, and some were also procured from the Dutch plantations in Java. Now the culture has spread over a wide area in Southern India, in Ceylon, on the slopes of the Himalayas, and in British Burmah; and recently plantations which already present a promising appearance have been established in Mauritius. Exclusive of private enterprise, the trees in the Government plantations in India now amount to several millions, and in the Neilgherry plantations they have attained a height of from 20 to 30 feet. The species introduced in the East are principally *Cinchona officinalis, C. Calisaya, C. succirubra, C. pitayensis,* and *C. Pahudiana,* some agreeing with certain soils and climates

[1] [A Scotch toxicologist (1797–1882), professor in Edinburgh University, was made baronet in 1871. His work on *Poisons* is standard. —AM. ED.]

better than others, while the yield of alkaloids and the relative proportions of the different alkaloids differ in each species.

In the original memorial above alluded to, presented to the East India Board by Sir R. Christison, he, according to a communication to the Edinburgh Botanical Society (*Trans.*, vol. xi. p. 111), pointed out that "the transplantation, if successful, would become remunerative. For although it would be a very arduous undertaking were the bark to be collected only by cutting down large trees, which do not attain sufficient growth in less than twenty or twenty-five years, being the only American method, the case would be very different were it shown that bark could be profitably taken from trees very much younger, and without either destroying or even injuring them. Now, I had ascertained," continues Sir Robert, "by chemical analysis that—contrary to the analysis of some French chemists—sulphate of quinia was to be obtained from fine quills of yellow bark taken from twigs two or three years old in as large proportion as from the large flat bark from the trunks and great branches. Consequently, as it appeared, from the facility with which the trees grew in their native forests by suckers from the old roots, when the trunks are properly cut down, that young twigs might safely be cut from them at an early period, it followed that the collection of cinchona bark might be conducted in the same way as that of cinnamon bark at Colombo, where only twigs of one or two years' growth are cut for the purpose, and without injuring the trees. . . . This doctrine has proved true, so true that it has been found suitable in India even to treat the cinchona plants like osier beds in England, by cutting them down altogether when young, thus using only twigs for the bark, and trusting to suckers for renewing the growth of the plants; and that the result has been the introduction of fine bark from India in such bulk as to have been sold by auction in the London market only nine years after the first cinchona plants were transplanted to India." Mr. W. G. M'Ivor, to whom the success of Indian plantations is largely due, introduced a system of mossing the plants, which consists in wrapping the growing stems in a layer of damp moss, whereby the yield of alkaloid is increased, and the growth of renewed bark promoted. It has been pointed out by Dr. De Vrij, and the observation is confirmed by Mr. D. Howard, that renewed bark contains the alkaloids not only in different proportions from the original bark, but that it even develops principles altogether absent in the natural bark.

The officinal barks of the *British Pharmacopœia* are three in number:—(1) the pale or Loxa bark (*cortex cinchonæ pallidæ*) yielded by *Cinchona officinalis;* (2) the yellow, royal, or Calisaya bark (*cortex cinchona flavæ*), the produce of *C. Calisaya;* and (3) red bark (*cortex cinchonæ rubra*) derived from *C. succirubra*. These are the sources of the tinctures, extracts, and other preparations of pharmacy, while, in common with several others, they also yield the alkaloids which now constitute the chief form in which the active principles of the barks are administered in medicine. Among the other barks used as sources of quinine, &c., the principal are—the ashy crown bark, *C. macrocalyx;* Carthagena bark, *C. lanceolata;* Columbian bark, *C. lancifolia;* Pitayo bark, *C. pitayensis;* grey or Lima bark, *C. micrantha*, *C. nitida*, and *C. peruviana*.

Leaving out of view certain alkaloids unimportant as yet in a commercial view, and found very sparingly in particular barks, the four primary alkaloids yielded by cinchona barks are quinine, quinidine, cinchonine, and cinchonidine. Certain secondary alkaloids are developed by chemical treatment of these primary principles, and an amorphous substance precipitated from the mother liquors of the quinine manufactured under the name of quinoidine is in considerable medicinal use. Much confusion has arisen in the terminology of the alkaloids by the application of the same name to chemically distinct principles, and by the converse description of the same alkaloids or products under different names. It is found that different barks derived from the same species vary greatly in richness in alkaloids, and that equally great fluctuations occur in the relative proportions of the various principles they yield. When a comparison is instituted among the barks of different species the variations are of course even more marked,—some barks having been found to yield as high as 13 per cent. of alkaloids, while in others not a trace has been obtained. Certain barks, however, are known as a rule to contain quinine in largest proportion, and in others cinchonine is the most abundant principle. Generally quinine is the most constant and abundant constituent, after which cinchonine, then cinchonidine, while quinidine is the rarest both in proportion and in frequency of occurrence of the principal alkaloids.

The preparation of cinchona bark most extensively employed in medicine is the alkaloid quinine in the form of a sulphate. As the barks from which it is extracted contain besides proportions of one or other of the principal alkaloids above enumerated, a demand for any of them might be supplied without interfering with the production of quinine, and as they also have been proved to be potent febrifuges their non-utilization is a regrettable waste. From the record of an extensive series of experiments instituted by the Indian Government it is demonstrated that quinidine is even more active than quinine, and it forms the principal constituent of a variety of calisaya bark in extensive cultivation in Java. Cinchonidine is only a little less powerful in its febrifugal effect than quinine, and it is abundantly formed by the red bark cultivated in British India. Cinchonine, although the least potent, is an abundant principle, and still a highly valuable and efficient remedial agent. (J. PA.)

CINCINNATI, an important city of the United States, situated in the S.W. part of Ohio, on the N. bank of the Ohio River, in 39° 6′ N. lat. and 84° 26′ W. long. It is the capital of Hamilton county, and in size is the first city in the State, while, according to the Federal census of 1870, it is the eighth in the United States. It was first settled in 1788 by persons from New Jersey, and is said to have been named in honor of the Cincinnati Society of officers of the Revolutionary war. It was incorporated as a city in 1814, and soon acquired a commercial importance which has steadily increased. In 1800 Cincinnati contained but 750 inhabitants. The population amounted to 9602 in 1820, 46,338 in 1840, 115,436 in 1850, 161,044 in 1860, and 216,239 in 1870. Of the total population in 1870, 79,612 were foreigners, including 49,448 born in Germany, 18,624 in Ireland, 3526 in England, and 2093 in France. The city is chiefly built upon two terraces or plateaus, the first 60 and the second 112 feet above the river. Beyond these rises an amphitheatre of hills from 400 to 450 feet high, from which may be obtained a magnificent view of the valley of the Ohio and the surrounding country. On the opposite bank of the river, in the State of Kentucky, are Covington, which had 24,505 inhabitants in 1870, and Newport, which had 15,087. Communication between these cities and Cincinnati is afforded by two bridges and three steam ferries. The wire suspension bridge, which is 1057 feet long between the towers (or, including the approaches, 2252 feet), with a height of 100 feet above low water, was completed in 1867 at a cost of nearly $2,000,000. It has a double wagon road, and two ways for pedestrians. Further up the river is a wrought iron railroad bridge built upon piers; besides a railway track, it has wagon and foot ways. Cincinnati covers an area of 24 square miles, extending along the river about 10 miles, with an average width of 3 miles. The most important part of the city, however, is comprised within a distance of 2½ miles along the river. The corporate limits have been much extended in recent years by the annexation of numerous villages, the most important being Columbia, Walnut Hills, Mount Auburn, and Cumminsville. In these, which still retain their former names, are seen the most costly residences and villas, with ornamental grounds embracing from 5 to 80 acres each. The city is also noted for the beauty of its suburbs and its surrounding scenery. The streets, which generally cross one another at right angles, are usually from 1½ to 2½ miles long, and from 50 to 100 feet wide. Many of them are lined with trees. Brick is chiefly used for buildings, with a greyish buff freestone for fronts. Business buildings are usually five and often six stories high. Cincinnati is well supplied with public parks, the largest of which, Eden, is situated on a hill in the eastern part of the city, and contains 216 acres. In Burnet Woods, recently purchased, there are 170 acres, mostly forest, on the hill north of the city. Centrally situated in the city are Washington, Lincoln, Hopkins, and the City parks, which together contain about 25 acres. One of the most attractive objects in the city is the Tyler Davidson bronze fountain which was unveiled in

1871. It was presented to the city by Mr. Henry Probasco, a wealthy citizen, who named it after the late Mr. Tyler Davidson, the originator of the proposal. Its cost was nearly $200,000. The design embraces fifteen bronze figures, all cast at Munich, the chief one representing a female with outstretched arms, from whose fingers the water falls in fine spray. This is the surmounting figure, and reaches a height of 45 feet above the ground. Among the most notable buildings is that of the Federal Government, built of sawed freestone in the Roman Corinthian style, with a porch of six columns; it is three stories high, with a length of 150 feet and a width of 80 feet. The county court-house, in the same style of architecture, is 175 feet square and three stories high, and has a porch with six Corinthian stone columns. The brick buildings for the city offices are 205 feet long and 52 feet wide. The city workhouse, 3½ miles from the heart of the city, is a brick structure, 515 feet long and 55 feet wide, erected at a cost, including 26 acres of land, of $650,000. It has room for 700 prisoners. The Cincinnati hospital, comprising eight buildings arranged around a central court and connected by corridors, occupies a square of 4 acres. It cost more than $1,000,000, and will accommodate 700 patients. The Masonic Temple, built in the Byzantine style, 195 feet long and 100 feet wide, is four stories high, and has two towers 140 feet, and a spire 180 feet high. Other noticeable structures are Pike's Opera House, 170 by 134 feet, and five stories high, the public Library, St. Xavier's College, the Wesleyan Female College, and the Hughes High School. The most imposing church edifices are St. Peter's Roman Catholic Cathedral, built in pure Grecian style, 200 by 80 feet, with a stone spire rising to a height of 224 feet; St. Paul's Church (Methodist), with a spire 200 feet high; the First Presbyterian Church,

Plan of Cincinnati.

with an immense tower surmounted by a spire 270 feet high; St. John's Episcopal Church; and two large and attractive Hebrew temples.

Cincinnati is one of the most important commercial and manufacturing centres of the West. The six railroads entering the city are used by twelve companies, and besides these two lines terminate at Covington on the opposite side of the river. About 300 passenger and freight trains arrive and leave daily on these roads. For their use are four depôts near the river in different parts of the city. Communication with different parts of the city and with the suburbs is afforded by fourteen lines of street railroad, with about 50 miles of track, and by numerous lines of omnibuses and stages. The top of the adjacent hills is reached by an inclined steam passenger-railway. The position of the city on the Ohio River gives it water communication with the extensive river system of the Mississippi valley; while it is connected with Lake Erie by the Miami Canal, whose northern terminus is at Toledo, Ohio. The Miami is connected by a branch with the Wabash and Erie Canal, the largest in the United States (467 miles), which extends from Toledo to Evansville, Indiana, on the Ohio river. The average yearly number of steamers and barges running between Cincinnati and other ports during the ten years ending with August, 1875, was 338; the yearly number of arrivals of steamers during this period was 2713, and of departures 2680. The large steamers of the Mississippi river are enabled to reach Cincinnati by means of the canal around the falls of the Ohio at Louisville, Kentucky, which was opened in 1872. About three-fourths of the commerce of the city is by railroad and canal, and the remainder by river transportation. The extent of the entire commerce is indicated by the value of imports, which during the ten years ending in 1875 averaged $314,528,009 a year, and of exports, which averaged $201,236,066.

Cincinnati is one of those interior ports to which, under the Act of Congress passed in 1870, foreign merchandise may be transported without appraisement and payment of duties at the port of first arrival. The value of such imports to this city during the year ending June 30, 1875, was $566,989.

Boat building was formerly a prominent industry, but it has recently declined. Prior to 1863 Cincinnati was the chief centre in the United States for the slaughtering of swine and the packing of pork. Since that year this supremacy has been held by Chicago, Cincinnati taking the second rank. There are more than seventy establishments in the latter city employed in this industry. The United Railroads Stock-yards for the reception of live pigs occupy about 60 acres. During the winter season of 1874–75 there were slaughtered 560,164 hogs, weighing in the aggregate 155,864,126 lb, and valued at $10,897,584. The production included 44,232 barrels of pork, and 23,400,157 lb of lard. During the year ending August 31, 1875, pork and bacon valued at $12,645,538 were exported from the city; the imports amounted to $2,580,493 The

excess of exports of lard over imports was $2,781,091. After this important industry the brewing of lager beer ranks next, the brewers here turning out about 15,000,000 gallons annually. Distillation is also carried on to a very considerable extent. The city contains five national banks with a capital of $4,000,000, and seventeen private banks with a capital of $2,740,000. The leading commercial organization is the Chamber of Commerce and Merchants' Exchange, which has about 1200 members and holds daily sessions. The Board of Trade has about 900 members, chiefly manufacturers. There are also a mechanics' institute, cotton exchange, and pork packers' association. An industrial exhibition has been held in the autumn of each year since 1871, and has attracted large numbers of visitors to the city. The buildings are centrally situated, and occupy 3½ acres of ground. The total value of the products of manufacturing industry has increased from $46,995,062 in 1860 to $127,459,021 in 1870 and $144,207,371 in 1874. The details for the last-mentioned years are as follows:—

Industries.	1870.		1874.	
	Hands Employed.	Value of Products.	Hands Employed.	Value of Products.
Iron	10,723	$20,804,263	8,713	$17,129,224
Other metals	1,809	3,873,356	2,147	4,871,362
Wood	7,597	12,699,165	7,977	13,776,066
Leather	4,647	7,227,324	4,929	7,651,113
Food	2,334	17,945,651	4,957	24,071,077
Soap, candles, and oils	1,122	7,455,561	1,043	9,527,343
Clothing	12,363	12,626,682	15,198	13,329,914
Beer and whiskey	2,301	16,361,006	1,835	24,231,273
Cotton, wool, hemp, &c.	1,035	1,854,774	832	1,562,160
Drugs, chemicals, &c.	735	3,544,195	560	3,937,593
Stone and earth	2,209	2,980,102	2,199	3,916,401
Carriages, cars, &c.	1,175	1,794,413	1,335	1,941,396
Paper, &c.	452	880,516	662	1,687,290
Bookbinding and blank books	424	626,870	635	838,800
Printing and publishing	2,588	4,699,280	2,334	5,930,304
Tobacco	3,886	5,837,690	3,260	4,745,688
Fine arts	250	540,746	363	694,114
Miscellaneous	4,177	5,697,427	1,990	4,363,253
Total	59,327	127,459,021	60,999	144,207,371

The city is divided into 25 wards, and is governed by a mayor, who is elected by the people for two years, and receives an annual salary of $4000, a board of 25 aldermen, and a board of 50 councilmen, who are also elected by the people. It has a paid fire department under the control of five commissioners appointed by the mayor, and a police force under the control of the mayor and four commissioners. The efficiency of these departments is promoted by extensive fire-alarm and police telegraphic lines. The city is supplied with water obtained by pumping from the Ohio river by means of three immense reservoirs, two of which, with a capacity of 100,000,000 gallons each, are in Eden Park. Beside the usual municipal and county courts, the United States circuit and district courts for the southern district of Ohio are held in the city.

Cincinnati has a large number and variety of well-organized charitable institutions. The Cincinnati hospital is supported by taxation, and affords free treatment to all unable to pay for it; the city infirmary, besides supporting pauper inmates, affords relief to outdoor poor; the Good Samaritan and St. Mary's hospitals are private institutions, under the supervision of Roman Catholic sisters; the Jewish hospital is maintained by persons of that faith. The Longview asylum for the insane, built at Carthage, 10 miles from the city, at a cost, including 110 acres of land, of $1,000,000, ranks among the first institutions of the kind in the United States. It belongs to Hamilton county, whose population consists chiefly of the inhabitants of Cincinnati; patients are, however, sent here by the State, which contributes to its support. The average daily number of inmates in 1874 was 582, nearly all of whom were maintained free of charge. Besides the city orphan asylum, which has accommodation for 300 children, and is supported by private charity, and the German Protestant asylum, with a capacity for about 100, two large asylums are maintained by the Roman Catholics and by the colored people. There are also several institutions for indigent and friendless women. The house of refuge and the city workhouse are maintained by the city for the confinement of persons convicted of minor offences; children are sent to the former, and adults to the latter.

The public schools are under the control of a superintendent and a board of 50 elected members, and comprise 3 high, 5 intermediate, and 30 district schools, including those for colored pupils. There are also a normal school for females and evening schools. In 1874 there were 529 teachers and 28,949 pupils enrolled, with an average daily attendance of 21,486. German is a prominent study in the public schools, and music and drawing are taught. The Woodword and the Hughes high schools have long been known for their excellence. Besides the above, there are a large number of Roman Catholic parochial schools. The university of Cincinnati, recently founded by means of a bequest made by Charles M'Micken, is designed to afford advanced and technical instruction free of charge. A school of design has been in operation since 1869. Besides the Cincinnati Wesleyan College for females (Methodist-Episcopal), St. Xavier College (Roman Catholic), and Mount St. Mary's of the West, the city has 1 law, 6 medical, and 2 theological schools, 4 commercial colleges, and 2 schools of music. One of the theological schools is connected with Mount St. Mary's of the West, the other is the widely-known Lane Theological Seminary (Presbyterian), founded in 1829. It occupies a site of 7 acres on Walnut Hills, and has 5 professors and a library of 12,000 volumes. Three of the medical schools are classified as regular, one as pharmaceutic, one as homœopathic, and one as dental. The oldest is the medical college of Ohio, which was opened in 1819, and now has 10 instructors; the Cincinnati college of medicine and surgery was opened in 1821, and has 14 instructors; the Miami medical college, opened in 1852, has 12 instructors; and the Pulte medical college, opened in 1872, has 14. There are 11 public libraries in the city, the largest being the free public library, which has 81,000 bound volumes and 5500 pamphlets, and the young men's mercantile with nearly 40,000 volumes. The public library occupies one of the best library buildings in the country. The most important literary associations are the natural history and the historical and philosophical societies. There are published in the city 70 newspapers and periodicals,—9 appearing daily, 1 twice a-week, 33 weekly, 3 fortnightly, 21 monthly, and 3 quarterly. Of these 3 daily, 9 weekly, 1 fortnightly, and 2 monthly are published in German. The city contains 160 churches, the largest denominations being the Roman Catholic, which has 32 churches and 12 chapels, the Methodist with 26 churches, the Presbyterian with 22, the Baptist with 14, and the Protestant Episcopal with 11.

(E. S. DR.)

CINCINNATUS, the hero of one of the early Roman legends, was born about 519 B.C. According to the story, he was ruined by the fine which was imposed on his son Cæso for the murder of a plebeian during the commotions caused by the introduction of a bill by Terentilius Arsa. This measure, which proposed the creation of a code of written laws applicable to plebeian and patrician alike, was also strongly opposed by Cincinnatus himself. Cincinnatus is, in fact, the type of the ancient patrician agriculturist. Twice he was called from the plough to the dictatorship of Rome. On the first occasion his task was to save the army from the Æquians and Volscians, who had forced it into a position of imminent danger; and he is said to have raised an army and defeated the enemy within a single day (458). On his return he summoned Volscius, the accuser of his son, to take his trial on a charge of perjury; but Volscius fled from the city. On the second occasion (439) he was appointed by the patricians, in order to crush Spurius Mælius, who had spent his wealth in relieving the wretched debtors, and who was consequently accused of desiring popularity that he might seize the supreme authority. Mælius, refusing to appear before the dictator, was killed by Ahala, the master of the horse.

CINEAS, a Thessalian, the chief adviser of Pyrrhus, king of Epirus. The most famous event of his life was the visit which he made to Rome for the purpose of concluding the war, after the defeat of the Romans by Pyrrhus at Heraclea (280 B.C.). He performed the feat of learning in one day the name of every man of importance in the city, and displayed besides the most marvellous tact and eloquence; but the effects of his persuasion being destroyed through the patriotic vehemence of the venerable Appius Claudius Cæcus, he returned to his master with the report that Rome was a temple, and its senate an assembly of

kings. Cineas also served as an ambassador in Sicily. He is perhaps the Cineas referred to by Cicero as the author of a work *De Re Militari*.

CINNA, Lucius Cornelius, a Roman patrician, conspicuous in the contest between Marius and Sulla. After serving in the war with the Marsi as pretorian legate, he was elected consul in 87 B.C. Breaking the oath he had sworn to Sulla that he would not attempt any revolution in the state, Cinna allied himself with Marius, raised an army of Italians, and took possession of the city. Soon after his triumphant entry and the massacre of the friends of Sulla, by which he had satisfied his vengeance, Marius died. L. Valerius Flaccus became Cinna's colleague, and on the murder of Flaccus, Cn. Papirius Carbo. In 84, however, Cinna, who was still consul, was forced to advance against Sulla; but while embarking his troops he was killed in a mutiny. See Roman History.

CINNABAR, the *κιννάβαρις* of Theophrastus, is the native sulphide of mercury, and the only commercial source of that metal and its compounds. It crystallizes in the rhombohedral form, in which condition it is sometimes found; but generally it occurs in fibrous or amorphous masses bedded in slate rocks and shales, and more rarely in veins in granitic or porphyritic rocks. In hardness it is intermediate between gypsum and calcspar; its specific gravity is 8·998, and its color varies from a fine bright red to a reddish-brown and leaden-grey hue. It possesses the same composition as the ordinary vermilion of commerce, for which it may, when pure and fine in color, sometimes be used after simple levigation, although the greater part of that brilliant pigment is artificially prepared. Pure cinnabar should contain 86·21 per cent. of mercury, combined with 13·79 of sulphur; but in its native state the ore is frequently contaminated with oxide of iron, clay, and bituminous matter. The principal European localities for cinnabar are at Idria in Carniola, and at Almaden in Spain, whence the British demand is mainly supplied. It is also extensively worked at New Almaden and several other localities in California, in the southern part of Peru, and in Borneo, Japan, and China. See Vermilion.

CINNAMON is the inner bark of *Cinnamomum Zeylanicum*, a small evergreen tree belonging to the Natural Order *Lauraceæ*. The leaves are large, ovate-oblong in shape, and the flowers, which are arranged in panicles, have a greenish color and a rather disagreeable odor. Cinnamon has been known from the most remote antiquity, and it was so highly prized among ancient nations that in very small quantities it was regarded as a present fit for monarchs and other great potentates. It is mentioned in Exod. xxx. 23, where Moses is commanded to use both sweet cinnamon (*Kinman*) and cassia. It is likewise alluded to by Herodotus under the name *κιννάμωμον*, and it is frequently mentioned by many other classical writers. It is now almost exclusively a product of Ceylon, but the origin of the plant and the derivation of its name are matters of considerable doubt and dispute. The Arab traders, by whom the trade in this and other Oriental spices was conducted in ancient times, surrounded the history and production of these precious and lucrative products with grotesque tales of mystery. It is contended by some that cinnamon was originally obtained from the promontory of Gardafui (the *regio cinnamomifera* of classical geographers), while others lean to the opinion that it was brought from China, whence the chief portion of the closely allied cassia bark is still derived. Although as the produce of Ceylon, cinnamon did not come prominently into the market till the settlement of the Portuguese in the island, it is the opinion of the best authorities that the tree yielding it is indigenous, and certainly no other situation and climate have yet been found where the trees flourish so well and yield a bark so fine and so delicately aromatic.

The cinnamon gardens are confined to a strip of country in the neighborhood of Colombo. When the trade was at its best, five of the principal gardens measured from 15 to 20 miles in circumference, but now the area of cultivation is very much restricted, and plants which were at one time tended with the greatest care, and guarded with inhuman jealousy, are choked with the natural profusion of jungle vegetation. The bark is taken from shoots of eighteen months' or two years' growth, in which time they attain a length of from 6 to 10 feet, and a thickness of from ½ to 2 inches. The plants are managed on the coppice system, and only four or five shoots are allowed to grow up from each stool. The shoots are cut down twice a year after the rains, and the bark is detached in lengths of about a foot. After lying in bundles as taken from the shoots for about a day, each separate piece is carefully scraped to remove the outer and middle layers of the bark, and the remaining portion is thereby often reduced to the thickness of one-hundredth part of an inch. The pieces are then made up into composite quills by placing the smaller pieces inside the larger, and thus the cinnamon is often formed into straight firm rods of from 3 to 4 feet in length. After drying in the sun the bark is ready to make up into bundles for exportation.

Cinnamon of an inferior quality is grown in Southern India at Tellicherry and Tinnevelly; and in Java the cultivation was introduced by the Dutch about the year 1825. The plant has also been grown in the colony of French Guiana, and in other localities. The produce of none of these places, however, approaches in quality to the cinnamon of Ceylon, whence also the largest proportion of the entire consumption is supplied. Nearly the whole quantity prepared in Ceylon is brought to the British market. The value of Ceylon cinnamon submitted to the English Board of Trade, was in 1874 more than 2s. 2d. per lb, that from other localities being estimated at about 10d.

Ceylon cinnamon of fine quality is a very thin smooth bark, with a light yellowish-brown color, a highly fragrant odor, and a peculiarly sweet, warm, and pleasing aromatic taste. Its peculiar flavor is due to an aromatic oil which it contains to the extent of from 0·5 to 1 per cent. The essential oil of cinnamon, as an article of commerce, is prepared chiefly in Ceylon, where the coarser pieces of bark are used for its extraction. These are roughly powdered and macerated in sea water for two days, when the whole is quickly distilled. The oil is of a golden-yellow color, with the peculiar odor of cinnamon and a very hot aromatic taste. It consists essentially of cinnamic aldehyde or the hydride of cinnamyl, and by the absorption of oxygen as it becomes old it darkens in color and develops resinous compounds with cinnamic acid.

Cinnamon is principally employed in cookery as a condiment and flavoring material, being largely used in the preparation of some kinds of chocolate and liqueurs. In medicine it acts as an aromatic stimulant and cordial; but it is chiefly prescribed for improving the flavor of bitter substances and to correct the griping action of purgatives. Being a much more costly spice than cassia, that comparatively harsh-flavored substance is frequently substituted for or added to cinnamon. The two barks when whole are easily enough distinguished, and their microscopical characters are also quite distinct. When powdered bark is treated with tincture of iodine, little effect is visible in the case of pure cinnamon; but with cassia a deep-blue tint is produced, the intensity of the coloration depending on the proportion of the cassia.

CINO DA PISTOIA (1270–1336), a poet and jurist, whose full name was Guittoncino de' Sinibuldi, was born in Pistoia, of a noble family. He studied law at Bologna under Dinus and Franciscus Accursius, and in 1307 is understood to have been an assessor of civil causes in his native city. In that year, however, Pistoia was disturbed by the Guelf and Ghibelline feud. The Ghibellines who had for some time been the stronger party, being worsted by the Guelfs, Cino, a prominent member of the former faction, had to quit his office and the city of his birth. Pitecchio, a stronghold on the frontiers of Lombardy, was yet in the hands of Filippo Vergiolesi, chief of the Pistoian Ghibellines; Selvaggia, his daughter, was beloved by Cino (who was probably already the husband of Margherita degli Unghi); and to Pitecchio did the lawyer-poet betake himself. It is uncertain how long he remained at the fortress; it is certain, however, that he was not with Vergiolesi at the time of Selvaggia's death, which happened three years afterwards (1310), at the Monte della Sambuca, in the Apennines, whither the Ghibellines had been compelled to shift their camp. He visited his mistress's grave on his way to Rome, after some time spent in travel in France and elsewhere, and to this visit is owing his finest sonnet. At Rome Cino held office under Louis of Savoy, sent thither by the Ghibelline leader Henry of Luxembourg, who was crowned emperor of the Romans in 1312. In 1313, however, the emperor died, and the Ghibellines lost their last hope. Cino appears to have

thrown up his party, and to have returned to Pistoia. Thereafter he devoted himself to law and letters. After filling several high judicial offices, a doctor of civil law of Bologna in his forty-fourth year, he lectured and taught from the professor's chair at the universities of Treviso, Siena, Florence, and Perugia in succession; his reputation and success were great, his judicial experience enabling him to travel out of the routine of the schools. In literature he continued in some sort the tradition of Dante during the interval dividing that great poet from his successor Petrarca. The latter, besides celebrating Cino in an obituary sonnet, has coupled him and his Selvaggia with Dante and Beatrice in the fourth *capitolo* of his *Trionfi d'Amore*.

Cino, the master of Bartolus, and of Joannes Andreæ the celebrated canonist, was long famed as a jurist. His commentary on the statutes of Pistoia, written within two years, is said to have great merit; while that on the code (*Lectura Cino Pistoia super Codice*, Pavia, 1483, Lyons, 1526) is considered by Savigny to exhibit more practical intelligence and more originality of thought than are found in any commentary on Roman law since the time of Accursius. As a poet he also distinguished himself greatly. He was the friend and correspondent of Dante's later years, and possibly of his earlier also, and was certainly, with Guido Cavalcanti and Durante da Maiano, one of those who replied to the famous sonnet *A ciascun' alma presa e gentil core* of the *Vita Nuova*. The great Florentine in the treatise *De Vulgari Eloquio* refers to him as one of "those who have most sweetly and subtly written poems in modern Italian," but his works, printed at Rome in 1559, do not altogether justify the praise bestowed on them by his illustrious friend. Strained and rhetorical as many of his outcries are, however, Cino is not without moments of true passion and fine natural eloquence. Of these qualities the sonnet in memory of Selvaggia, *Io fui in sull' alto e in sul beato monte*, and the canzone to Dante, *Avegnachè di omaggio più per tempo*, are interesting examples.

The text-book for English readers is Mr. D. G. Rossetti's *Early Italian Poets*, wherein will be found not only a memoir of Cino da Pistoia (pp. 206–211), but also (pp. 381–395) some admirably translated specimens of his verse,—the whole wrought into significant connection with that friendship of Cino's, which is perhaps the most interesting fact about him. See also Ciampi, *Vita e Poesie di Messer Cino da Pistoia*, Pisa, 1813.

CINQ-MARS, Henri Coiffier de Ruzé, Marquis de (1620–1642), French courtier, was born in 1620. At the age of eighteen he was introduced to the court by Richelieu, who had been the patron of his father, and who intended him to fill the post of favorite to the king, Louis XIII. The design succeeded well, and Cinq-Mars became grand master of the wardrobe, and grand master of the horse. He developed into a gallant courtier, won the affection of the princess of Mantua, and claimed a seat in the royal council. But Richelieu opposed his ambition, and refused to countenance his pretensions. Cinq-Mars, therefore, in revenge, entered into the conspiracy against him, of which the duke of Orleans was nominal head. Unfortunately aid had been sought from Spain; and using this treason as an argument, Richelieu persuaded the weak and fickle king first to forbid Cinq-Mars to enter his presence, and then to permit his execution (1642).

CINQUE PORTS. The Cinque Ports, or Five Ports, is the name of an ancient jurisdiction in the south of England, which is still maintained with considerable modifications and diminished authority. As the name implies, the original members of the body were only five in number —Hastings, Romney, Hythe, Dover, and Sandwich; but to these were afterwards added the "Ancient Towns" of Winchelsea and Rye with the same privileges, and a good many other places, both corporate and non-corporate, which, with the title of Limb or Member, held a subordinate position. To Hastings were attached the corporate members of Pevensey and Seaford, and the non-corporate members of Bulverheeth, Petit Iham, Hidney, Beaksbourne, and Grange; to Romney, Lydd, and Old Romney, Dengemarsh, and Oswardstone; to Dover, Folkstone and Feversham, and Margate, St. John's, Goresend, Burchington Wood, St. Peter's, Kingsdowne, and Ringwold; to Sandwich, Fordwich, and Deale, Walmer, Ramsgate, Stoner, Sarr, and Brightlingsea. The jurisdiction thus extends along the coast from Seaford in Sussex to Burghington near Margate in Kent; and it also includes a number of inland districts, at a considerable distance from the ports with which they are connected. The non-incorporated members are within the municipal jurisdiction of the ports to which they are attached; but the corporate members are as free within their own liberties as the individual ports themselves. The incorporation of the Cinque Ports had its origin in the necessity for some means of defence along the southern seaboard of England, and in the lack of any regular navy. Up to the reign of Henry VII. they had to furnish the Crown with nearly all the ships and men that were needful for the state; and for a long time after they were required to give large assistance to the permanent fleet. The oldest charter now on record is one belonging to the 6th year of Edward I.; and it refers to previous documents of the time of Edward the Confessor and William the Conqueror. In return for their services the ports enjoyed extensive privileges. From the Conquest or even earlier they had, besides various lesser rights,—(1) Exemption from tax and tallage; (2) Soc and sac, or full cognizance of all criminal and civil cases within their liberties; (3) Toll and theam, or the right of receiving toll and of holding serfs; (4) Bloodwith and fledwith, or the right to punish shedders of blood and those who were seized in an attempt to escape from justice; (5) Pillory and tumbrell; (6) Infangtheof and outfangtheof, or power to imprison and execute felons; (7) Mundbriech, or authority to erect banks or dykes on any man's land as a defence against the sea; (8) Waives and strays, or the right to appropriate lost property or cattle not claimed within a year and a day; (9) The right to seize all flotsam, jetsam, or witsam, or in other words whatever of value was cast ashore by the sea; (10) The privilege of being a guild with power to impose taxes for the common weal; and (11) The right of assembling in portmote or parliament at Shepway or Shepway Cross, a few miles west of Hythe—the parliament being empowered to make by-laws for the Cinque Ports, to regulate the Yarmouth fishery, to hear appeals from the local courts, and to give decision in all cases of treason, sedition, and illegal coining, or concealment of treasure trove. The ordinary business of the ports is conducted in two courts known respectively as the Court of Brotherhood and the Court of Brotherhood and Guestling—the former being composed of the mayors of the seven principal towns and a number of jurats and freemen from each, and the latter including in addition the mayors, bailiffs, and other representatives of the corporate members. The Court of Brotherhood was formerly called the Brotheryeeld, Brodall, or Brodhull; and the name Guestling seems to owe its origin to the fact that the officials of the "members" were at first in the position of invited guests. The highest office in connection with the Cinque Ports is that of the Lord Warden, who also acts as governor of Dover Castle, and has a maritime jurisdiction as admiral of the ports. His power was formerly of great extent, and he held a court of chancery at Dover in the old parish church of St. James. He still presides in the court of Shepway, and appoints the justices of peace for the liberties of the Cinque Ports.

See Samuel Jeake, *Charters of the Cinque Ports*, London, small folio, 1728; Philipott's *Villare Cantianum;* the *First Report on Municipal Corporations in* 1835; and the *Census of England and Wales*, 1871, vol. i.

CINTRA, a town of Portugal in the province of Estremadura, 14 miles north-west of Lisbon, with about 4500 inhabitants. It stands at the foot of a rocky mountain of an altitude varying from 1800 to 3000 feet, and is remarkable for the picturesque beauty of its situation and the salubrity of its climate, which render it a favorite resort of the wealthier inhabitants of Lisbon. On one of the adjacent summits stands the Penha Castle, erected by King Ferdinand of Coburg on the site of the former convent of the Hieronymites; and on another are the ruins of a Moorish castle. There is also an ancient royal palace described as a medley of Moorish and Christian architecture, and long famous as the summer residence of the court; and in the neighborhood is the "Cork Convent" of Santa Cruz, which derives its name from the lining of its cells, and owes its origin to João de Castro, the celebrated viceroy of the Indies, whose heart is still preserved in the chapel of Penha Verde, near the villa in which he resided after his return. The convention by which the French were allowed to leave Portugal without molestation was signed at Cintra, August 22, 1808.

CIPHER. See Cryptography.

CIPRIANI, Giovanni Battista (1727–1785), painter and draughtsman, was of Pistoian descent, but was born at Florence, where he studied design and color under Heckford and Gabbiani. After painting several pictures at Pistoia and elsewhere, Cipriani, who had contracted a friendship with Bartolozzi, the eminent engraver, quitted Florence for London. There he worked for the duke of Richmond and other noblemen and gentlemen, repaired the Rubens ceiling in Whitehall Chapel, and the Verrio frescoes at Windsor, and decorated in part the Royal Academy library. His drawings, which are better than his paintings, engraved by Bartolozzi and his pupils, achieved a wide popularity, and were bought up eagerly all over Europe; but his reputation is nowadays somewhat faded.

CIRCAR is an Indian term applied to the component parts of a *Subah* or province, each of which is administered by a deputy-governor. In English it is principally employed in the name of the Northern Circars, used to designate a now obsolete division of the Madras presidency, which consisted of a narrow slip of territory lying along the western side of the Bay of Bengal from 15° 40′ to 20° 17′ N. lat. These Northern Circars were five in number, Cicacole, Rajamundry, Ellore, Condapilly, and Guntoor, and their total area was about 30,000 square miles. The district corresponds in the main to that now occupied by the modern divisions of Guntoor, Masulipatam, Rajamundry, Vizagapatam, and Gunjam. It was first invaded by the Mahometans in 1471; in 1541 they conquered Condapilly, and nine years later they extended their conquests over all Guntoor and the district of Masulipatam. But the invaders appear to have acquired only an imperfect possession of the country, as it was again wrested from the Hindu princes of Orissa about the year 1571, during the reign of Ibrahim Kutub, shah of Hyderabad or Golcondah. In 1687 the Circars were added, along with the empire of Hyderabad, to the extensive empire of Aurungzebe. Salabut Jung, the son of Nizam ul Mulk, who was indebted for his elevation to the throne to the French East India Company, granted them in return for their services the district of Condavir or Guntoor, and soon afterwards the other Circars. In 1759, by the conquest of the fortress of Masulipatam, the dominion of the maritime provinces on both sides, from the River Gondegama to the Chilca Lake, was necessarily transferred from the French to the British. But the latter left them under the administration of the Nizam, with the exception of the town and fortress of Masulipatam, which were retained by the English East India Company. In 1765 Lord Clive obtained from the Mogul a grant of four of the Circars, which in the following year was confirmed by a treaty entered into with Nizam Ali, who had by this time superseded Salabut Jung in his authority. The remaining Circar of Guntoor devolved to the East India Company in 1788.

CIRCASSIA. The name of Circassia is commonly given to the whole of the north-western portion of the Caucasus, including the district between the mountain range and the Black Sea, and extending to the north of the central ridge as far as the River Kuban. In this sense the term is still in use as a geographical appellation, though the Circassians, as a nation, may be regarded as extinct. The region thus defined may be considered as extending from the neighborhood of Anapa on the Black Sea to the frontiers of Mingrelia, and having a seaboard of about 280 English miles. Throughout this extent the country is almost wholly mountainous,—the great range of the Caucasus, which begins in the neighborhood of Anapa at a moderate elevation, rising gradually as it extends towards the south-east, till it culminates in the lofty summit of Mount Elbruz, at an elevation of 18,526 feet. The strip of land between the dividing ridge or watershed of these mountains and the sea, a tract varying from twenty to forty miles in width, is extremely rugged, traversed by successive offshoots of the mountains, extending quite down to the sea, and covered for the most part with extensive forests. The slopes on the northern side of the Caucasus are more gentle, and here the valleys afford abundant pasturage, but hardly any portion of Circassia, properly so called, is a level or open country.

The Tcherkesses or Circassians, who gave name to this region, of which they were until lately the sole inhabitants, are a peculiar race, differing from the other tribes of the Caucasus in origin and language. They designate themselves by the name of Adighe, that of Tcherkesses being a term of Russian origin. By their long-continued struggles with the power of Russia, during a period of nearly forty years, they attracted the attention of the other nations of Europe in a high degree, and were at the same time an object of interest to the student of the history of civilization, from the strange mixture which their customs exhibited of chivalrous sentiment with savage customs. For this reason it may be still worth while to give a brief summary of their national characteristics and manners, though these must now be regarded as in great measure things of the past.

In the patriarchal simplicity of their manners, the mental qualities with which they were endowed, the beauty of form and regularity of feature by which they were distinguished, they surpassed most of the other tribes of the Caucasus. At the same time they were remarkable for their warlike and intrepid character, their independence, their hospitality to strangers, and that love of country which they manifested in their determined resistance to an almost overwhelming power during the period of a long and desolating war. The government under which they lived was a peculiar form of the feudal system. The free Circassians were divided into three distinct ranks, the princes or *pschi*, the nobles or *uork* (Tartar *usden*), and the peasants or *hokotl*. Like the inhabitants of the other regions of the Caucasus, they were also divided into numerous families, tribes, or clans, some of which were very powerful, and carried on war against each other with great animosity. The slaves, of whom a large proportion were prisoners of war, were generally employed in the cultivation of the soil, or in the domestic service of some of the principal chiefs.

The will of the people was acknowledged as the supreme source of authority; and every free Circassian had a right to express his opinion in those assemblies of his tribe in which the questions of peace and war, almost the only subjects which engaged their attention, were brought under deliberation. The princes and nobles, the leaders of the people in war and their rulers in peace, were only the administrators of a power which was delegated to them. As they had no written laws, the administration of justice was regulated solely by custom and tradition, and in those tribes professing Mahometanism by the precepts of the Koran. The most aged and respected inhabitants of the various *aouls* or villages frequently sat in judgment, and their decisions were received without a murmur by the contending parties. The Circassian princes and nobles were professedly Mahometans; but in their religious services many of the ceremonies of their former heathen and Christian worship were still preserved. A great part of the people had remained faithful to the worship of their ancient gods,—Shible, the god of thunder, of war, and of justice, Tleps, the god of fire, and Seosseres, the god of water and of winds. Although the Circassians are said to have possessed minds capable of the highest cultivation, the arts and sciences, with the exception of poetry and music, were completely neglected. They possessed no written language. The wisdom of their sages, the knowledge they had acquired, and the memory of their warlike deeds were preserved in verses, which were repeated from mouth to mouth and descended from father to son.

The education of the young Circassian was confined to riding, fencing, shooting, hunting, and such exercises as were calculated to strengthen his frame, and prepare him for a life of active warfare. The only intellectual duty of the *atalik*, or instructor with whom the young men lived until they had completed their education, was that of teaching them to express their thoughts shortly, quickly, and appropriately. One of their marriage ceremonies was very strange. The young man who had been approved by the parents, and had paid the stipulated price in money, horses, oxen, and sheep, for his bride, was expected to come with his friends fully armed, and to carry her off by force from her father's house. Every free Circassian had unlimited right over the lives of his wife and children. Although polygamy was allowed by the laws of the Koran, the custom of the country forbade it, and the Circassians were generally faithful to the marriage bond. The respect for superior age was carried to such an extent, that the young brother used to rise from his seat when the elder entered an apartment, and was silent when he spoke. Like all the other inhabitants of the Caucasus, the Circassians were distinguished for two very opposite qualities, the most generous hospitality, and implacable vindictiveness. Hos-

pitality to the stranger was considered one of the most sacred duties. Whatever were his rank in life, all the members of the family rose to receive him on his entrance, and conduct him to the principal seat in the apartment. The host was considered responsible with his own life for the security of his guest, upon whom, even although his deadliest enemy, he would inflict no injury while under the protection of his roof. The chief who had received a stranger was also bound to grant him an escort of horse to conduct him in safety on his journey, and confide him to the protection of those nobles with whom he might be on friendly terms. The law of vengeance was no less binding on the Circassian. The individual who had slain any member of a family was pursued with implacable vengeance by the relatives, until his crime was expiated by death. The murderer might, indeed, secure his safety by the payment of a certain sum of money, or by carrying off from the house of his enemy a newly-born child, bringing it up as his own, and restoring it when its education was finished. In either case, the family of the slain individual might discontinue the pursuit of vengeance without any stain upon its honor. The man closely followed by his enemy, who, on reaching the dwelling of a woman, had merely touched her hand, was safe from all other pursuit so long as he remained under the protection of her roof. The opinions of the Circassians regarding theft resembled those of the ancient Spartans. The commission of the crime was not considered so disgraceful as its discovery; and the punishment of being compelled publicly to restore the stolen property to its original possessor, amid the derision of his tribe, was much dreaded by the Circassian who would glory in a successful theft. The greatest stain upon the Circassian character was the custom of selling their children, the Circassian father being always willing to part with his daughters, many of whom were bought by Turkish merchants for the harems of Eastern monarchs. But no degradation was implied in this transaction, and the young women themselves were generally willing partners in it. Herds of cattle and sheep constituted the chief riches of the inhabitants. The princes and nobles, from whom the members of the various tribes held the land which they cultivated, were the proprietors of the soil. The Circassians carried on little or no commerce, and the state of perpetual warfare in which they lived prevented them from cultivating any of the arts of peace.

The early history of Circassia is exceedingly obscure. This part of the coasts of the Black Sea was inhabited in ancient times only by wild and barbarous tribes, whose names are very differently given by ancient writers. No Greek colonies were planted within the limits of Circassia proper, though the Greeks carried on an extensive trade with the nations of the interior at Dioscurias, near Sukhum Kaleh. In the 12th and 13th centuries the princes of Georgia were successful in reducing Circassia into the condition of a province; and are said to have also been the first to introduce Christianity into the country—a religion which they continued to profess (in name at least) till the 18th century, when they were converted to Islamism by the teaching of a fanatical devotee named Mansur. The common people, however, retain to a great extent their pagan customs and beliefs. After they had succeeded in throwing off the Georgian yoke, the Circassians passed for a time under the rule of the Tartar khans of the Crimea, from whom they emancipated themselves with the assistance of Ivan I., czar of Russia. But the Russian monarchs do not appear to have regarded their conquest as a matter of much importance, until the time of Peter the Great. That powerful monarch, perceiving how much the possession of the Caucasus would contribute to his political and commercial influence in Western and Central Asia, made an unsuccessful attempt to reduce it permanently under his dominion. Catherine II. pursued a similar line of policy. Georgia having been harassed by the successive invasions of the Persians and Turks, the prince of that country at last threw himself under the protection of the Russians, and became tributary to their power. The River Kuban being afterwards fixed as the southern boundary of the Muscovite empire, the Russians became ambitious of extending their dominion uninterruptedly to the extreme limits of Georgia. In the wars which now took place between the Russians and the Turks, the latter used every exertion, by exciting the fanatical feelings of the Circassians against the Infidels, to induce them to harass the Russians by frequent incursions into their territory. After various vicissitudes of fortune, the Turks were worsted, and compelled by the treaty of Adrianople in 1829 to cede a considerable portion of their territory to the czar. Assuming a right of political sovereignty which they had never possessed, they included Circassia in this cession. The Circassians, refusing to acknowledge the right of the sultan (whom they had never recognized as their sovereign, though acknowledging him as head of their religion) thus to dispose of their country, were now exposed to the hostility of the Russians, who determined to become masters of the territory on the coasts of the Black Sea, and indeed of the whole Caucasian region, by force of arms. This was the origin of that remorseless war which was carried on with so much animosity down to a very recent period, and cost the Russians an incredible amount of blood and treasure.

A brief outline of the leading events which characterized this long-protracted struggle will be found in the article CAUCASUS. After the Circassians were finally reduced to submission, the inhabitants of the sea-coast, rather than submit to the regulations imposed by the Russian Government, determined to quit their country, and emigrate in a mass to Turkey. Not less than half a million of people carried out this resolution, and were settled in different parts of the Turkish empire, the greater part of them in Asia Minor, but some also in the mountain country on the borders of Bulgaria and Servia. Since that period the whole tract along the sea-coast from Anapa to Sukhum Kaleh, which was that best known as Circassia, has been almost entirely destitute of inhabitants. But the northern slopes of the Caucasus, and the valleys descending towards the Kuban, are still occupied by tribes of Circassian race; and the Kabardans, a kindred tribe, but of less warlike character, extending eastwards to beyond the Terek, have long settled down quietly in the condition of Russian subjects. (E. H. B.)

CIRCE, in classical mythology, the daughter of Sol and Perse, or of Hyperion and Aërope, or, according to some, of Æetes, king of Colchis (whom others call her brother), was a famous sorceress. Having murdered her husband, the prince of Colchis, she was expelled by her subjects, and placed by her father on the solitary island of Ææa, on the coast of Italy. Here she was found by Ulysses and his companions; the latter she changed into swine, but the hero, protected by the herb *moly* which he had received from Mercury, not only forced her to restore them, but also gained her love. For a year he relinquished himself to her endearments; but at length he aroused himself, and after descending at her advice to the lower world, to consult the prophet Tiresias as to the fate which awaited him, he left her. The metamorphoses by Circe of Scylla and of Picus, king of the Ausonians, are celebrated by Ovid.

CIRCEII, a town of ancient Italy, in Latium, at the foot of Mons Circeius, or Capo Circello, a short distance from the sea, and 10 or 12 miles along the coast from Terracina. It was originally colonized by the Romans in the reign of Tarquin the Proud, who deemed the position favorable for commerce and for repressing the inroads of the Volsci. From its foundation till the date of the Latin War, 340 B.C., it seems at one time to have been subject to the Romans, at another to have espoused the cause of the Volsci, and sometimes to have been independent of both powers. After the Latin War it was recolonized by the Romans; but it continued gradually to decline till the emperors Tiberius and Domitian, attracted to it by the pleasantness of its situation and the excellence of its oysters, erected villas in the neighborhood. Its ruins are still distinctly visible on the Monte della Cittadella, and consist of walls and gateways built of polygonal blocks.

CIRCUIT, a law term, signifying the periodical progress of a legal tribunal for the sake of carrying out the administration of the law in the several provinces of a country. It has long been applied to the journey or progress which the judges have been in the habit of making twice every year, through the several counties of England, to hold courts and administer justice, where recourse could not be had to the king's court at Westminster. The country, including Wales, is now, by Order in Council (under the Judicature Act, 1875), dated 5th February, 1876, divided into seven circuits, viz., the Northern, North-Eastern, Midland, South-Eastern, Oxford, Western, North Wales, and South Wales Circuits. Counsel are not expected to practise on a circuit other than that to which they have attached themselves,

unless they receive a special retainer. This and similar regulations are enforced by the discipline of the circuit bar mess only. In Scotland the judges of the supreme criminal court, or High Court of Justiciary, form also three separate circuit-courts consisting of two judges each; and the country, with the exception of the Lothians, is divided into corresponding districts, called the Northern, Western, and Southern Circuits. In certain burghs of each circuit two courts are held in the year, in spring and autumn, called Circuit Courts. One more is held at Glasgow during the Christmas recess. Ireland is divided into the North-East and the North-West Circuits, the Home Circuit, and those of Leinster, Connaught, and Munster.

CIRCUMCISION. The importance of this rite is so largely due to its quasi-sacramental character in Judaism, that any inquiry into its history and meaning must be prefaced by a reference to the Old Testament.

I. There are three distinct narratives in the sacred literature of the Jews which claim to be considered. It is related in Gen. xvii. that when Abram the Hebrew was ninety-nine years of age, he became a party on behalf of himself and his descendants to a covenant with his God. Of this covenant the sign and condition was circumcision, which was directed to be performed (a peculiarity of Judaism) on the eighth day after the child's birth. Is this account, we may ask, based on a historical tradition? If so, the circumcision of the Israelites is entirely unconnected with that of other nations unless indeed other nations have borrowed theirs from the Israelites. This has actually been maintained in the case of the Egyptians by Archdeacon Hardwicke, but the theory is not only improbable in itself, considering the imitative character of the Israelites, and their low reputation in Egypt (Gen. xlvi. 34), but contrary to the evidence of the Egyptian monuments (see below). If, as has been supposed by some, the document to which Gen. xvii. belongs is of post-captivity origin, this would put it out of court as a witness to the popular tradition of the Hebrews. But there is another narrative, apparently of a more archaic complexion, which leads to a directly opposite historical result. We read in Exod. iv. 25, 26, that when Moses was returning from Midian to Egypt, he was in danger of his life, owing to the neglect of the rite of circumcision in his family. "And Zipporah," his Midianitish wife, "took a sharp stone, and cut off the foreskin of her son, and cast it at his feet, and said, Surely a *khathan* (Auth. Vers., 'husband') of blood art thou to me; so he (*sc.*, the offended deity) desisted from him. At that time she said, A *khathan* of blood, with reference to the circumcision." The meaning of this story can still be discerned. *Khathan*, or *khatan*, meant originally not "husband" (as Auth. Vers. of Exodus), nor "son-in-law" (as in ordinary Arabic), but "a newly-admitted member of the family." This appears from the sense of Arab. *khatana*, "to provide a wedding-feast," and *khātana*, "to give or receive a daughter in marriage." So that in the sense of the old Hebrew tradition "a *khāthan* of blood" meant "one who has become a *khathan*, not by marriage, but by circumcision," a meaning which is still further confirmed by the derived sense of Arab. *khatana* "to circumcise," circumcision being performed in Arabia at the age of puberty. To sum up:—an Arabian woman plays the chief part in the story, and her words are only explicable from the Arabic; it is also far from improbable that Yahweh (or Jehovah) was himself first made known to the Jews in Arabia (comp. Judg. v. 4, Hab. iii. 3); putting all which together, we obtain a strong case for the hypothesis of the Arabian origin of Jewish circumcision.

The third narrative is Josh. v. 2–9, where Joshua is said to have circumcised the children of Israel a second time with "knives of stone," and to have thus "rolled away the reproach of Egypt from off them." It is not unnatural that this should have been used by some to confirm the view of an Egyptian origin of circumcision, among others by Dr. Ebers, who refers to the additional words in the Septuagint, Josh. xxiv. 31, "There they buried with him . . . the stone knives with which he had circumcised the children of Israel in Gilgal." But, first, with regard to this singular statement of the Alexandrine version, it must henceforth be abandoned by all scholars. It is simply an unscientific attempt to account for the existence near Joshua's supposed tomb of flint instruments, such as those discovered by M. Guérin on this very site. It need hardly be added that the flint instruments discovered by the French *savant* were really pre-historic; they consist not only of knives, but of saws, which would hardly have been available for the purpose ascribed to Joshua (see Burton and Drake's *Unexplored Syria*, ii. 295–300). And, secondly, Bishop Colenso has shown some reason for the suspicion that verses 2 to 8 (not verse 9) are later additions to the narrative, in which case the "reproach of Egypt" means, not the state of uncircumcision, but the contempt of the Egyptians so forcibly expressed in Exod. xxxii. 12, Num. xiv. 13–16. As for the "knives of stone" (comp. Josh. xxiv. 31, Sept.), on which Ebers has laid some stress, such implements are not distinctively Egyptian, if they were even employed at all by the Egyptians for the purpose of circumcision. It is true that Herodotus (ii. 104, comp. Diod. Sic., i. 28) asserts the Egyptian origin of circumcision to have been admitted in Palestine, but he is probably only right so far as the Phœnicians or Canaanites are concerned.

II. We may now proceed to consider circumcision from an ethnographical point of view. It was not a specially Semitic rite, being only known to the southern and western Semites, who probably derived it directly or indirectly from the Egyptians, if not from some entirely non-Semitic source. Though not referred to in the Koran, it was a primitive Arabian custom to circumcise youths at their entrance on puberty (*i.e.*, between their tenth and fifteenth year), as appears not only from Gen. xvii. 25, Jos. *Antiq.*, i. 12, 2, but from the express statement of Ibn-al-Athír (quoted by Pococke, *Specimen Hist. Arabum*, p. 319), which is confirmed by a remarkable passage in the life of the old Arabian poet Dhû-l-isba (*Zeitschr. f. d. Kunde des Morgenlandes*, iii. 230). From Arabia it was carried by the preachers of Islam to Persia, India, and Turkey; from Arabia, too, as we have seen, it probably came in remote times to the Israelites. The circumcision of the Phœnicians or Canaanites has been disputed, but is attested by Herodotus (ii. 104), and is confirmed by the story in Gen. xxxiv., as also by the fact that the term of contempt, "the uncircumcised," is reserved in the Old Testament for the Philistines. The rite seems, however, to have fallen into disuse in later times in Phœnicia as well as in Egypt (Dr. Ebers refers to the uncircumcised figures on the stele of Pianchi, comp. also Herod, *l.c.*, Jos. *Antiq.*, viii. 10, 3, *Contr. Ap.* i. 22, and perhaps Ezek. xxxii. 24, 30), which may partly account for its being afterwards regarded as distinctive of the Jews. The Egyptians, too, were circumcised, and that prior to the immigration of the Hebrews (Wilkinson), as appears from the representations on the very earliest monuments. The most striking of these is the scene on a bas-relief discovered in the temple of Chunsu at Karnak, a drawing of which is given by M. Chabas and Dr. Ebers. The subjects of the operation are apparently the two children of Rameses II., the founder of the temple. Their age, says Dr. Ebers, must be between six and ten, which agrees with the present custom in Egypt, where, as Mr. Lane tells us, circumcision is generally performed in the fifth or sixth year, though often postponed by peasants to the twelfth, thirteenth, or even fourteenth year (*Modern Egyptians*, i. 71). It has often been asserted that only the priests underwent the operation, but there is no earlier evidence for this than that of Origen (ed. Lommatzsch, iv. 138), in whose time it is quite possible that the Egyptians, like the later Jews, sought to evade a peculiarity which exposed them to ridicule and contempt.

But the rite of circumcision is known among nations which cannot be suspected of communication with Egypt. Similar causes produce similar effects all the world over. It was in use in some form among the ancient civilized peoples of Central America, though this is better attested of the Nahua branch (including the Aztecs) than of the Maya (Bancroft, *Native Races*, vol. iii.). It is still kept up among the Teamas and Manaos on the Amazon; also among three distinct races in the South Seas, among most of the tribes of Australia, among the Papuans, the New Caledonians, and the inhabitants of the New Hebrides. It is widely spread in Africa, especially among the Kaffir tribes. Among the Bechuanas the boys who are circumcised together form a sort of society, for which among other reasons, Waitz conjectures that the Bechuanas communicated the rite to the other Kaffirs. Prichard (*Physical History of Mankind*, ii. 287) rightly dismisses the idea that the Kaffirs borrowed the rite from Mahometan na-

tions, though the progress of Islam will help to account for its prevalence in other parts of Africa.

III. Very different views were held in antiquity as to the meaning of the rite of circumcision. There was a myth common to Egypt and Phœnicia, though not of very ancient date in its extant Egyptian form, which seems to bring circumcision into connection with the Sun-god. In the *Book of the Dead*, chap. xvii., we read of "the blood which proceeded from the limb of the god Ra, when he wished to cut himself," which the late Vicomte de Rougé interpreted, with much plausibility, of circumcision (*Revue archéologique*, nouv. série, i. 244). And in a fragment of the Philonian Sanchoniathon (*Fragmenta Historicorum Græcorum*, ed. Müller, iii. 568, 569), we find a similar tale of El circumcising his father Uranos, or, according to another version, himself, and the blood flowing into the springs and rivers. Space forbids us to discuss the bearings of this myth. Herodotus (ii. 37) ascribes the Egyptian custom to the motive of cleanliness (καθαριότητος εἵνεκα). This is also one of the four causes reported on the authority of tradition by Philo the Jew (*Opera*, ed. Mangey, ii. 210), the three others being the avoidance of carbuncle, the symbolizing of purity of heart, and the attainment of a numerous offspring. Mere cleanliness, however, seems hardly an adequate motive for the practice. Sanitary reasons seem much more probable, judging from the well-ascertained physical advantages of circumcision to the Jewish race. But even this is not a complete explanation. Why was the practice adopted by some nations and not by others? The most scientific theory is that which refers it to a religious instinct common to all nations, though not always expressing itself in the same way, and this seems even to be at least obscurely indicated by the tradition of the Israelites. The prophet Jeremiah (ix. 25, 26), too, puts it in the same class with cutting off the hair (comp. Herod. iii. 8), which, like other bodily mutilations, has been shown to be of the nature of a representative sacrifice (Tyler's *Primitive Culture*, ii. 363, 364). The principle of substitution was familiar to all ancient nations, and not least to the Israelites. Witness the story of Gen. xxi., the paschal lamb, and the redemption of the first-born by an offering (Exod. xiii. 11–16), and compare the singular phrase ascribed to Saul in 1 Sam. xviii. 25. On this principle circumcision was an economical recognition of the divine ownership of human life, a part of the body being sacrificed to preserve the remainder. But it was more than this; otherwise it would scarcely have asserted its claim to existence among the Jews, when all other mutilations were strictly forbidden as heathenish (Lev. xix. 27, xxi. 5). It can scarcely be doubted that it was a sacrifice to the awful power upon whom the fruit of the womb depended, and having once fixed itself in the minds of the people, neither priest nor prophet could eradicate it. All that these could do was to spiritualize it into a symbol of devotion to a high religious ideal (comp. Jer. iv. 4; Deut. x. 16; Jer. ix. 25).

In conclusion, we must briefly refer to an analogous rite, of which women are in many countries the subjects. It is said to consist in mutilation of the clitoris, which is sometimes connected with the degrading practice of infibulation. It was prevalent in the time of Strabo (pp. 771, 824) in Arabia and in Egypt, and, as Mr. Lane attests, is still native to those regions (*Modern Egyptians*, i. 73, *Arabic Lexicon*, s. v. "hafada"). Carsten Niebuhr heard that it was practised on both shores of the Persian Gulf, and at Baghdad (*Description de l'Arabie*, p. 70). It appears in some parts of West Africa, *e.g.*, Dahomey, but is said to be still more common in the eastern part of that continent.

See F. C. Baur, *Tübinger Zeitschrift*, 1832, Heft 1; Ewald, *Antiquities of Israel*, Eng. Trans., pp. 89–97; Büdinger, "Egyptische Einwirkungen auf Hebraïsche Culte," in *Berichte* of Vienna Academy; Sir Gardner Wilkinson, *Ancient Egypt*, vol. v. p. 318; Chabas, *Revue archéologique*, n. s., vol. iii. pp. 298–300; Ebers, *Egypten und die Bücher Mosis*, vol. i. pp. 278–284; G. Grey, *Travels in Australia*, vol. ii. p. 343; Waitz, *Anthropologie der Naturvölker*, vol. ii. pp. 111, 390; Peschel, *Völkerkunde*; Burton, "Notes connected with the Dahomans," in *Memoirs of the Anthropological Society*, 1863–64. (T. K. C.)

CIRCUS, in Roman Antiquity, was a building for the exhibition of horse and chariot racing. It consisted of tiers of seats running parallel with the sides of the course, and forming a crescent round one of the ends. The other end was straight and at right angles to the course, so that the plan of the whole had nearly the form of an ellipse cut in half at its vertical axis. Along the transverse axis ran a fence (*spina*) separating the return course from the starting one. The straight end had no seats, but was occupied by the stalls (*carceres*) where the chariots and horses were held in readiness. This end constituted also the front of the building with the main entrance. At each end of the course were conical pillars (*metæ*) to mark its limits.

The oldest building of this kind in Rome was the Circus Maximus, in the valley between the Palatine and Aventine hills, where previous to any permanent structure races appear to have been held beside the altar of the god Consus. The first building is assigned to Tarquin the younger, but for a long time little seems to have been done to complete its accommodation, since it is not till 329 B.C. that we hear of stalls being erected for the chariots and horses. It was not in fact till under the empire that the circus became a conspicuous public resort. Cæsar enlarged it to some extent, and also made a canal 10 feet broad between the lowest tier of seats and the course as a precaution for the spectators' safety when exhibitions of fighting with wild beasts, such as were afterwards confined to the amphitheatre, took place. When these exhibitions were removed, and the canal (*euripus*) was no longer necessary, Nero filled it up. Augustus is said to have placed an obelisk between the metæ or goals, and to have built a new *pulvinar*, or state box; but if this is taken in connection with the fact that the circus had been partially destroyed by fire in 31 B.C., it may be supposed that besides this he had restored it altogether. Only the lower tiers of seats were of stone, the others being of wood, and this, from the liability to fire, may account for the frequent restorations to which it was subject; it would also explain the falling of the seats by which a crowd of people were killed in the time of Antoninus Pius. In the reign of Claudius, apparently after a fire, the carceres of stone (tufa) were replaced by marble, and the metæ of wood by bronze gilt. Under Domitian, again, after a fire, the circus was rebuilt and the carceres increased to 12 instead of 8 as before. The work was finished by Trajan. The number of people it could seat is given at 150,000 and at 250,000, the latter being supposed to be the more correct. This was the only public spectacle at which men and women were not assigned to separate places. The lower seats were reserved for persons of rank; the state box, *suggestus* or *cubiculum*, was midway in the range of seats. The principal object of attraction apart from the racing must have been the spina or low wall which ran down the middle of the course, with its obelisks, images, and ornamental shrines. On it also were seven figures of dolphins and seven oval objects, one of which was taken down at every round made in a race, so that spectators might see readily how the contest proceeded. The chariot race consisted of seven rounds of the course. The chariots started abreast, but in an oblique line, so that the outer chariot might be compensated for the wider circle it had to make at the other end. Such a race was called a *missus*, and as many as 24 of these would take place in a day. The competitors wore different colors, originally white and red (*albata* and *russata*); afterwards the colors green (*prasina*) and blue (*veneta*) were added, and further, under Domitian, gold and purple, but these last two were not long retained. To provide the horses and large staff of attendants, it was necessary to apply to rich capitalists and owners of studs, and from this there grew up in time four select companies (*factiones*) of circus purveyors which were identified with the four colors, and with which those who organized the races had to contract for the proper supply of horses and men. The drivers, who were mostly slaves, were sometimes held in high repute for their skill. The horses most valued were those of Sicily, Spain, and Cappadocia. Chariots with two horses (*bigæ*) or four (*quadrigæ*) were most common, but sometimes also they had three (*trigæ*) and exceptionally more than four horses. Occasionally there was combined with the chariots a race of riders (*desultores*), each rider having two horses and leaping from one to the other during the race. At certain of the races the proceedings were opened by a *pompa* or procession in which images of the gods and of the imperial family deified were conveyed in cars drawn by horses, mules, or elephants, attended by the colleges of priests, and led by the presiding magistrate seated in a chariot in the dress and with the insignia of a triumphator. The procession passed from the capitol along

the forum, and on to the circus, where it was received by the people standing and clapping their hands. The presiding magistrate gave the signal for the races by throwing a white flag (*mappa*) on to the course. Next in importance to the Circus Maximus in Rome was the CIRCUS FLAMINIUS, erected 221 B.C., in the censorship of C. Flaminius, from whom it may have taken its name; or the name may have been derived from Prata Flaminia, where it was situated, and where also were held plebeian meetings. The only games that are positively known to have been celebrated in this circus were the *Ludi Taurii* and *Plebeii*. There is no mention of it after the 1st century. Its ruins were identified in the 16th century at S. Caterina de Funari and the Palazzo Mattei. A third circus in Rome was erected by Caligula in the gardens of Agrippina, and was known as the CIRCUS NERONIS, from the notoriety which it obtained through the Circensian pleasures of Nero. A fourth was constructed by Maxentius outside the Porta Appia near the tomb of Cæcilia Metella, where its ruins are still, and now afford the only instance from which an idea of the ancient circi in Rome can be obtained. It was traced to Caracalla, till the discovery of an inscription showed it to be the work of Maxentius. Old topographers speak of six circi, but two of these appear to be imaginary, the Circus Floræ and the Circus Salustii. There remain then the four described above,—C. Maximus, Flaminius, Neronis, and Maxentii.

Circus races were held in connection with the following public festivals, and generally on the last day of the festival if it extended over more than one day:—(1) The *Consualia*, August 21, December 15; (2) *Equivia*, February 27, March 14; (3) *Ludi Romani*, September 4–19; (4) *Ludi Plebeii*, November 4–17; (5) *Cerealia*, April 12–19; (6) *Ludi Apollinares*, July 13; (7) *Ludi Megalenses*, April 4–10; (8) *Floralia*, April 28–May 3. (A. S. M.)

CIRENCESTER, or CICESTER, a parliamentary borough and market-town of England, in the county of Gloucester, 16 miles south-east of the town of that name, and 88 miles by road and 95 by the Great Western Railway from London. It returns one member to Parliament, and is a polling-place for East Gloucestershire. Not being incorporated, it is governed by two high constables and 14 wardsmen, elected annually. Cirencester was created a separate hundred by a charter granted in the reign of Henry IV. The town, which is situated on the River Churn, and is in connection with a branch of the Thames and Severn Canal, has four principal streets, and contains a free grammar-school, almshouses, a savings bank, a museum, a public library, breweries, and a carpet factory. The church is a fine structure of the 15th century, with an embattled tower 134 feet high, a fine decorated porch, and several lateral chapels. The Royal Agricultural College, which adjoins Oakley Park, the seat of Lord Bathurst, is about a mile and a half from the town. It is a handsome edifice, with a frontage of 190 feet, facing North Wiltshire. Its buildings include a chapel, a dining hall, a library, a lecture theatre, laboratories, classrooms, private studies and dormitories for the students, apartments for resident professors, and servants' offices; also a museum containing a collection of anatomical and pathological preparations, and mineralogical, botanical, and geological specimens. The college farm comprises 500 acres, 450 of which are arable; and on it are the well-appointed farm buildings and the veterinary hospital. Besides agriculture, the course of instruction at the college includes chemistry, natural and mechanical philosophy, natural history, mensuration, surveying, and drawing, and other subjects of practical importance to the farmer, proficiency in which is tested by means of sessional examinations. There is some manufacture of carpets, woollen cloths, and curriers' knives, but the industries of Cirencester are chiefly agricultural. It has now a chamber for the promotion of agriculture, and the market is accounted one of the best for live-stock in the west of England. In 1871 the population of the borough, which, including the parish of Stratton, has an area of 5985 acres, amounted to 7681; that of the parish was 7079.

Arms of Cirencester.

Cirencester occupies the site of Corinum, Corinium, or Durocornovium, the capital of the Dobuni, and an important military station of the Romans, situated at the junction of the Fosse-way with the Ermin and Icknield streets. In 577 it was taken by Ceawlin, king of Wessex, and in 878 by the Danes; and it was the seat of a council held by Canute about the year 1020. An abbey for Black Canons, relics of which still exist, was founded here by Henry I. in 1117. The town was garrisoned for the Parliament at the commencement of the Civil War, and was taken by Rupert in 1642; but in 1643 it was finally surrendered to Cromwell's forces. Numerous Roman antiquities have from time to time been discovered at Cirencester, and remains of the ancient wall, two miles in circuit, and of a Roman amphitheatre are still to be seen there. See *All the Year Round*, No. 494, Oct. 10, 1868.

CIRILLO, DOMINICO (1734–1799), physician and patriot, was born at Grugno in the kingdom of Naples. Elected while yet a young man to the botanical chair left vacant by the death of Pedillo, Cirillo went some years afterwards to England, where he was made member of the Royal Society, and to France, where he became the friend of Buffon, Diderot, D'Alembert, and others of like mark. On his return to Naples he was appointed successively to the chairs of practical and theoretical medicine. He wrote voluminously and well on scientific subjects; and he secured an extensive medical practice. The entry into Naples of the French under Championnet, and the proclamation of the Parthenopeian Republic (1799), brought to a conclusion his life of laborious and thoughtful benevolence. Cirillo was chosen a representative of the people; he then became a member of the Legislative Commission, and was elected its president. On the abandonment by the French of the young republic (June, 1799), cardinal-general Ruffo and the army of Ferdinand of Bourbon returned to Naples, and the republicans withdrew, ill-armed and inadequately provisioned, to the forts. After a short siege, in which an English squadron under Captain Foote bore a prominent part, they surrendered, on honorable terms. Life and liberty were guaranteed them by the signatures of Ruffo, of Foote, and of Micherouxa, the Russian minister. But the arrival of Nelson changed the complexion of affairs; he refused to ratify the capitulation. Secure under the British flag, too, Ferdinand and Caroline of Austria showed themselves eager for revenge. The patriots were arrested; and Cirillo, who had tended the queen more than once, and whose skill had been employed on behalf of the English admiral himself, was thrown into prison with the others. A court was formed to try the captives, and Cirillo was brought before them. Neither his age, nor his fair life and fame, nor his heroic speech and bearing, availed with them, and he was condemned to death. Nelson attempted to save him, and Ferdinand consented to forego his vengeance if the republican would ask for mercy. He refused, and was hanged. Cirillo, whose favorite study was botany, and who was recognized as an entomologist by Linnæus, left many books, in Latin and Italian, all of them treating of medical and scientific subjects, and all of little value now save as indications of the writer's fine qualities as a man of science and humanitarian. Exception must, however, be made in favor of the *Virtù Morali dell' Asino*, a pleasant philosophical opuscule remarkable for its double charm of sense and style.

CIRTA, an ancient city of Numidia, in Africa, in the country of the Massyli. It was regarded by the Romans as the strongest position in Numidia, and was made by them the converging point of all their great military roads in that country. By the early emperors it was allowed to fall into decay, but was afterwards restored by Constantine, from whom it took its modern name. See CONSTANTINE.

CIS-SUTLEJ STATES. This term has for many years been obsolete, as inapplicable to modern territorial arrangements. It came into use in 1809, when the Sikh chiefs south of the Sutlej (Satlaj) passed under British protection, and was generally applied to the country south of the Sutlej and north of the Delhi territory, bounded on the E. by the Himálayas, and on the W. by Soisá District. Prior to 1846, the greater part of this territory was independent, the chiefs being subject merely to control from a political officer stationed at Ambálá, and styled the agent of the governor-general for the Cis-Sutlej States. After the first Sikh war the full administration of the territory became vested in the officer already mentioned. In 1849 occurred the annexation of the Punjab, when the Cis-Sutlej States Commissionership, comprising the districts of Ambálá, Feroz-

pur, Ludhiáná, Thanéswár, and Simla, was incorporated with the new province. The name continued to be applied to this division until 1862, when, owing to Ferozpur having been transferred to the Lahore, and a part of Thanéswár to the Delhí Division, it ceased to be appropriate. Since then, the tract remaining has been known as the Ambálá or Umballa Division. Those of the old Cis-Sutlej States which still retain their independence are Gatiálá, Jhino, Nábhá, Maler Kotlá, and Farídkot.

CISTERCIANS, a religious order of the rule of St. Benedict, founded in 1098, by St. Robert, abbot of Molesme. It was so named from its original convent in the forest of Citeaux (Cistercium), about 14 miles north-east of Beaune. This order became so powerful that it governed almost all Europe both in temporal and spiritual concerns, and through the exertions of St. Bernard of Clairvaux had increased so rapidly in power, that within a century from its foundation it embraced 800 rich abbeys in different countries of Europe. The abbeys of La Ferté, Pontigny, Clairvaux, and Morimond were offshoots of that of Citeaux, and produced in their turn a great number of separate communities, all which continued under the superintendence of the abbey of Citeaux. The abbey of Morimond alone possessed 700 benefices; and its supremacy was acknowledged by the military orders of Calatrava, Alcantara, and Montesa in Spain, and by those of Christ and of Avis in Portugal. But the most famous of all the communities of this order was that of Clairvaux, founded in 1115 by St. Bernard (see BERNARD). Towards the end of the 12th century, however, the immense wealth of Citeaux began to operate unfavorably on its discipline, and led the way to great corruptions. Jean de la Barrière, abbot of Nôtre-Dame des Feuillants, near Toulouse, succeeded in 1577 in effecting a reform, which gave rise to the Feuillants in France, and likewise to the Reformed Bernardines in Italy. But of all the reforms among the Cistercians, the most celebrated was that effected by the abbot of La Trappe in 1664.

Dependent on the abbey of Citeaux there were about 1800 monasteries and an equal number of nunneries. This ancient abbey was the burial-place of all the dukes of Burgundy of the original line, with the exception of the first two, who died before its foundation.

The Cistercians were involved in the general fate of the religious orders during the period of the French Revolution of 1789, and were reduced to a few convents in Spain, Poland, Austria, and the Saxon part of Upper Lusatia.

The habit of the order is a white robe or cassock, with a black scapulary and a woollen girdle. The nuns wear a white tunic and a black scapulary and girdle.

The order began by exercising more austerity than either the Benedictines of that period (the 11th century) or the Cluniac monks who had emerged from the Benedictine order two centuries earlier. This austerity was exhibited, not only in the rude and scanty fare of the brethren (limited during a great part of the year to one meal a day) and in the great amount of silence imposed, but likewise in the dress, the sacred vestments, and the church furniture of the order. The Cluniac monks not only possessed fine churches, but were also in the habit of adorning them with pictures, jewelled crosses, and other elaborate decorations, while their vestments and chalices were in keeping with this splendor. Indeed one of their first men, St. Hugh, a contemporary of St. Bernard, strongly maintained the principle that nothing could be too rich and costly for the divine service. But St. Stephen Harding, the English monk, who, though only the second abbot, was the virtual creator of Cistercian rule and discipline, impressed on the Cistercian mind a different principle, and trained up St. Bernard in it. Their chasubles were to be only of linen, the chalice not of gold but of silver gilt, and even the white robe of the order was less voluminous in its folds than that of the Cluniac brethren. In one respect, however, the sense of beauty seems to have been allowed to operate. Although the material was to be coarse, yet the form of a vestment might be carefully looked to; and this taste for beauty of form led in due time to great advances in the architecture of their buildings. This difference between the Cistercians and the Cluniacs occasioned considerable rivalry and even bitterness of sentiment,—the Cistercians being in danger of something like Pharisaic pride in contrasting their own severer rule with the comparative luxury of their neighbors the Cluniacs, who apparently afforded some ground for the charge of relaxation of discipline, especially in the 12th century after the death of St. Hugh.

In the matter of government, the Cistercian order (as constituted by St. Stephen Harding at a general chapter held in 1119) differed both from the Benedictine and from the Cluniac constitutions. According to the rule of St. Benedict each monastery was to be an independent monarchy under its own abbot; although in extraordinary cases neighboring monasteries of the order might interfere in the election of an abbot. This independence had not been found to work well, and the Cluniac rule made each daughter monastery to be subject to Cluny, and to receive its prior from his appointment. Such subordination tended to greater regularity of discipline, and greatly increased the power of the order, especially when abbeys were assailed by laymen or unduly harassed by bishops. The abbot of Cluny became a veritable prince with 314 monasteries subject to him, and with the right of coining money, which was accepted as readily as that of the king of France. But its concentration of power in a single hand involved the risk attendant upon all such despotisms; and the Abbot Pontius, who had succeeded St. Hugh about 1109, seems to have endangered the entire system by an extravagance which loaded Cluny with debt, and by his ambition in claiming the title of Abbot of Abbots, and in endeavoring to sway the oldest Benedictine house itself, the famous abbey of Monte Casino. St. Stephen Harding framed a constitution for the Cistercians which aimed at combining the excellences without the defects of the two systems. Although in his rule the abbot of Citeaux was to be recognized as the *Pater Universalis Ordinis*, yet a system of reciprocal visitation was to be carried on, and the four earliest houses which derived their origin from Citeaux—La Ferté, Pontigny, Clairvaux, and Morimond—governed the abbeys which had respectively sprung from them. The four abbots of these eldest daughters of Citeaux might even in extreme cases, with the consent of a general chapter, depose the head of the order, the abbot of Citeaux. The constitution, known as the Chart of Charity, exercised much influence upon other orders, and in some degree upon that of Cluny. But it gave rise to a claim which (though not intended by its author, and denounced by its greatest *alumnus*, St. Bernard) was successfully urged in after years by the Cistercian, as well as by other orders, viz., an exemption from episcopal superintendence.

With respect to intellectual culture and influence, the Cistercian order cannot claim a place in the front rank among the monastic bodies. Devoted to worship, to penance, to contemplation, and to culture of the soil, the order did not, like some others, admit the relaxation of scholastic disputations. No doubt it received learned men into its fold. It is also true that St. Stephen Harding, with some of his brethren, undertook a revision of the Bible, that copies of many valuable works were made by the brethren (though with less ornamentation than the illuminated MSS. of some other orders), and that St. Bernard was solicitous to furnish all the monasteries founded by himself with good libraries. Nevertheless, as an order, the Cistercians have not achieved such triumphs of learning as the Benedictines, the Dominicans, or the Jesuits.

But no order springing out from the Benedictine proved so popular as the Cistercian. During the 11th century its houses were multiplied in every direction. It touched both ends of the social scale. St. Bernard and the thirty novices who joined with him were all of noble birth; many similar accessions were made from time to time, and in the 12th century we read of fifteen young German princes entering the order. But a place was also found for the poor and uneducated. Such as could not be choir brethren, might be lay brethren and till the fields; and the contrast between a laborer of this sort, partaking of the dignity of a great and powerful community, and the neighboring husbandman, the serf of some feudal lord, was in the eyes of many all in favor of the monk. It may have tended towards that emancipation of the laborers so largely effected by the monastic orders and celebrated in a well-known sonnet by Wordsworth.

The order seems to have especially thriven in England. From Waverley in Surrey, the earliest Cistercian settlement in the country, they spread over Britain, especially by the rivers of Yorkshire, and extended into Scotland.

The overthrow of the Cistercian houses at the time of the Reformation is a part of general monastic history.

While some of the dissolutions were unjust, and the execution of abbots mere judicial murders, the luxury of the great Yorkshire houses seems quite undeniable, and perhaps their overthrow may, on the whole, be thought to favor the *dictum* of Mr. Carlyle,—that nothing is crushed from without, until it is ripe to perish from within.

For authorities see the articles already referred to. See also Manriquez, *Annales Cistercienses*, 4 vols. folio, Lyons, 1642, and the various biographies of St. Bernard by Alban Butler, Neander, De Ratisbon, Morrison, and others; and *The Cistercian Saints of England*, especially *St. Stephen Harding*, edited by John Henry Newman, London, 1844. Dean Milman cautions his readers against the love of legend displayed in these biographies, but praises "their research and exquisite charm of style," *Lat. Christianity*, bk. viii. chap. 4. See also Cheruel, *Dictionnaire Historique*, Paris, 1855; and for the artistic elements, so far as regards paintings, Mrs. Jamieson's *Legends of the Monastic Orders*, London, 1850; also Cosmo Innes's *Scotland in the Middle Ages*, Edinburgh, 1860; *Records of the Monastery of Kinlos*, by John Stuart, LL.D., Edinburgh, 1872; and an article "Cistercian Abbeys in Yorkshire," in *Fraser's Magazine* for September, 1876. (J. G. C.)

CITEAUX, or CISTEAUX, a village in France, in the department of Côte d'Or, about 7 miles east of the town of Nuits, and 12 from Dijon. It is celebrated for the great abbey founded by Robert de Molesme in 1098, which became the head-quarters of the Cistercian order (see last article). The buildings are now occupied as a reformatory for juvenile criminals; and in the neighborhood is an extensive agricultural college.

CITHÆRON, or as it is now called from its pine forests, ELATEA, a famous mountain, or rather mountain range, in the south of Bœotia, separating that state from Megaris and Attica. It was greatly celebrated in Grecian mythology, and is frequently mentioned by the great poets of Greece, especially by Sophocles. It was on Cithæron that Actæon was changed into a stag, that Pentheus was torn to pieces by the Bacchantes whose orgies he had been watching, and that the infant Œdipus was exposed. This mountain, too, was the scene of the mystic rites of Dionysus; and the festival of the Dædala in honor of Juno was celebrated on its summit. The carriage road from Athens to Thebes crosses the range by a picturesque defile which has at one time been guarded on the Attic side by a strong fortress, the ruins of which are known as Ghyphto-kastro or Gipsy Castle.

CITRIC ACID, or OXYTRICARBALLYLIC ACID, $C_6H_8O_7$ or $C_3H_4(OH)(CO.OH)_3$, a tetrahydric tribasic acid, first prepared in the solid state by Scheele, in 1784, from the juice of lemons, in which it exists in large quantity. It is present also in oranges, citrons, currants, gooseberries, and many other fruits, and in several bulbs and tubers. It is made on a large scale from lime or lemon juice, chiefly in the months of November and December. The juice is fermented for some time to free it from mucilage, then boiled and filtered, and neutralized with powdered chalk and a little milk of lime; the precipitate of calcium citrate so obtained is decomposed with dilute sulphuric acid, and the resulting solution of citric acid is separated by filtration, evaporated to remove calcium sulphate, and concentrated. The concentration is best effected in vacuum pans. The acid is thus procured in colorless rhombic prisms of the composition $C_6H_8O_7+H_2O$. Crystals of a different form are deposited from a strong boiling solution of the acid. About 20 gallons of lemon juice should yield about 10 lb of crystallized citric acid. The acid may also be prepared from the juice of unripe gooseberries. Calcium citrate for exportation in the place of lemon juice must be manufactured with care to avoid an excess of chalk or lime, which would precipitate constituents of the juice that cause the fermentation of the citrate and the production of calcium acetate and butyrate.

Citric acid has an agreeable sour taste. It is soluble in ¾ths of its weight of cold, and in half its weight of boiling water, and dissolves in alcohol, but not in ether. At 150° C. it melts and on the continued application of heat boils, giving off its water of crystallization. At 175° C., it is resolved into water and aconitic acid, $C_6H_6O_6$, a substance found in *Equisetum fluviatile*, monkshood, and other plants. A higher temperature decomposes this body into carbonic anhydride and itaconic acid, $C_5H_6O_4$, which, again, by the expulsion of a molecule of water, yields citraconic anhydride, $C_5H_4O_3$. Citric acid digested at a temperature below 40° C. with concentrated sulphuric acid gives off carbonic oxide. With fused potash it forms potassium oxalate and acetate. It is a strong acid, and dissolved in water decomposes the carbonates and attacks iron and zinc. Citric acid, in common with other tribasic acids, evolves about three times the amount of heat disengaged by acetic acid when quantities of these two bodies in the proportion of their molecular weights are saturated with soda,—one molecule of the tribasic being equivalent to three of the monobasic acid.

The citrates are a numerous class of salts, the most soluble of which are those with alkaline bases; the alkaline earthy citrates are insoluble. Citric acid, being tribasic, forms either acid monometallic, acid dimetallic, or neutral trimetallic salts; thus, mono-, di-, and tri-potassic and sodic citrates are known. In a few salts a fourth atom of hydrogen is replaced by a metal, and citric acid is therefore considered by some chemists to be tetrabasic. Citric acid gives with excess of lime-water a slight precipitate of calcium citrate; a further precipitate is produced by boiling, but it is redissolved as the liquid cools. Solution of citric acid may be approximately titrated by means of baryta-water and litmus.

The impurities occasionally present in citric acid are salts of potassium and sodium, traces of iron, lead, and copper derived from the vessels used for its evaporation and crystallization, and free sulphuric, tartaric, and even oxalic acid. Tartaric acid, which is sometimes present in large quantities as an adulterant in commercial citric acid, may be detected in the presence of the latter, by the production of a precipitate of acid potassium tartrate when potassium acetate is added to a cold solution of the sample of acid to be tested. Another mode of separating the two acids is to convert them into calcium salts, which are then treated with a perfectly neutral solution of cupric chloride, soluble cupric citrate and calcium chloride being formed, while cupric tartrate remains undissolved. Citric is furthermore distinguished from tartaric acid by the fact that an ammonia solution of silver tartrate produces a brilliant silver mirror when boiled, whereas citric of silver is reduced only after prolonged ebullition.

Citric acid is used in calico-printing, also in the preparation of effervescing draughts, and occasionally as a refrigerant and antiscorbutic, instead of fresh lemon juice, to which, however, it is therapeutically inferior. In the form of lime juice it has long been known as an antidote for scurvy, and several of the citrates are much employed as medicines.

CITRON, a species of Citrus (*C. medica*, Risso), belonging to the Natural Order *Aurantiaceæ*, which furnishes also the orange, lime, and shaddock. The citron-tree is an evergreen growing to a height of about 8 feet; it has long, pendent, and, in the wild varieties, spiny branches, pale-green, oblong, and sub-serrate leaves, and flowers purple without and white within. The fruit is ovate or oblong, protuberant at the tip, and from 5 to 6 inches long, with a rough, furrowed, adherent rind, the inner portion of which is thick, white, and fleshy, the outer, thin, greenish-yellow, and very fragrant. The pulp is sub-acid and edible, and its seeds are bitter. There are many varieties of the fruit, some of them of great weight and size. The Madras citron has the form of an oblate sphere; and in the "fingered citron" of China, the lobes are separated into finger-like divisions.

Gallesio and De Candolle consider citrons and lemons to be distinct species; but the former authority states that seed produced by lemon-trees growing amongst citron-trees gave varieties which were intermediate between the two species; and by some botanists citrons, lemons, and oranges are held to be all varieties of the wild *Citrus medica*. According to Dr. G. Birdwood, however, the orange and lemon are both natives of Upper India, the former being derived from the wild *Citrus Aurantium* of Gurhwal, Sikkim, and Khasia, and the lemon, lime, and probably citron also, from the wild *Citrus Limonum* of the valleys of Sikkim and Kumaon, of which the *Citrus medica* was the first cultivated variety (*Athenæum*, No. 2544, July 29, 1876, p. 151).

The citron-tree thrives in the open air in China, Persia, the West Indies, Madeira, Sicily, Corsica, and the warmer parts of Spain and Italy; and in conservatories it is often to be seen in more northerly regions. It was described by Theophrastus as growing in Media; it appears, however, not

to be indigenous to Persia, but to have been introduced into that country and other lands from North India, where it was found growing wild by Dr. Royle. It was early known to the ancients, and the fruit was held in great esteem by them; but they seem to have been acquainted with no other member of the *Aurantiaceæ*, the introduction of oranges and lemons into the countries of the Mediterranean being due to the Arabs, between the 10th and 15th centuries. Josephus tells us that "the law of the Jews required that at the feast of tabernacles every one should have branches of palm-tree and citron-tree" (*Antiq.*, xiii. 13, 5); and the Hebrew word *tappuach*, rendered "apples" and "apple-tree" in Cant. ii. 3, 5, Prov. xxv. 11, &c., probably signifies the citron-tree and its fruit. Oribasius in the 4th century describes the fruit, accurately distinguishing the three parts of it. About the 3d century the tree was introduced into Italy; and, as Gallesio informs us, it was much grown at Salerno in the 11th century. In China, citrons are placed in apartments to make them fragrant. The rind of the citron yields two perfumes, *oil of cedra* and *oil of citron*, isomeric with oil of turpentine; and when preserved it is much esteemed as a sweetmeat.

Oribasii Sardiani, *Collectorum Medicinalium Libri XVII.*, l. i. c. 64 (*De citrio*); Gallesio, *Traité du Citrus* (1811); Darwin, *Animals and Plants under Domestication*, vol. i. pp. 334–6 (1868); Brandis, *Forest Flora of North-West and Central India*, p. 51 (1874).

CITTÀ DELLA PIEVE, a town of Italy, in the province of Umbria and district of Orvieto, about six miles from the station of Chiusi on the railway between Siena and Rome. It was the birthplace of Pietro Perugino, and still preserves some of his finest works. Of these several are to be found in the cathedral, and his fresco of the adoration of the Magi adorns the oratory of the Disciplinati. Population, 6500.

CITTÀ DI CASTELLO, a town of Italy, pleasantly situated on the left bank of the Tiber, in the province of Perugia, 25 miles N. by W. from the town of that name. It has a cathedral, dedicated to St. Floridus and dating from 1503, a large number of interesting churches with valuable paintings, a communal palace of the 13th century, an episcopal palace remodelled since 1789, and no fewer than four mansions belonging to the Vitelli family, who governed the town in the 15th century, and were among the first to patronize the youthful Raphael. The city for a long time numbered several works of this artist among its most precious possessions; but they have all been removed except two of minor importance. Città di Castello occupies the site of the ancient *Tifernum Tiberinum*, which was chiefly famous for its connection with the younger Pliny, who had a villa in the neighborhood. The older city was destroyed by Totila, but numerous inscriptions have been discovered which prove its identity. Population, 6090.

CITTÀ VECCHIA, or CITTÀ NOTABILE, a fortified city of Malta, situated about six miles west of Valetta, on high ground which affords a view of a large part of the island. It is the seat of a bishop, and contains an episcopal seminary and a handsome modern cathedral, which is said by tradition to occupy the site of the house of the governor Publius, who welcomed the apostle Paul. In the rock beneath the city there are some remarkable catacombs; and a grotto, reputed to have given shelter to the apostle, is pointed out below the church of S. Paolo. About two miles from the town is the residence of the English governor, known as the palace of St. Antonio; and at a like distance in another direction is the ancient palace of the grand-masters of the order of St. John, with an extensive public garden called Il Boschetto. Città Vecchia was called Medina, or the City, by the Arabs, and it probably represents the town of *Melita*, which is mentioned by all the ancient geographers. It continued to be the capital of the island till the rise of Valetta in the 16th century. Population about 7000.

CITY. This word, derived through the French *cité* from the Latin *civitas*, is used in England with considerable laxity as little more than a synonym for town; while at the same time there is a kind of traditional feeling of dignity connected with it. It was maintained by Coke and Blackstone that a city is a town incorporate which is or has been the see of a bishop; and this opinion has been very generally adopted since. It does not correspond, however, with actual English usage; for Westminster, on the one hand, is called a city though it has no corporation; and Thetford, Sherbourne, and Dorchester are never so designated though they are regularly incorporated and were once episcopal sees. It is true, indeed, that the actual sees in the country all have a formal right to the title, and that Westminster is the only place without a bishop that has the same claim. In the United States, where the ecclesiastical distinction does not exist, the application of the term depends on the kind and extent of the municipal privileges possessed by the corporations, and charters are given raising from the rank of town to that of city. This use of the word is much more in keeping with its derivation, which leads the mind back to the idea of the social life and corporate action of a body of freemen; and it also agrees better with such classical English phrases as "a free city," an imperial city. Both in France and in England the word is popularly used to distinguish the older and central nucleus of some of the larger towns such as London and Paris. The history of the rise of cities and towns has been given in the article BOROUGH.

CIUDAD BOLIVAR. See ANGOSTURA.

CIUDAD REAL, the chief town formerly of La Mancha, and now of the province of Ciudad Real, in Spain, 97 miles south from Madrid, on a plain between the Jabalon and Guadiana. It was built and fortified by Alphonso the Wise in 1264, to check the progress of the Moors; and portions of the walls and towers remain. It has several fine churches, and a large hospital, founded by Cardinal Lorenzana. It is one of the least commercial of the larger towns of Spain, deriving most of its trade from agriculture and an annual fair which is of great importance for the sale of asses and mules. Population, 9000.

CIUDAD REAL, the chief town of the state of Chiapas in Mexico, otherwise known as SAN CRISTOBAL (*q.v.*).

CIUDAD RODRIGO, a town of Spain, on the Agueda, in the province of Salamanca, near the frontier of Portugal. It is fortified, and has some good public buildings, including a cathedral (built in 1190), several churches and convents, an arena for bull-fights, and an episcopal seminary. In the principal square are three Roman columns brought from the ancient Malabriga; and remains of a Roman aqueduct are also extant. A bridge connects the city with the suburbs, which are surrounded by a fertile and well-cultivated district. There are manufactures of woollen stuffs, leather, and linen; and the soap is celebrated in Spain as *Jabon de Piedra*. During the Peninsular war the town was taken by Marshal Masséna in 1810, and in 1812 by the duke of Wellington, who received from the Cortes the title of Duke of Ciudad Rodrigo. Population, 5700.

CIUDADELA, a city, formerly the capital of Minorca, at the head of a deep and narrow bay on its west coast, 25 miles north-west of Mahon. It is surrounded by walls, and has a fine Gothic church. Population upwards of 5000.

CIVET (*Viverra*), a genus of Carnivorous Mammals forming with the genet and ichneumon the family *Viverridæ*, and characterized by the possession of a deep pouch situated in the neighborhood of the genital organs (divided into two sacs each about the size of an almond), into which the substance known as civet is poured from the glandular follicles secreting it. This fatty substance is at first semifluid and of a yellow color, but afterwards acquires the consistency of pomade and becomes darker. It has a strong musky odor, exceedingly disagreeable to those unaccustomed to it, but "when properly diluted and combined with other scents it produces a very pleasing effect, and possesses a much more *floral* fragrance than musk, indeed it would be impossible to imitate some flowers without it" (Rimmel's *Art of Perfumery*). There are three species of civet-producing *Viverridæ*. The Civet (*Viverra civetta*) is a native of North Africa and extends as far south and west as Fernando Po. It is from 2 to 3 feet in length, exclusive of the tail, which is half the length of the body, and stands from 10 to 12 inches high. It is covered with long hair, that on the middle line of the back being longest and capable of being raised or depressed at will, of a dark-grey color, with numerous transverse black bands and spots. It is chiefly nocturnal, and is by

preference carnivorous, feeding on birds and the smaller quadrupeds, in pursuit of which it climbs trees, but it is said also to eat fruits, roots, and other vegetable matters. In a state of captivity it is never completely tamed, and is only thus kept for the sake of the civet, which is obtained in largest quantity from the male, especially when he is in good condition and is subjected to irritation. It is scraped from the pouch with a small spoon usually twice a week. The Zibeth (*Viverra zibetha*) is a widely distributed species extending from Arabia to Malabar, and throughout several of the larger islands of the Indian Archipelago. It is smaller than the civet, and wants the dorsal crest. In the wild state it is exceedingly ferocious, doing great damage among poultry, and frequently making off with the young of the swine and sheep. "To the rapacity of the wolf," says Captain Williamson, "it joins the agility of the cat and the cunning of the fox." When hunted it makes a determined resistance, and emits a scent so strong as even to sicken the dogs, who nevertheless are exceedingly fond of the sport, and cannot be got to pursue any other game while the stench of the zibeth is in their nostrils. In confinement, however, it becomes comparatively tame, and civet is obtained from it in considerable quantity. In preparing this for the market it is usually spread out on the leaves of the pepper plant in order to free it from the hairs that have become detached from the pouch. The Rasse (*Viverra rasse*) is the fiercest and most carnivorous of its kind, and remains untamed in confinement. It is a native of Java, where it is found not unfrequently in forests at a moderate elevation above the sea level. It is almost 3 feet long including the tail, and is prettily marked with dark longitudinal stripes, and with spots which have a distinctly linear arrangement. Its perfume, which is extracted in the same way as in the two preceding species, is highly valued and much used by the Javanese, who, according to Dr. Horsfield, apply it to their dresses, and by means of various unguents and mixtures of flowers to their persons. British imports of civet are chiefly from the Indian Archipelago, and when pure it is worth about £2 per ounce. It is frequently adulterated with butter or lard. Fossil remains of extinct civets are found in the Miocene strata of Europe.

CIVIDALE, or more precisely CIVIDALE DEL FRIULI, a town of Italy, in the province of Udine, and about ten miles east of the city of that name, on the right bank of the Natisone, over which there is a bridge 250 feet in length. It has an interesting collegiate church founded in 750, an antiquarian museum, and a military training college. The archives of the "duomo" contain various manuscripts of value, among which may be mentioned a 5th century copy of the translation of the Gospels by St. Jerome, and the prayer-book of St. Gertrude which dates from the 11th century. Cividale is generally supposed to occupy the site of the ancient *Forum Julii*, a town of the Carni, which rose to the rank of a Roman colony, became the capital of Venetia after the destruction of Aquileia in 452, was made the seat of a duchy under the Lombards, and thus gave its name to the province of Friuli. Many ancient remains have been brought to light from time to time, including vases, bas-reliefs, inscriptions, a temple, and another large building with mosaic floors. In 1874 the tomb of the Lombard duke Gisulfo was discovered. Paulus Diaconus was born at Forum Julii in the 8th century; and the actress Ristori is a native of Cividale. Population, 8200.

CIVIL LAW. This phrase, and its Latin equivalent *jus civile*, have been used in a great variety of meanings. *Jus civile* was sometimes used to distinguish that portion of the Roman law which was the proper or ancient law of the city or state of Rome from the *jus gentium*, or the law common to all the nations comprising the Roman world, which was incorporated with the former through the agency of the prætorian edicts. This historical distinction remained as a permanent principle of division in the body of the Roman law. One of the first propositions of the Institutes of Justinian is the following:—"Jus autem civile vel gentium ita dividitur. Omnes populi qui legibus et moribus reguntur partim suo proprio, partim communi omnium hominum jure utuntur; nam quod quisque populus ipsi sibi jus constituit, id ipsius civitatis proprium est, vocaturque jus civile quasi jus proprium ipsius civitatis. Quod vero naturalis ratio inter omnes homines constituit, id apud omnes peræque custoditur, vocaturque jus gentium quasi quo jure omnes gentes utuntur." The *jus gentium* of this passage is elsewhere identified with *jus naturale*, so that the distinction comes to be one between civil law and natural or divine law. The municipal or private law of a state is sometimes described as civil law in distinction to public or international law. Again the municipal law of a state may be divided into civil law and criminal law. The phrase, however, is applied *par excellence* to the system of law created by the genius of the Roman people, and handed down by them to the nations of the modern world. The civil law in this sense would be distinguished from the local or national law of modern states. In England recent changes have reduced the number of courts in which the principles of the civil law are recognized, but we are still accustomed to say that the civil law has a certain limited application, and that the race of civilians or civil lawyers is not quite extinct. The civil law in this sense is further to be distinguished from that adaptation of its principles to ecclesiastical purposes which is known as the canon law. See ROMAN LAW.

CIVITA CASTELLANA, a town of Italy in the province of Rome, 17 miles E.S.E. of Viterbo, situated on a volcanic plateau surrounded on all sides but one by deep ravines which send down their streamlets to the Tiber. The road from Borghetto crosses the gorge by a magnificent bridge erected in 1712 by Cardinal Imperiali. The town is a bishop's see, and has a cathedral dating from 1210, with beautiful mosaics and an interesting crypt adorned by an altar-piece of the 14th century. The citadel, which was founded by Alexander VI. and completed by Leo X., is used for the incarceration of state prisoners. In the neighborhood are the remains of the ancient city of *Falerium Vetus*, well known in connection with the story of Camillus and the schoolmaster; portions of the ancient walls, gateways, and sepulchres are still to be seen at the edge of the ravine. About four miles to the west are the much more extensive ruins of *Falerii Novi*, now known as Sta. Maria di Falleri. They present some of the most remarkable specimens of ancient military architecture now in existence, consisting of walls nearly perfect, a large number of square towers in good preservation, and several finely-arched gateways. In the internal area the most important buildings are a Roman theatre erected on Etruscan foundations, and a Lombard church of the 12th century (the Abbadia Sta. Maria). The population of Civita Castellana is about 4000.

CIVITA DI PENNE, an episcopal town of Italy, at the head of a district in the province of Abruzzo Ulteriore I., 19 miles west of Pescara. Under the name of Pinna it was the chief city of the Vestini, and is celebrated in the history of the Social war for its obstinate resistance to the Roman army by which it was besieged. It has still some remains of ancient buildings, and numerous inscriptions that attest its importance, and it is noted for the manufacture of artificial flowers. Population, 9800.

CIVITA VECCHIA, a maritime city and port of the Roman territory, which gives its name to a "delegation," or province. It is the best and almost the only port on the coast of the former territories of the church, and is about 24 miles to the west of Rome. The city occupies the site of the ancient *Centum Cellæ*, so called from a palace which the Emperor Trajan built there. That place, after Trajan had by means of an aqueduct brought good water thither from the mountain of Tolfo, acquired considerable importance as the natural port of Rome. Totila besieged it; Narses recovered it; but it was utterly destroyed in 812 by the Saracens, who were then ravaging all that coast. The inhabitants fled to the neighboring mountains, but when Pope Leo IV. had overcome and driven away the Saracens, they returned to the old site, rebuilt the town, and called it Civita Vecchia. The articles exported from Civita Vecchia are timber, sulphur, wool and silk, skins, decorative marbles, and anchovies. The imports consist of wines, forged iron, salt provisions, stock-fish, linen, woollen, and cotton cloths, silks, coffee, sugar, and general colonial produce. The port enjoyed under the Popes commercial freedom and sundry special privileges. But its commerce declined in recent times almost to zero. Some little life is imparted to the place from its being a station for steamers on their way from Genoa and Leghorn to Naples, and from the residence of consuls of all nations. But the city, which apart from its territory has only 8143 inhabitants, is a squalid-looking place. On the land side it is protected by fortifications once of considerable import-

ance. The principal of these is the castle erected by the architect Vangallo for Pope Julius II., after a design attributed to Michelangelo, and by others to Bramante. In the immediate vicinity of this castle are the arsenal and the bagno or establishment for convicts.

CLACKMANNAN, a county of Scotland, on the north bank of the River Forth, situated between 56° 5′ and 56° 14′ N. lat., and 3° 33′ and 3° 56′ W. long., is bounded on the S.W. by the Forth, W. by Stirlingshire, N. and N.W. by Perthshire and a detached portion of Stirling, E. by Fife, and N.E. by a detached portion of Perth. It is the smallest county in the United Kingdom, is irregular in form, and occupies an area of 47½ square miles, or 30,477 acres. The surface of the county is varied in its character. An elevated ridge rises on the west, and running through the middle of the county spreads itself gradually till it reaches the eastern boundary, skirting the alluvial or carse lands in the valleys of the Forth and of the Devon. Still further to the north, the Ochil Hills (the highest of which is Bencleuch, 2363 feet, above Tillicoultry) form a very picturesque landscape, having their generally verdant surface broken by bold projecting rocks and deeply indented ravines. The range forms a great igneous mound, developing itself in amygdaloid felspar and porphyry, and occasionally in pentagonal columns of basaltic greenstone. It is used almost entirely for sheep farming.

The only streams worthy of notice which traverse the county are the Devon and the Black or South Devon. The former, remarkable in the upper parts of its course for its romantic scenery, runs through the county near the base of the Ochils, and falls into the Forth at the village of Cambus. The Black Devon flows westward in a direction nearly parallel to the Devon, and falls into the Forth near Clackmannan. It supplies motive power to numbers of mills and coal engines; and its whole course is over coal strata. The Forth is navigable as far as it forms the boundary of this county, and ships of 500 tons burden can run up as far as Alloa.

The soils of the arable land of Clackmannanshire are in general productive and well cultivated; though the greater part of the elevated range which is interposed between the carse lands on the Forth and the vale of Devon at the base of the Ochils on the north consists of inferior soils, often incumbent on an impervious clay. All the crops commonly raised in Scotland grow luxuriantly on both sides of this tract, which also contains within itself a considerable proportion of valuable soil. According to the agricultural returns for 1875 the area of land under cultivation in Clackmannan is considerably above the average for Scotland, and the average under corn is 7 per cent. above the average of other counties. In minerals the county is rich. Iron-ore (hæmatite), copper, silver, lead, cobalt, and arsenic have all been discovered in small quantity in the Ochils, between Airthry and Dollar. Ironstone is wrought to a considerable extent for the Devon iron-works, near Clackmannan. It is found either in beds, or in oblate balls imbedded in slaty clay, and yields from twenty-five to thirty per cent. of iron. Coal has been wrought for upwards of two hundred years in this county. A considerable proportion of the quantity obtained is shipped at Alloa for foreign ports. It is all bituminous or common coal of a good quality; no smithy or caking coal has yet been discovered. In 1871 there were 2137 persons engaged in coal mining and its adjuncts. The strata which compose the coal-field are varieties of sand-stone, shale, fire-clay, and argillaceous ironstone. The great coal-field of Scotland, which passes in a diagonal line from the mouths of the Forth and Tay to the Irish Sea, is bounded by the Ochils; no coal has been found to the north of them, except at Brora, in Sutherlandshire.

There is a considerable manufacturing industry in the county. Woollens are made extensively at Tillicoultry; and at other parts distilling, brewing, coopering, tanning, glass-blowing, and ship-building are carried on. In 1871 there were 4952 persons engaged in connection with the woollen manufacture, or more than a fifth of the whole population.

Among the antiquities of Clackmannan may be mentioned the ruins of Castle Campbell, an old seat of the Argyll family, occupying a singularly wild and almost inaccessible situation, above the village of Dollar. It was burned by Montrose in 1644. The tower of Alloa, built prior to the year 1300, the residence of the Erskines, earls of Mar, now belonging to the representative of that noble family, is in good preservation. The tower of Clackmannan was long the seat of a lineal descendant of the Bruce family after the failure of the male line.

According to the parliamentary return for 1873 Clackmannan county was divided among 1227 proprietors, the average size of the holdings amounting to 24½ acres (that of all Scotland being 143), while the average value of the land was £3, 4s. 6d. per acre (that of Scotland being £1). There were in the same year 1137 holdings of less than 1 acre, 52 of 1 and under 10 acres, 20 of 10 and under 100, and 5 above 2000—the largest amounting to 6163 acres, the property of the earl of Kellie.

Clackmannanshire sends a member to Parliament conjunctly with the county of Kinross and certain adjoining parishes. By the Reform Bill, the parishes of Culross and Tulliallan, formerly comprehended in the county of Perth, Alva, formerly belonging to Stirling, and the Perthshire portion of Logie were included in the parliamentary group. The population of the county in 1861 was 21,450, and in 1871, 23,747, consisting of 11,555 males and 12,192 females. The principal towns are—Alloa, population 9000; Tillicoultry, 3700; Dollar, 2100; and Clackmannan, 1300.

CLAIRAULT, or Clairaut, Alexis-Claude (1713–1765), a French mathematician, was born on May 7, 1713, at Paris, where his father was a teacher of mathematics. Under his father's tuition he made so rapid progress in mathematical studies, that in his thirteenth year he read before the French Academy an account of the properties of four curves which he had then discovered. When only sixteen, he finished his treatise on *Curves of Double Curvature*, which, on its publication two years later, procured his admission into the Academy of Sciences, although even then he was below the legal age. In 1736, together with his friend Maupertuis, he took part in the famous expedition to Lapland, which was undertaken for the purpose of estimating a degree of the meridian, and on his return he published his treatise *Sur la figure de la terre*. In his work on this subject he promulgated his theorem in regard to the variation of gravity, which has been corrected by Sir G. Airy. He obtained an ingenious approximate solution of the problem of the three bodies; in 1750 he gained the prize of the St. Petersburg Academy for his treatise on the Lunar Theory; and in 1759 he calculated the perihelion of Halley's comet. Clairault died at Paris, May 17, 1765.

CLAMECY, a town of France at the head of an arrondissement, in the department of Nièvre, at the confluence of the Yonne and Beuvron, 38 miles N.N.E. of Nevers. It has some remains of its ancient castle, and of the massive walls by which it was formerly surrounded, several Gothic churches, and a handsome modern château. There are manufactures of woollen cloths, earthenwares, paper, and leather, and a considerable trade in wood and charcoal, principally with Paris, by means of the Yonne. Population in 1872, 4717.

CLAN. The Goidelic word *cland* or *clann* (in Welsh, *plant*) signifies seed, and in a general sense children, descendants. In the latter sense it was used as one of many terms to designate groups of kindred in the tribal system of government which existed in Ireland and the Highlands of Scotland. Through the latter country the word passed into the English language, first in the special sense of the Highland clan, afterwards as a general name for a tribe or group of kinsmen. The results of inquiries into the tenure of land in different countries and the ancient laws and institutions of Aryan nations, and the publication of various Celtic documents, particularly the ancient laws of Ireland and Wales, have thrown much light on the constitution of the clan system, and given to it a wider and more important interest than it had hitherto possessed.

Before the use of surnames and elaborate written genealogies, a tribe in its definite sense was called a *tuath*, a word of wide affinities, from a root *tu*, to grow, to multiply, existing in all European languages. When the tribal system began to be broken up by conquest and by the rise of towns and of territorial government, the use of a common surname furnished a new bond for keeping up a connection between kindred. The head of a tribe or smaller group of kindred selected some ancestor and called himself his *Ua*, grandson, or as it has been anglicized *O'*, *e.g.*, *Ua Conchobair* (O' Conor), *Ua Suilleabhain* (O' Sullivan). All his kindred adopted the same name, the chief using no

fore-name however. The usual mode of distinguishing a person before the introduction of surnames was to name his father and grandfather, *e.g.*, Owen, son of Donal, son of Dermot. This naturally led some to form their surnames with *Mac*, son, instead of *Ua*, grandson, *e.g.*, *Mac Garthaigh*, son of *Carthach* (Mac Carthy), *Mac Ruaidhri*, son of Rory (Macrory). Both methods have been followed in Ireland, but in Scotland *Mac* came to be exclusively used. The adoption of such genealogical surnames fostered the notion that all who bore the same surname were kinsmen, and hence the genealogical term *clann*, which properly means the descendants of some progenitor, gradually became synonymous with *tuath*, tribe. Like all purely genealogical terms, *clann* may be used in the limited sense of a particular tribe governed by a chief, or in that of many tribes claiming descent from a common ancestor. In the latter sense it was synonymous with *síl*, *siol*, seed, *e.g.*, *Siol Alpine*, a great clan which included the smaller clans of the Macgregors, Grants, Mackinnons, Macnabs, Macphies, Macquarries, and Macaulays.

The clan system in the most archaic form of which we have any definite information can be best studied in the Irish *tuath*, or tribe. This consisted of two classes:—(1) tribesmen, and (2) a miscellaneous class of slaves, criminals, strangers, and their descendants. The first class included tribesmen by blood in the male line, including all illegitimate children acknowledged by their fathers, and tribesmen by adoption or sons of tribeswomen by strangers, foster-sons, men who had done some signal service to the tribe, and lastly the descendants of the second class after a certain number of generations. Each *tuath* had a chief called a *rígh*, king, a word cognate with the Gaulish *rígs* or *rix*, the Latin *reg-s* or *rex*, and the Old Norse *rik-ir*. The tribesmen formed a number of communities, each of which, like the tribe itself, consisted of a head, *ceann fine*, his kinsmen, slaves, and other retainers. This was the *fine*, or sept. Each of these occupied a certain part of the tribe-land, the arable part being cultivated under a system of co-tillage, the pasture land co-grazed according to certain customs, and the wood, bog, and mountains forming the marchland of the sept being the unrestricted common land of the sept. The sept was in fact a village community like the Russian *mir*, or rather like the German *gemeinde* and Swiss *almend*, which Sir H. S. Maine, M. de Laveleye, and others have shown to have preceded in every European country the existing order of things as respects ownership of land.

What the sept was to the tribe, the homestead was to the sept. The head of a homestead was an *aire*, a representative freeman capable of acting as a witness, compurgator, and bail. These were very important functions, especially when it is borne in mind that the tribal homestead was the home of many of the kinsfolk of the head of the family as well as of his own children. The descent of property being according to a gavel-kind custom, it constantly happened that when an *aire* died the share of his property which each member of his immediate family was entitled to receive was not sufficient to qualify him to be an *aire*. In this case the family did not divide the inheritance, but remained together as "a joint and undivided family," one of the members being elected chief of the family or household, and in this capacity enjoyed the rights and privileges of an *aire*. Sir H. S. Maine has directed attention to this kind of family as an important feature of the early institutions of all Aryan nations. Besides the "joint and undivided family" there was another kind of family which we might call the "joint family." This was a partnership composed of three or four members of a sept whose individual wealth was not sufficient to qualify each of them to be an *aire*, but whose joint wealth qualified one of the co-partners as head of the joint family to be one.

So long as there was abundance of land each family grazed its cattle upon the tribe-land without restriction; unequal increase of wealth and growth of population naturally led to its limitation, each head of a homestead being entitled to graze an amount of stock in proportion to his wealth, the size of his homestead, and his acquired position. The arable land was no doubt apportioned annually at first; gradually, however, some of the richer families of the tribe succeeded in evading this exchange of allotments and converting part of the common land into an estate in severalty. Septs were at first colonies of the tribe which settled on the march-land; afterwards the conversion of part of the common land into an estate in severalty enabled the family that acquired it to become the parent of a new sept. The same process might, however, take place within a sept without dividing it; in other words, several members of the sept might hold part of the land of the sept as separate estate. The possession of land in severalty introduced an important distinction into the tribal system—it created an aristocracy. An *aire* whose family held the same land for three generations was called a *flaith*, or lord, of which rank there were several grades according to their wealth in land and chattels. The *aires* whose wealth consisted in cattle only were called *bó-aires*, or cow-*aires*, of whom there were also several grades, depending on their wealth in stock. When a *bó-aire* had twice the wealth of the lowest class of *flaith* he might enclose part of the land adjoining his house as a lawn; this was the first step towards his becoming a *flaith*. The relations which subsisted between the *flaiths* and the *bó-aires* formed the most curious part of the Celtic tribal system, and throw a flood of light on the origin of the feudal system. Every tribesman without exception owed *ceilsinne* to the *rígh*, or chief, that is, he was bound to become his *ceile*, or vassal. This consisted in paying the *rígh* a tribute in kind, for which the *ceile* was entitled to receive a proportionate amount of stock without having to give any bond for their return, giving him service, *e.g.*, in building his *dun*, or stronghold, reaping his harvest, keeping his roads clean and in repair, killing wolves, and especially service in the field, and doing him homage three times while seated every time he made his return of tribute. Paying the "*calpe*" to the Highland chiefs represented this kind of vassalage, a *colpdach* or heifer being in many cases the amount of food-rent paid by a free or *saer ceile*. A tribesman might, however, if he pleased, pay a higher rent on receiving more stock together with certain other chattels for which no rent was chargeable. In this case he entered into a contract, and was therefore a bond or *daer ceile*. No one need have accepted stock on these terms, nor could he do so without the consent of his sept, and he might free himself at any time from his obligation by returning what he had received, and the rent due thereon.

What every one was bound to do to his *rígh*, or chief, he might do voluntarily to the *flaith* of his sept, to any *flaith* of the tribe, or even to one of another tribe. He might also become a bond *ceile*. In either case he might renounce his ceileship by returning a greater or lesser amount of stock than what he had received according to the circumstances under which he terminated his vassalage. In cases of disputed succession to the chiefship of a tribe the rival claimants were always anxious to get as many as possible to become their vassals. Hence the anxiety of minor chieftains, in later times in the Highlands of Scotland, to induce the clansmen to pay the "*calpe*" where there happened to be a doubt as to who was entitled to be chief.

The effect of the custom of gavel-kind was to equalize the wealth of each and leave no one wealthy enough to be chief. The "joint and undivided family," and the formation of "joint families," or gilds, was one way of obviating this result; another way was the custom of tanistry. The headship of the tribe was practically confined to the members of one family; this was also the case with the headship of a sept. Sometimes a son succeeded his father, but the rule was that the eldest and most capable member of the *geilfine*, that is the relatives of the actual chief to the fifth degree,[1] was selected during his lifetime to be his successor,—generally the eldest surviving brother or son of the preceding chief. The man selected as successor to a chief of a tribe, or chieftain of a sept, was called the tanist, and should be "the most experienced, the most noble, the most wealthy, the wisest, the most learned, the most truly popular, the most powerful to oppose, the most steadfast to sue for profits and [be sued] for losses." In addition to these qualities he should be free from personal blemishes and deformities, and of fit age to lead his tribe or sept, as the case may be, to battle.[2] So far as selecting the man of the *geilfine* who was supposed to possess all these qualities,

[1] It is right to mention that the explanation here given of *geilfine* is different from that given in the introduction to the third volume of the *Ancient Laws of Ireland*, which has been followed by Sir H. S. Maine in his account of it in his *Early History of Institutions*, and which the present writer believes to be erroneous.

[2] It should also be mentioned that illegitimacy was not a bar. The issue of "handfast" marriages in Scotland were eligible to be chiefs, and even sometimes claimed under feudal law.

the office of chief of a tribe or chieftain of a sept was elective, but as the *geilfine* was represented by four persons together with the chief or chieftain, the election was practically confined to one of the four. In order to support the dignity of the chief or chieftain a certain portion of the tribe or sept land was attached as an apanage to the office; this land, with the *duns*, or fortified residences upon it, went to the successor, but a chief's own property might be gavelled. This custom of tanistry applied at first probably to the selection of the successors of a *rí*g, but was gradually so extended that even a *bó-aire* had a tanist.

A sept might have only one *flaith*, or lord, connected with it, or might have several. It sometimes happened, however, that a sept might be so broken and reduced as not to have even one man qualified to rank as a *flaith*. The rank of a *flaith* depended upon the number of his *ceiles*, that is, upon his wealth. The *flaith* of a sept, and the highest, when there was more than one, was *ceann fine*, or head of the sept, or as he was usually called in Scotland, the chieftain. He was also called the *flaith geilfine*, or head of the *geilfine*, that is, the kinsmen to the fifth degree from among whom should be chosen the tanist, and who according to the custom of gavel-kind were the immediate heirs who received the personal property and were answerable for the liabilities of the sept. The *flaiths* of the different septs were the vassals of the *rí*g, or chief of the tribe, and performed certain functions which were no doubt at first individual, but in time became the hereditary right of the sept. One of those was the office of *maer*, or steward of the chief's rents, &c.;[1] and another that of *aire tuisi*, leading *aire*, or *taoisech*, a word cognate with the Latin *duc-s* or *dux*, and Anglo-Saxon here-*tog*, leader of the "here," or army. The *taoisech* was leader of the tribe in battle; in later times the term seems to have been extended to several offices of rank. The cadet of a Highland clan was always called the *taoisech*, which has been translated captain; after the conquest of Wales the same term *tywysaug*, was used for a ruling prince. Slavery was very common in Ireland and Scotland; in the former slaves constituted a common element in the stipends or gifts which the higher kings gave their vassals *sub-reguli*. Female slaves, who were employed in the houses of chiefs and *flaiths* in grinding meal with the hand-mill or quern, and in other domestic work, must have been very common, for the unit or standard for estimating the wealth of a *bó-aire*, blood-fines, &c., was called a *cumhal*, the value of which was three cows, but which literally meant a female slave. The descendants of those slaves, prisoners of war, forfeited hostages, refugees from other tribes, broken tribesmen, &c., gathered round the residence of the *rí*g and *flaiths*, or squatted upon their march-lands, forming a motley band of retainers which made a considerable element in the population, and one of the chief sources of the wealth of chiefs and *flaiths*. The other principal source of their income was the food-rent paid by *ceiles*, and especially by the *daer* or bond *ceiles*, who were hence called *biathachs*, from *biad*, food. A *flaith*, but not a *rí*g, might, if he liked, go to the house of his *ceile* and consume his food-rent in the house of the latter.

Under the influence of feudal ideas and the growth of the modern views as to ownership of land, the chiefs and other lords of clans claimed in modern times the right of bestowing the tribe-land as *turcrec*, instead of stock, and receiving rent not for cattle and other chattels as in former times, but proportionate to the extent of land given to them. The *turcrec*-land seems to have been at first given upon the same terms as *turcrec*-stock, but gradually a system of short leases grew up; sometimes, too, it was given on mortgage. In the Highlands of Scotland *ceiles* who received *turcrec*-land were called "taksmen." On the death of the chief or lord, his successor either bestowed the land upon the same person or gave it to some other relative. In this way in each generation new families came into possession of land, and others sank into the mass of mere tribesmen. Sometimes a "taksman" succeeded in acquiring his land in perpetuity, by gift, marriage, or purchase, or even by the "strong hand." The universal prevalence of exchangeable allotments, or the rundale system, shows that down to even comparatively modern times some of the land was still recognized as the property of the tribe, and was cultivated in village communities.

The chief governed the clan by the aid of a council called the *sabaid* (*sab*, a prop), but the chief exercised much power, especially over the miscellaneous body of non-tribesmen who lived on his own estate. This power seems to have extended to life and death. Several of the *flaiths*, perhaps all heads of septs, also possessed somewhat extensive powers of the same kind.

The Celtic dress, at least in the Middle Ages, consisted of a kind of shirt reaching to a little below the knees called a *lenn*, a jacket called an *inar*, and a garment called a *brat*, consisting of a single piece of cloth. This was apparently the garb of the *aires*, who appear to have been further distinguished by the number of colors in their dress, for we are told that while a slave had clothes of one color, a *rí*g *tuatha*, or chief of a tribe, had five, and an *ollamh* and a superior king, six. The breeches was also known, and cloaks with a cowl or hood, which buttoned up tight in front. The *lenn* is the modern kilt, and the *brat* the plaid, so that the dress of the Irish and Welsh in former times was the same as that of the Scottish Highlander.

By the abolition of the heritable jurisdiction of the Highland chiefs, and the general disarmament of the clans by the Acts passed in 1747 after the rebellion of 1745, the clan system was practically broken up, though its influence still lingers in the more remote districts. An Act was also passed in 1747 forbidding the use of the Highland garb;[2] but the injustice and impolicy of such a law being generally felt it was afterwards repealed. (W. K. S.)

CLAPARÈDE, Jean Louis René Antoine Édouard (1832–1870), an eminent naturalist, was born at Geneva, April 24, 1832, and belonged to an ancient family of that city. His father was pastor of the parish of Chancy, and Édouard's early years were spent in that village. After a distinguished course at the classical college, the gymnasium, and the academy of his native city, he repaired in 1852 to the university of Berlin, and there devoted himself with self-sacrificing ardor to the study of medicine and the natural sciences and the acquisition of the Germanic languages of Northern Europe. The direction of his investigations was greatly affected by J. Müller and Ehrenberg, the former of whom was at that period engaged in his important researches about the Echinoderms. In 1855 he accompanied Müller to Norway, and there spent two months on a desolate reef that he might obtain satisfactory observations. The latter part of his stay at Berlin he devoted, along with Lachmann, to the study of the Infusoria and Rhizopods; and their united labors resulted in an important publication which at once gave them rank among the chief zoologists of the day. In 1857 he obtained the degree of doctor, and soon after he was chosen professor of comparative anatomy in the academy of Geneva. Here he continued to teach with ever growing acceptance; and he even became a favorite of the general public through his popular lectures. In 1859 he visited England, and, in company with Dr. Carpenter, took a voyage to the Hebrides; and in 1863 he spent some months in the Bay of Biscay. On the appearance of Darwin's work on the *Origin of Species*, he adopted his theories and published a valuable series of articles on the subject in the *Revue Germanique*, 1861. His enormous activity might seem to indicate vigorous health; but he was a martyr from the year 1854 to a painful affection of the heart, which caused excessive palpitations, frequently ac-

[1] This office is of considerable importance in connection with early Scottish history. In the Irish annals the *rí*g, or chief of a great tribe (*mor tuath*), such as of Ross, Moray, Marr, Buchan, &c., is called a *mor maer*, or great *maer*. Sometimes the same person is called king also in these annals. Thus *Findlaec*, or Finlay, son of *Ruadhri* the father of Shakespeare's Macbeth, is called king of Moray in the *Annals of Ulster*, and *mor maer* in the *Annals of Tighernach*. The term is never found in Scottish charters, but it occurs in the Book of the Abbey of Deir in Buchan, now in the library of the University of Cambridge. The Scotic kings and their successors obviously regarded the chiefs of the great tribes in question merely as their *maers*, while their tribesmen only knew them as kings. From these "mor-maerships," which correspond with the ancient *mor tuatha*, came most, if not all the ancient Scottish earldoms.

[2] The following oath was administered at Fort Willlam and other places in 1747 and 1748.

"I, [name], do swear, as I shall answer to God at the great day of judgment, that I have not, nor shall have, in my possesslon any gun, sword, pistol, or any arm whatsoever, and that I never use tartan, plaid, or any part of the Highland garb; and if I do so, may I be cursed in my undertakings, family, and property,—may I never see my wife and children, father, mother, or relations,—may I be killed in battle as a coward, and lie without Christian burial in a strange land, far from the graves of my forefathers and kindred: may all this come across me if I break my oath."

companied by spitting of blood. During 1865 and 1866 he was quite incapable of work, and he determined to pass the winter of 1866–7 in Naples. The change of climate produced some amelioration, and the patient's indomitable energy was attested by two elaborate volumes on the Annelidæ of the Gulf. He again visited Naples with advantage in 1868; but in 1870, instead of recovering as before, he grew worse, dropsy set in, and on the 31st of May he died at Siena on his way home. Modest and retiring, he was at the same time generous, hospitable, and helpful; and in spite of his physical weakness, he displayed remarkable spirit in the political disturbances of Geneva. A certain bluntness of expression sometimes made him fail of courtesy in debate, and he could be pitilessly severe in his criticism where he thought severity was deserved; but he was at the same time strikingly free from uncharitableness, jealousy, or resentment. His library was bequeathed to his native city. See the notice of his life by Henri de Saussure in the 42d vol. of the *Archives des Sciences physiques et naturelles* (Bibliothèque Univ. et Revue Suisse), Geneve, 1871.

Besides the works already mentioned his chief contributions to science are:—"Ueber Actinophrys Eichhornii," in Müller's *Arch. für Anatomie*, 1855; "Sur la théorie de la formation de l'Œuf," in *Arch. des Sci.*, 1855; "Anatomie und Entwickelungs geschichte der Neritina fluviatilis," in Müller's *Arch.*, 1857; various papers in regard to binocular vision in the *Arch. des Sci.*, 1858 and 1859; "Zur Morphologie der Zusammengesetzten Augen bei den Arthropoden" in *Zeitsch. fur Wissensch. Zool.*, 1860; *Recherches anat. sur les Oligochètes*, Gen., 1862; *Rech. sur l'évolution des Araignées*, 1862, which obtained the gold medal of the Utrecht Society of Arts and Sciences; *Beobacht. über Anat. und Entwickelungsgesch. Wirbelloser Thiere an der Küste der Normandie*, 1863; "De la myopie," in *Arch. des Sci.*, 1863; "Studien an Akariden," in *Zeitsch. für Wiss. Zool.*, 1868; and "Histologische Untersuch. über den Regenwurm (Lumbricus terrestris)" in do., 1868. He left in MSS. *Recherches sur la structure des Annelides sédentaires.*

CLAPPERTON, Hugh (1788–1827), an African traveller, was born in 1788 at Annan, Dumfriesshire, where his father was a surgeon. In his youth he gained some knowledge of practical mathematics and navigation; and while still very young he was apprenticed on board a vessel which traded between Liverpool and North America. After having made several voyages across the Atlantic, he was impressed for the navy, in which, having a little influence and much intelligence and physical vigor, he soon rose to the rank of midshipman. He acted as drill sergeant in the "Asia," the flag-ship of Vice-Admiral Cochrane, and was promoted to the rank of lieutenant, and to the command of a schooner on the Canadian lakes. In the year 1817, when the flotilla on the lakes was dismantled, he returned to his native country on half-pay.

In 1820 Clapperton removed to Edinburgh, where he contracted an intimacy with Dr. Oudney, who first awoke his interest in the cause in which both were destined to perish. After the return of Captain Lyon, the British Government having determined on equipping a second expedition for the purpose of exploring Northern Africa, Dr. Oudney was appointed to proceed to Bornu as consul, and Clapperton and Colonel Denham[1] were added to the party. From Tripoli, early in 1822, they set out southward to Murzuk, and from this point Clapperton and Oudney travelled westward into the country of the Tuaricks, as far as Ghraat, 11° E. long. On the 17th February, 1823, they reached Kouka the capital of Bornu, where they were well received by the sultan; and after remaining here till the 14th December they again set out for the purpose of exploring the course of the Niger. They arrived in safety at Murmur, where Oudney breathed his last in the arms of his companion. Clapperton, however, penetrated alone as far as Sackatu, 13° N. lat. and 6½° E. long., where he was obliged to stop, though the Niger was only five days' journey to the west. Worn out with travel he returned to Kouka, where he again met Denham. The two travellers then set out for Tripoli, and thence proceeded to England, where they arrived on June 1, 1825. An account of the travels of Denham, Clapperton, and Oudney was published under the title of *The Narrative of Travels and Discoveries in Northern and Central Africa in the years* 1822-24.

Immediately after his return Clapperton was raised to the rank of commander, and sent out with another expedition to Africa. He set sail in August, 1825, in company with Captain Pearce, Mr. Dickson, Dr. Morrison, and Richard Lander, who acted as his servant. On this occasion he landed at Badagry in the Bight of Benin, and immediately commenced his journey into the interior, along with Lander, Captain Pearce, and Dr. Morrison. The last two soon fell victims to the hardships of the journey; but in January, 1826, Clapperton reached Katunga, the capital of Yariba, and soon afterwards crossed the Niger at Broussa, the spot where Mungo Park met his untimely fate. In July he arrived at Kano, a city which he had previously visited. Here he left his servant with the baggage, and proceeded alone to Sackatu, intending to proceed to Timbuctu. The sultan, however, detained him, and being seized with dysentery he died at Sackatu on the 13th April, 1827. His Journal was published by Lander, who also wrote a work entitled *Records of Captain Clapperton's last Expedition to Africa*, which appeared in 1830, in 2 vols. 12mo.

CLAQUE, from the French *claquer*, literally "to make a sharp, rattling noise," and used in such phrases as *claquer des mains*, "to clap the hands," or applaud. The word is of comparatively recent origin. It is the name given to a certain practice, or perhaps we may call it business, which has gradually come in vogue within the last sixty or seventy years, more especially in the theatres and concert-rooms of Paris, yet to a lesser extent in other parts of the world, by which the friends of a new singer, for instance, or of the author of a new play, endeavor to make sure that such new singer or new play shall be successful in appearance at least, even though neither should really deserve success. In the early days of this practice it consisted merely in the friends of the author or singer assembling in the theatre or concert-room, and then and there, at a preconcerted part of the performance, breaking out into loud applause—applause so loud and given with such seeming spontaneousness and unanimity as, in most cases, not only to ensure the success of an average singer or play, but even to cut short any manifestations of merited condemnation of absolute dulness. Thus originating in the very natural wish which one friend entertains that another should succeed, the practice by degrees grew up into a system which, not content with the comparatively innocent endeavor to lift medium ability to a level with genius, not unfrequently became the weapon with which envious stupidity struck down rising talent.

At length, late in the first quarter of the present century, an ingenious Parisian, Sautan by name, conceived the brilliant idea of organizing the *claque* into a regular business. He established an office for the "assurance of dramatic success," to which the managers of theatres, when they wish to ensure the success of any particular pieces, are to send orders for as many *claqueurs* as may seem needed to effect the desired result. These *claqueurs* are arranged in classes, the members of each of which have special duties to perform. First, and most important of all, are the *commissars*. Their business is to commit to memory the entire play, so as to be able to repeat readily those passages which may be considered particularly brilliant, and then expatiate upon their beauty, so as in a measure to influence the sentiments of such persons as may be within hearing. The *rieurs*, or laughers, are instructed to laugh heartily at every passage in the play which may be supposed to sparkle with wit or humor; while the *pleururs*, or weepers, who are usually women, have to arouse the sympathies of those around them by a free use of their handkerchiefs to wipe away the tears to which they are to be moved by the pathetic scenes in the piece. Still lower in the scale is the *chatouilleur*, or tickler, who is to keep those near him in a good humor by such delicate little attentions as anticipating their desires for a pinch of snuff, supplying them with programmes, offering them bonbons, or the like, or by chatting pleasantly with them on any genial topic which may suggest itself. Last of all comes the *bisseur*, whose special field of action is the concert-room, though he is not always out of place in the theatre, and whose duty is to vociferate *encore* with the greatest apparent enthusiasm and determination when a singer has finished his or her piece. These various persons are supplied with free tickets, and frequently even attend rehearsals, where they receive instructions as to what particular part of the play they are to greet with applause. An assurance office of this character

[1] [Dixon Denham (1786–1828), born in London, also explored Mandara. He died at Sierra Leone as vice-governor.—Am. Ed.]

is said to have been established in London, while in Germany the system of claquing exists, though not so openly as in France. It is scarcely necessary to say that such a mode of creating success, even if it were not liable to scandalous abuses, is one which cannot but be fatal to all genuine talent.

CLARAC, Charles Othon Frédéric Jean Baptiste, Count, a French antiquarian and student of art, the author of several important works on the subjects to which he devoted much of his life, was born at Paris on the 16th of June, 1777. He was yet a child when, on the breaking out of the revolution of 1789, his family, along with so many others seeking refuge from the rising tempest, quitted France, and found abroad that safety which their rank jeopardized at home. The boy had grown to manhood before he again saw his native land. Meantime, entering the army at a very early age, he had borne arms, first under the prince De Condé, and afterwards in a Russian regiment. The amnesty granted under the consulate to the royalist emigrants afforded him an opportunity to return to France of which he was not slow to take advantage. In 1808 he went to Naples, whither he was called to superintend the education of the children of Murat, who had just been proclaimed king of the Two Sicilies. While at Naples he received an appointment to take charge of the work of excavation then being vigorously prosecuted at Pompeii. In this he took a zealous interest. The art studies to which much of his leisure while in the army had been devoted gave him peculiar qualifications for the duty he had been entrusted with. Making good use of his opportunities, he has recorded the results in a book entitled *Fouilles Faites á Pompeii* (excavations made at Pompeii), which contains much that is at once interesting and valuable. After Murat's dethronement in 1815, Clarac returned to France, but presently set sail for Brazil in the train of the duke of Luxembourg, who had been appointed ambassador to that country. Having once more returned to his native land, he was placed in charge of the museum of antiquities at Paris, a position which he retained till his death, in 1847. During the interval he published several works, the most important of which are a *Manual of the History of Art*, and the *Museum of Ancient and Modern Sculpture*. It is upon the latter of these that his reputation mainly depends, and to it he devoted his best talents and his entire fortune. Though begun in 1826, it was not completed until some five years after his death.

CLARE, a maritime county in the south-west of Ireland, in the province of Munster, bounded N.W. by the Atlantic, S. by the estuary of the Shannon, S.E. and N.E. by Limerick, Tipperary, Lough Dearg, and Galway, having an area of 1293 square miles, or 827,994 acres.

Although the surface of the county is hilly, and in some parts even mountainous, it nowhere rises to a great elevation. Much of the western baronies of Moyarta and Ibrickan is composed of bog land. Bogs are frequent also in the mountainous districts elsewhere, except in the limestone barony of Burren, the inhabitants of some parts of which supply themselves with turf from the opposite shores of Connemara. Generally speaking, the eastern parts of the county are mountainous, with tracts of rich pasture land interspersed; the west abounds with bog; and the north is rocky and best adapted for grazing sheep. In the southern part, along the banks of the Fergus and Shannon, are the bands of rich low grounds called corcasses, of various breadth, indenting the land in a great variety of shapes. They are composed of deep rich loam, and are distinguished as the black corcasses, adapted for tillage, and the blue, used more advantageously as meadow land.

The coast is in general rocky, and occasionally bold and precipitous in the extreme, as may be observed at the picturesque cliffs of Moher within a few miles of Ennistymon and Lisdoonvarna, which rise perpendicularly at O'Brien's tower to an elevation of 580 feet. The coast of Clare is indented with several bays, the chief of which are Ballyvaghan, Liscannor, and Malbay; but from Blackhead to Loop Head, that is, along the entire western boundary of the county formed by the Atlantic, there is no safe harbor except Liscannor Bay. The county possesses only one large river, the Fergus; but nearly 100 miles of its boundary-line are washed by the river Shannon, which, after almost dividing Ireland from north to south, and dispensing its bounties to the adjoining counties of Roscommon, Leitrim, Longford, Westmeath, Galway, King's County, Kerry, Tipperary, and Limerick, enters the Atlantic Ocean between this county and Kerry. The numerous bays and creeks on both sides of this noble river render its navigation safe in every wind; but the passage to and from Limerick is often tedious, and the port of Kilrush has from that cause gained in importance. The river Fergus is navigable from the Shannon to the town of Clare, which is the terminating point of its natural navigation, and the port of all the central districts of the county. A railway traverses Clare county *via* Ennis, connecting Limerick with Athenry and Galway.

There are upwards of one hundred lakes and tarns in the county, of which the largest are Loughs O'Grady, Graneg, Tedane, Inchiquin, Inniscronan, and Clonlea; but they are more remarkable for picturesque beauty than size or utility, with the exception of the extensive and navigable Lough Derg, formed by the river Shannon between this county and Tipperary.

Although metals and minerals have been found in many places throughout the county, they do not often show themselves in sufficient abundance to induce the application of capital for their extraction. The principal metals are lead, iron, and manganese. Lead mines were recently worked at Kilbricken in the barony of Bunratty (about six miles from Ennis), and at Annaglough. The Milltown lead mine in the barony of Tulla is probably one of the oldest mines in Ireland, and at one time, if the extent of the ancient excavations may be taken as a guide, there must have been a very rich deposit. The richest lead mine worked in recent times is that of Ballyhickey, about two miles from Kilbricken. Copper pyrites occurs in several parts of Burren, but in small quantity. Coal exists at Labasheeda on the right bank of the Shannon, but the seams are thin. Limestone occupies all the central and northern parts of the county in a tract bounded on the S. by the Shannon, on the E. by a line running parallel with the Ougarnee River to Scariff Bay, on the N. by the mountain of Talla and the confines of Galway, on the W. by Galway Bay and a line including Kilfenora, Corofin, and Ennis, and meeting the Shannon at the mouth of the Fergus. Within half a mile of the Milltown lead mines are immense natural vaulted passages of limestone, through which the river Ardsullas winds a singular course. The lower limestone of the eastern portion of the county has been found to contain several very large deposits of argentiferous galena. Flags, easily quarried, are procured near Kilrush, and thinner flags near Ennistymon. Slates are quarried in several places, the best being those of Broadford and Killaloe, which are nearly equal to the finest procured in Wales. A species of very fine black marble is obtained near Ennis; it takes a high polish, and is free from the white spots with which the black Kilkenny marble is marked.

The mineral springs, which are found in many places, are chiefly chalybeate. That of Lisdoonvarna, about eight miles from Ennistymon, has long been celebrated for its medicinal qualities. There are chalybeate springs of less note at Scool, Colneen, Kilkishen, Burren, Kilcoran, Broadford, Lahinch, Kilkee, Kilrush, Killadysart, and Casino, near Milltown Malbay. Springs called by the people "holy" or "blessed" wells, generally mineral waters, are common; but the belief in their power of performing cures in inveterate maladies is nearly extinct.

The Atlantic Ocean and the estuary of the Shannon afford many situations admirably adapted for summer bathing-places. Among the best frequented of these localities are Burren, Milltown Malbay, with one of the best beaches on the western coast, Lahinch, about two miles from Ennistymon, and near the interesting cliffs of Moher, which has a magnificent beach, on Liscanuor Bay, and forms a delightful summer residence, Kilkee, perhaps the most fashionable watering-place on the western coast of Ireland, and Kilrush on the Shannon estuary.

The soil and surface of the county is in general better adapted for grazing than for tillage. Agriculture is in a backward state, there not being a fifth part of its area under cultivation. In 1870 the acreage of the county under crops amounted to 147,662 acres, and in 1875 little advance had been made. The number of acres under the principal crops in these two years stood as follows:—

	Oats.	Wheat.	Potatoes.	Turnips and other Green Crops.	Meadow.
1870	18,776	7828	33,107	9,764	73,429
1875	17,354	3296	28,459	10,411	84,927

As regards live-stock the same stationary condition of its agricultural industry will be apparent from the following figures:—

	Cattle.	Sheep.	Pigs.	Horses and Mules.	Poultry.
1870	100,839	15,100	24,771	6601	284,551
1875	100,405	13,459	21,413	6989	323,635

As regards the property in the county, the land in 1874 was divided among 1025 separate owners, of whom 243 possessed less than one acre, and 782 one acre and upwards. Twelve proprietors owned more than 10,000 acres each, the most extensive holdings being in the hands of Lord Leconfield, with 37,292 acres; the marquis of Conyngham, with 27,613; E. P. Westby, 25,779; Lord Inchiquin, 20,321; Colonel Vandeleur, 19,790; and the Hon. C. W. White, 18,266. The value of the land was at the same date rated at an average of 8s. 3d. per acre, while that of all Munster was 11s. 2d.

There are no extensive manufactures in the county of Clare, although flannels and friezes are made for home use, and hosiery of various kinds, chiefly coarse and strong, is made around Corofin, Ennistymon, and other places. The Shannon, west of Scattery Island, and the sea along the coasts, are good fishing-stations, abounding with cod, haddock, ling, sole, turbot, ray, mackerel, and other fish, but the rugged nature of the coast and the tempestuous sea greatly hinder the operations of the fishermen. Near Pooldoody is the great Burren oyster-bed called the Red Bank, where a large establishment is maintained, and from which a constant supply of the excellent Red Bank oysters is furnished to the Dublin and other large markets. Crabs and lobsters are caught on the shores of the Bay of Galway in every creek from Blackhead to Ardfry. The salmon-fishery of the Shannon is very considerable, and eels, which abound in every rivulet, form an important article of consumption.

The population of the county shows a remarkable decrease within the 30 years between 1841 and 1871, although, after all, this is exceeded by the neighboring counties of Cork, Limerick, and Tipperary. In 1841 the inhabitants numbered 286,394; in 1851, 212,440; in 1861, 166,305; and in 1871, 147,864. Of these, 144,440 were Roman Catholics, 8027 Episcopalians, 220 Presbyterians, and 177 of other denominations. In 1874 there were 8709 persons who had obtained parochial relief throughout the year, while during the twenty-four years ending 1875 there had emigrated from the county 90,154 persons. At the date of the last census (1871) 64,566 persons could read and write, and 15,972 could read but could not write; and 4432 were returned as speaking Erse only. There were 12 superior and 253 primary schools in the county. The principal towns in Clare are Ennis, population (1871) 6503; Kilrush, 4424; and Kilkee, 1600. The county returns three members to the Imperial Parliament,—two for the county and one for the borough of Ennis.

The county of Clare, which is divided into 11 baronies, contains 80 parishes, and includes the diocese of Kilfenora, the greater part of Killaloe, and a very small portion of the diocese of Limerick. It is within the military district of Cork, with barracks for infantry at Clare Castle, Ennis, Killaloe, and Kilrush, and for artillery in the forts at Scattery Island, Donnaha, Kilcredano, Blackwater, and Kilkerrin. The assizes are held at Ennis, where the county prison, the county infirmary, and the district lunatic asylum are situated. There are eight poor-law unions.

This county, together with some of the neighboring district, was anciently called Thomond or Tuadmuin, that is, North Munster, and formed part of the monarchy of the celebrated Brian Boroihme, who held his court at Kincora near Killaloe, where his palace was situated on the banks of the Shannon. The site is still distinguished by extensive earthen ramparts. Settlements were effected by the Danes, and in the 13th century by the Anglo-Normans, but without permanently affecting the possession of the district by its native proprietors. In 1543 Murrogh O'Brien, after dispossessing his nephew, and vainly attempting a rebellion against the English rule, proceeded to England, and submitted to Henry VIII., resigning his name and possessions. He soon received them back by an English tenure, together with the title of earl of Thomond, on condition of adopting the English dress, manners, and customs, and maintaining no kerns or gallowglasses. In 1565 this part of Thomond (sometimes called O'Brien's country) was added to Connaught, and made one of the six new counties into which that province was divided by Sir Henry Sidney under the Act 11 Eliz. c. 9. It was then named Clare, probably from the name of an English adventurer, Thomas de Clare, who obtained a grant from Henry III. of all the lands he should conquer from the Irish, and whose family for some time maintained a precarious position in the district. In 1602 the county was re-annexed to Munster. The O'Briens and other native chieftains had many fierce contests to preserve their independence against the Anglo-Norman and English adventurers, and generally succeeded in maintaining their position as native kings and chieftains of Thomond. From some cause or other the comparative immunity of Clare in ancient times from foreign rule and settlement, and from absenteeism, has proved of doubtful advantage to its modern condition. The chief ancient families of note in the district were the O'Briens, now represented by Lord Inchiquin of Dromoland, the Macnamaras, and the O'Loghlens.

The county abounds with remains of antiquities, both military and ecclesiastical. There still exist above a hundred fortified castles, several of which are inhabited. They are mostly of small extent, a large portion being fortified dwellings. The chief of them is Bunvatty Castle, built in 1277. Raths or Danish forts are to be found in every part. They are generally circular, composed either of large stones without mortar, or of earth thrown up and surrounded by one or more ditches. The list of abbeys and other religious houses formerly flourishing here (some now only known by name, but many of them surviving in ruins) comprehends upwards of twenty. The most remarkable are—Quin, considered one of the finest and most perfect specimens of ancient monastic architecture in Ireland; Corcomroe; Ennis, in which is a very fine window of uncommonly elegant workmanship; and those on Inniscattery, or Scattery Island, in the Shannon, said to have been founded by St. Senanus. On the same island there is a round tower, and also the ruins of what are called the seven churches. It is called Holy Island, and is still one of the most popular burial-places in the county. Four other round towers are to be found in various stages of preservation—at Drumcliffe, Dysert, Kilnby, and Inniscaltra. The cathedral of the diocese of Killaloe, at the town of that name, is a plain massive building originally erected in 1160; and near it are the ruins of the mausoleum of Brian Boroihme. Cromlechs are found, chiefly in the limestone rocky district of Burren, though there are some in other baronies. That at Ballygannor is formed of a stone 40 feet long and 10 broad. The celebrated tomb of Conan, on Mount Callan, is still extant.

CLARE, John (1793–1864), commonly known as "the Northamptonshire Peasant Poet," was the son of a farm laborer, and was born at Helpstone, near Peterborough, on 13th July, 1793. At the age of seven he was taken from school to tend sheep and geese; five years after he wrought on a farm, paying with his own meagre savings for the education he received in the evening. He endeavored to enter a lawyer's office but failed, studied algebra, and fell in love, became a pot-boy in a public-house, and subsequently was apprenticed to a gardener, from which employment he ran away. Among the neighbors his manners and habits made an unfavorable impression. He enlisted in the militia, tried camp life with gipsies, and wrought as a lime burner in 1817, but the following year he was obliged to accept parish relief. In 1820 appeared his *Poems Descriptive of Rural Life and Scenery*, which were very indulgently received, and the year following his *Village Minstrel and other Poems* were published. He was greatly patronized; fame, with many curious visitors, broke the tenor of his life, and dangerous habits were formed. From subscriptions he became possessed of £45 annually, a sum far beyond what he had ever earned, but new wants made his income insufficient, and in 1823 he was nearly penniless. His next volume, the *Shepherd's Calendar*, 1827, met with little success, which was not increased by his hawking it himself. As he wrought again on the fields his health improved; but farm operations being unsuccessful he was "as dull as a fog in November," and became seriously unwell. Although a noble patron presented him

with a new cottage and a piece of ground, Clare was full of anguish to leave the "old home of homes." The removal to Northborough was his culminating period, and gradually his mind gave way. His last and best work, the *Rural Muse*, published in 1835, was noticed by "Christopher North" alone. Bursts of insanity followed, of which he had for some time shown symptoms; and in July, 1837, he was kept in confinement, and was subsequently lodged in Northampton General Lunatic Asylum, where he died May 20, 1864. The neglect of friends and relatives to visit him, together with the non-success of his later poems, preyed heavily upon his mind. In the asylum he penned his most thrilling poem, beginning—"I am! yet what I am who cares or knows?" In its exceeding sadness of thought there is sublime feeling,—a strain of divine music in the wail of woe,—and the poet longed to

> "Sleep as I in childhood sweetly slept
> Full of high thoughts, unborn. So let me lie,
> The grass below, above the vaulted sky."

Clare was one of our most uneducated poets, and sung from the fulness of his heart; he is one of England's sweetest singers of nature, whose thoughts "gild life's brambles with a flower," and whose songs were gathered from the fields. Many of his sonnets, which display great power of word-painting, are sweet as "sunshine in summer dream." His ballads and love-songs are wild flowers strewn at will, which "art and fashion fling as weeds away," and his *Eternity of Nature*, and *First Love's Recollections* display deftness of touch, pastoral beauty, and genuine poetic ability. All his love and genius were showered on beautifying the rural scenes and humble incidents of his surroundings. His poems, drawn with a delicate hand, are those of a keen observer, but they greatly want that vigor which is essential to popularity; in his own words, "the tide of fashion is a stream too strong for pastoral brooks that gently flow and sing."

See the *Life of John Clare* by Frederick Martin, 1865, and *Life and Remains of John Clare*, by J. L. Cherry, 1873, the latter of which, though not so complete, contains some of the poet's asylum verses and prose fragments.

CLARENDON, Edward Hyde, first Earl of (1609–1674), historian and statesman, born at Dinton in Wiltshire, on the 18th February, 1609, was the third son of Henry Hyde, a gentleman belonging to an ancient Cheshire family. The profession first chosen for him was the church; and consequently, after being educated at home by the vicar of the parish up to the age of thirteen, he was sent to Magdalen College, Oxford. But his eldest brother having died young, the death of his second brother in 1625 left him heir to his father's estate; and the law being now considered a more appropriate profession, he was entered at the Middle Temple by his uncle, Sir Nicholas Hyde, then treasurer of that society. At the age of twenty he married a daughter of Sir George Ayliffe; but in six months he was left a widower; and three years later he took as his second wife a daughter of Sir Thomas Aylesbury, Master of Requests.

While yet a young man Hyde had the happiness, as he boasts in his autobiography, of being admitted into the most brilliant literary society of his time. Among poets he knew Ben Jonson, Waller, and Carew; he was acquainted with Selden, and with nearly every other scholar of eminence in his day; and he had a rare opportunity of acquiring, from the conversation of the subtle and impartial Chillingworth and the outspoken but liberal-minded Hales, a breadth of sympathy which unhappily his natural temper and the rough pressure of the times combined to prevent him from ever displaying. The brilliant, tender-hearted Falkland also was his most intimate friend. And, fortunately for his professional advancement, besides possessing considerable family influence, he enjoyed the favor of Laud, who, as commissioner of the treasury, regularly consulted him in regard to mercantile affairs.

When, therefore, in April, 1640, Hyde took his seat in the Short Parliament as representative of Wootton-Basset, he was already known as a lawyer of mark. During its session of barely three weeks, he made himself prominent as a zealous supporter of the popular party; and his maiden speech consisted of a vigorous attack upon the Earl Marshal's Court, which had become notorious for the savage manner in which it resented the least affront offered to a man of rank.

In the Long Parliament (in which he sat as member for Saltash) his zeal for reform was at first in no degree diminished. He effected the final overthrow of the Earl Marshal's Court. He sat as chairman of the committee which collected evidence against the Councils of York and of the Marshes, and of the committee which was appointed to consider the advisability of remodelling the government of the church. He went entirely with the popular party in their condemnation of ship-money; and it was largely through the earnest speech which Hyde delivered against him that Lord Keeper Finch was driven into exile. When, however, Episcopacy was threatened, and it became apparent that the popular leaders were not to be satisfied with merely temporary reform, but were resolved on gaining a permanent triumph, Hyde, in perfect accordance with both his religious and his political principles, went over to the royalist party. He uttered an open and determined protest against the Grand Remonstrance, and drew up an answer to it which was adopted and published by the king, and which procured for him the offer of the post of solicitor-general. This he declined; but he complied with the request that he would watch over his Majesty's interests in the House of Commons, in conjunction with Falkland and Colepepper. The king's deepest policy, however, was not disclosed to him, and there is no reason to doubt that the arrest of the five members surprised him as much as he professes. After the retreat of Charles from London, Hyde remained for some weeks in his seat in the Commons, maintaining constant but secret communication with the court; but in May, having been summoned by the king, and being besides alarmed for his own safety, he fled to York. In March, 1643, he was made chancellor of the exchequer. He was also chosen one of the royal commissioners at Uxbridge, and was employed in many other matters of importance; and the most persuasive and dignified of the state papers on the royalist side are from his pen.

In 1645, after the final ruin of the king's cause at Naseby, Hyde was appointed, with Lord Capel, Lord Hopton, and Sir John Colepepper, to watch over the safety of the prince of Wales. In the spring of the next year they were compelled to take refuge in Scilly, whence, after six weeks' stay, they passed to Jersey. Soon the prince was called by his mother to Paris, against the will of the council, none of whom accompanied him except Colepepper. Hyde resided at Jersey for nearly two years, solacing himself by studying the Psalms and recording the meditations which they suggested, and also by composing the first four books of his greatest work, the *History of the Rebellion*. In April, 1648, he drew up an answer to the ordinance which had been issued by the parliament declaring the king guilty of the civil war, and forbidding all future addresses to him. At length, in May, his attendance was required by the prince, who about this time assumed the command of the seventeen ships which had gone over to his side; but various accidents, of which the most serious was his capture by privateers, prevented him from meeting Charles till August, when he found him at Dunkirk.

In the agreement with the Covenanters and in the Scottish expedition of 1649 Hyde had no share, as he was then absent with Lord Cottington on a fruitless embassy to Spain. The two years which he passed there were not unpleasantly spent; for he was free from all serious cares, and had little to do but study Spanish etiquette and write his *Animadversions on the Supremacy of the Pope*. In 1651, the slights offered by the Spanish ministers having been crowned by a request that he would leave the country, he rejoined Charles at Paris. During the nine weary years which had to elapse before the Restoration he was not the least unfortunate of the exiles. It was no easy matter to fulfil the duty which his office imposed upon him of supplying the wants of his careless master; and his family and himself were often scarcely able to procure the necessaries of life. Besides, he was far from popular. His attachment to the English church admitting of compromise with no other sect, brought upon him the aversion alike of the Presbyterians and of the queen and the Papists. Charles, however, was wise enough to appreciate his disinterested fidelity. He was recognized as chief adviser of the king, and all state papers were drawn up by him; he conducted the correspondence with the English Royalists; and, in 1658, the dignity of lord chancellor was conferred upon him.

On the Restoration, Hyde retained his posts of lord chan-

cellor and chancellor of the exchequer, and at once assumed the direction of the Government. What the Episcopalian Royalists now required was not so much a leader to stimulate, as a guide to control. Their fervor and their strength were more than sufficient to replace the king firmly on the throne, and to raise the church to a loftier position than it had ever before attained. The parliament hastened to restore to the Crown the command of the militia, to repeal the Triennial Act, and to vote a revenue of £1,200,000. The Corporation Act, the Act of Uniformity, and the Five Mile Act avenged the church on her enemies, and forced all but the most determined of the clergy into her ranks. Thousands showed as much enthusiasm for monarchy as Hyde himself, and he was no longer the most Episcopalian of Episcopalians. To some extent, if not to as great an extent as was to be desired, he has the credit of having restrained his party from too insolent a triumph. Desirous as he was of the re-establishment of the full royal prerogative, he had no wish to see it transgress the limits which he believed to be assigned to it by the constitution, for which he cherished the true lawyer's reverence. Strongly as he held that all were guilty who had in any way countenanced the government of Cromwell, he was statesman enough to see that it was necessary to carry out the Declaration of Breda by pressing the Acts of Oblivion and Indemnity on the reluctant parliament. On the other hand, with regard to the triumph of the church over dissent, if he was somewhat alarmed at its completeness, his fear arose from no pity for the dissenters. His opinion of them, and of the policy which ought to be observed towards them, is emphatically stated in his *Life* (vol. ii. p. 121):—"Their faction is their religion; nor are those combinations ever entered into upon real and substantial motives of conscience, how erroneous soever, but consist of many glutinous materials of will, and humor, and folly, and knavery, and ambition, and malice, which make men cling inseparably together, till they have satisfaction in all their pretences, or till they are absolutely broken and subdued, which may always be more reasonably done than the other."

But, notwithstanding his exaggerated reverence for the sovereign, his passionate attachment to the church, and his real worth, Hyde rapidly became the most unpopular man in the kingdom. The settlement of landed property which had been made by the Act of Indemnity deeply offended hundreds of the cavaliers; for, while it restored all they had lost to those who, like Hyde himself, had both escaped the necessity of selling their land and refused to bow to the government of Cromwell, it did nothing for those who had sold their property, even though they had ruined themselves to support the cause of the king. By the people, who had no means of judging for what he was responsible and of what he was innocent, he was blamed for every misfortune. The sale of Dunkirk was the chief crime with which they charged him; but there is no reason to disbelieve his own declaration that he was at first opposed to the scheme, while it must be allowed that there is force in his excuses that the fortress was expensive to maintain, that the money offered for it was sorely needed, and that its worth to England was by no means great. Still its surrender was a great political mistake; it displayed to the popular eye in far too striking a light the difference between the government of Clarendon and the government of Cromwell. He was also held responsible for the marriage of the king with the childless and Catholic princess of Portugal, and he was even accused of having selected her in order that his own descendants might inherit the throne. And, though his worst political weakness—his allowing Charles to accept the bribes of France—was not then made known, it was the general belief that his splendid mansion in Piccadilly had been erected with foreign gold. Of all dissenters, Catholic and Protestant, his bitter dislike had made determined enemies; and his repellent hauteur, his somewhat conceited austerity, offended the courtiers, and aroused their derision. All these enemies, however, he could afford to scorn so long as he retained the regard of the king, who, to do him justice, was unusually mindful of his debts to Hyde. In 1661 the chancellor, on the disclosure of the marriage of his daughter to the duke of York, was created Baron Hyde of Hindon, and shortly after earl of Clarendon, at the same time receiving a gift of £20,000; he had already refused the offer of a garter and 10,000 acres. Two years later the attempt to impeach him, made by the earl of Bristol, resulted in a miserable failure, and the accuser sought safety in flight. But in 1667 a second impeachment found him powerless to resist. His dignified censoriousness must always have been disagreeable to the king, who was also annoyed by his strenuous opposition to every scheme for tolerating the Catholics; and when Clarendon ventured to thwart his plans and interfere with his pleasures, annoyance was turned into hatred. Charles, having become enamored of Miss Fanny Stewart, resolved to marry her, and therefore determined to effect a divorce from the queen. This scheme, which threatened to exclude his descendants from the throne, Clarendon was bold enough to oppose; and it was insinuated by his enemies that the marriage of Miss Stewart to the duke of Richmond, which put an end to the project, had been brought about partly by his contrivance. Misfortunes now pressed thick upon him. About the middle of 1667 his wife died; and a few days after the duke of York was sent to him with a message requesting him to resign the chancellorship. This he could not be persuaded to do; he so far forgot his dignity as to plead personally with his master to be allowed to retain his office; and he also addressed to him a humble letter, in which he denied that he had been in any way concerned with Miss Stewart's marriage, and declared that he had no acquaintance with either herself or her husband. But his humiliation was in vain; and on the 30th of August Secretary Morrice was sent to take from him the great seal. On the 6th November the Commons drew up seventeen articles of impeachment against him. It would not have been easy to convict him of high treason. Several of the charges were exaggerated, and one or two were altogether false; there were some, however, sufficiently serious. The chief articles were:—that he had sought to govern by means of a standing army, and without parliament; that he had confined prisoners uncondemned in places where they could not appeal to the law; that he had sold Dunkirk; that he had made a sale of offices, and obtained money by means of his position in various illegal ways; that he had introduced arbitrary government into the colonies; and that he had deceived the king with regard to foreign affairs, and had betrayed his plans to the enemy. It was, however, a general charge of high treason, without specified grounds, which was presented to the Lords, and this they refused to accept. Nevertheless it became plain even to Clarendon himself that he was deserted, and that his cause was hopeless. On the 29th November, 1667, he left England for ever, after addressing a vindication of his conduct to the Lords, which, being communicated to the Commons, was voted seditious, and burned by the hangman. A bill of attainder was brought in against him, but the Lords rejected it; and the matter was finally compromised by the passing of an act which condemned him to perpetual banishment, unless he should appear for trial within six weeks.

Meanwhile, sick in body and in mind, he had landed in France; but, before reaching Rouen, he was stopped, and informed that he could not be allowed to remain in the country. After several refusals, however, permission to stay was granted; and he was conducted to Avignon by a French officer. At Evreux an incident occurred which shows the bitterness of the feeling with which he was regarded by his countrymen. A party of English sailors who happened to be working in the town, on hearing of his arrival, broke into his bed-room, burst open his trunks, attacked and wounded him with their swords, and were only prevented from murdering him by the arrival of a body of French troops. From Avignon he passed to Montpellier; and the rest of his life was spent chiefly in this town and in Rouen. His time was thenceforth passed in the quiet pursuit of literature. He resumed his *Meditations on the Psalms*, concluded his *History of the Rebellion*, and wrote his *Life*, *A Short View of the State of Ireland*, most of his *Essays*, and his *Survey of Hobbes's Leviathan*. Twice he humbly appealed to Charles that he might be allowed to die in his native land; but not even a reply was vouchsafed, and it was at Rouen that he expired on the 9th December, 1674.

The character of Clarendon is well-marked. In the court of Charles II. he was almost the only man who lived chastely, drank moderately, and swore not at all. Three principles guided his life. The first, from which he never swerved, was a passionate attachment to the religion and polity of the Church of England. The second,

to which he was faithful on the whole, though with some declensions, was the determination to maintain what he regarded as the true and ideal English constitution. The third, which he more than once nobly sacrificed to the other two, was a desire for personal advancement. In political practice he sadly wanted both insight and tact, and, though he could plead most cleverly and affectingly in a state paper, he was too apt, when confronted by opposition in Parliament, to lose his temper. He was, however, ready in debate; he could speak well; and for business he was admirably adapted. In political theory he was intensely conservative; no royalist squire who had never seen the king but in moments of dignified ceremony could have cherished a deeper reverence for him than did this courtier, who had watched his every act of crime and selfishness. Cold and haughty as he was towards his equals, at least in the end of his life, in his bearing towards the royal family, he sometimes appeared to abjure every feeling of manly independence. On two occasions this was miserably exemplified. He was too proud to allow his own wife to visit any woman of disreputable character, whatever her position; yet, at the command of his master, he was base enough to urge the queen to admit her husband's favorite mistress as one of her ladies in waiting. And there is another scene in which we cannot help regarding him with still deeper scorn. In his life he calmly tells us the story. About the time of the Restoration the duke of York had fallen in love with his eldest daughter, Anne Hyde, and before their intimacy had been discovered had given her a written promise of marriage. Of this Clarendon professes to have been completely ignorant; and when the affair could no longer be concealed, he tells us he was the last to be informed of it. Nor is this surprising if his own account of the manner in which he received the news is to be credited in the least. He broke into "a very immoderate passion." He would turn his daughter from his house. He hoped she was the duke's mistress, and not his wife, for then he could refuse to harbor her. He would have her sent to the Tower; he would have an Act passed to execute her; nay, he would be the first to propose such an Act. "Whoever knew the man," he adds, "will know that he said all this very heartily." Modern historians are perhaps too kind in doubting him. Soon after he told the king that he "so much abominated" the thought of his daughter's becoming the wife of the prince, that he "had much rather see her dead, with all the infamy that is due to her presumption." He even informed the duke himself—when an infamous conspiracy was hatched against her honor, and Sir Charles Berkley swore that she had granted him favors inconsistent with her duty to her husband—that since she had deceived himself he could not answer for her fidelity to any other man. The conclusion of the affair displays a depth of meanness which could not have been credited on any other testimony than his own. In fear of death Mary of Orange confessed that the accusation was false, and Berkley admitted his perjury; but in Clarendon's breast there does not appear to have been kindled a spark of the burning indignation which an honorable stranger could not have repressed; Berkley himself had only to ask forgiveness. It is possible that this humiliating story—this basest display of the "besotted loyalty" of the time, is altogether true. Much of it is beyond denial; and if we hold that in the rest Clarendon was merely acting a part, we miserably save a very small portion of his manliness at the expense of all his sincerity.

It is in literature that Clarendon's name best deserves to be remembered. His *Essays* (which are chiefly didactic) and his *Survey of Hobbes's Leviathan* scarcely rise above the commonplace, but his *History of the Rebellion* and his *Life of Edward, Earl of Clarendon* have a high and permanent value. That he was a historian of wide grasp and deep insight cannot be maintained; his works are professedly pleadings on behalf of the Episcopalian Royalists and himself; but, though it would be too much to allege that his accuracy is never warped by his purpose, we may in general accept his statements of fact as correct. It is, however, as works of literary art that his histories have attained to the position they hold. They charm us by their calm and never-failing grace, by their quiet humor, by their general tone of lofty dignity, but perhaps most of all by the exquisite portraits which they contain. It is true he cannot penetrate to the innermost recesses of men's souls, and let us read the motives of their lives; but he can introduce them to us, as it were, in society, can let us observe their career, watch their humors, and listen to their talk. Clarendon's style, too, though extremely loose and often amusingly ungrammatical, has many beauties. His sentences are of extraordinary length, and usually contain numerous involved parentheses; but while these qualities threaten obscurity, obscurity is always avoided; and they have the merit of enabling the writer to produce a slow, stately, graceful music, of which the short sentence is altogether incapable. (T. M. W.)

CLARENDON, George William Frederick Villiers, fourth Earl of, diplomatist and statesman, was born in London 12th January, 1800, and died 27th June, 1870. He was the eldest son of the Honorable George Villiers, brother of the third earl of Clarendon (second creation), by Theresa, only daughter of the first Lord Boringdon, and granddaughter of the first Lord Grantham. The earldom of the Lord Chancellor Clarendon became extinct in 1756 by the death of the fourth earl, his last male descendant. Jane Hyde, countess of Essex, the sister of that nobleman (who died in 1724), left two daughters; of these the eldest, Lady Charlotte, became heiress of the Hyde family. She married Thomas Villiers, second son of the second earl of Jersey, who served with distinction as English minister in Germany, and in 1776 the earldom of Clarendon was revived in his favor. The connection with the Hyde family was therefore in the female line and somewhat remote. But a portion of the pictures and plate of the great chancellor was preserved to this branch of the family, and remains at the Grove, their family seat at Hertfordshire, to this day.

Young George Villiers, the subject of this notice, entered upon life under circumstances which gave small promise of the brilliancy of his future career. He was well born; he was heir presumptive to an earldom; and his mother was a woman of great energy, admirable good sense, and high feeling. But the means of his family were contracted; his education was desultory and incomplete; he had not the advantages of a training either at a public school or in the House of Commons. He went up to Cambridge at the early age of sixteen, and entered St. John's College on the 29th June, 1816. In 1820, as the eldest son of an earl's brother with royal descent, he was enabled to take his M.A. degree under the statutes of the university then in force; and in the same year he was appointed attaché to the British embassy at St. Petersburg, where he remained three years, and acquired that practical knowledge of the business of diplomacy which was of so much use to him in after-life. He had received from nature a singularly handsome person, a polished and engaging address, a ready command of languages, and a remarkable power of composition.

Upon his return to England in 1823, Mr. Villiers was appointed to a commissionership of customs, an office which he retained for about ten years. Part of this time was spent in Ireland in the work of fusing the revenue boards of England and Ireland into those of the United Kingdom. It was the period of the liveliest excitement that preceded Catholic Emancipation, and the young English official incurred the censure of the Tory Government of the day for having presumed to cultivate the acquaintance of the most accomplished of the Catholic leaders. These official duties trained Mr. Villiers in the business of civil administration, and likewise enabled him to acquire some useful experience of the Irish character. In 1831 he was despatched to France to negotiate a commercial treaty, which, however, led to no result.

The time was come which was to open to him a wider and more congenial field of action in the politics of Europe. On the 16th of August, 1833, Mr. Villiers was appointed minister at the court of Spain. Ferdinand VII. died within a month of his arrival at Madrid, and the infant queen Isabella, then in the third year of her age, was placed by the old Spanish law of female inheritance on her contested throne. Don Carlos, the late king's brother, claimed the crown by virtue of the Salic law of the House of Bourbon which Ferdinand had renounced before the birth of his daughter. Isabella II. and her mother Christina, the queen regent, became the representatives of constitutional monarchy, Don Carlos of Catholic absolutism. The conflict which had divided the despotic and the constitutional powers of Europe since the French Revolution of 1830 broke out into civil war in Spain, and by the Quadruple Treaty, signed on April 22, 1834, France and England pledged themselves to the defence of the constitutional thrones of Spain and Portugal. For six years Mr. Villiers continued to give the most active and in-

telligent support to the Liberal Government of Spain. He was accused, though unjustly, of having favored the revolution of La Granja, which drove Christina, the queen mother, out of the kingdom, and raised Espartero to the regency. He undoubtedly supported the chiefs of the Liberal party, such as Olozaga and Espartero, against the intrigues of the French Court; but the object of the British Government was to establish the throne of Isabella on a truly national and liberal basis and to avert those complications, dictated by foreign influence, which eventually proved so fatal to that princess. Spain never forgot what she owed in those years to the youthful and energetic minister of Great Britain, and he, on his part, retained a cordial interest in her welfare. He received the Grand Cross of the Bath in 1838 in acknowledgment of his services, and succeeded, on the death of his uncle, to the title of earl of Clarendon; in the following year, having left Madrid, he married Katharine, eldest daughter of James Walter, first earl of Verulam.'

In January, 1840, he entered Lord Melbourne's administration as Lord Privy Seal, and from the death of Lord Holland in the autumn of that year, Lord Clarendon also held the office of Chancellor of the Duchy of Lancaster until the dissolution of the ministry in 1841. In this capacity he made his first appearance in parliament, and although he always regretted the want of a previous training in the House of Commons, he was from the first listened to by the House of Peers as a speaker well qualified to assist the deliberations of parliament on questions of foreign policy. But on these questions he was not heartily united with the spirit that then animated the Foreign Office. Deeply convinced that the maintenance of a cordial understanding with France was the most essential condition of peace and of a liberal policy in Europe, he reluctantly concurred in the measures proposed by Lord Palmerston for the expulsion of the pasha of Egypt from Syria; he strenuously advocated, with Lord Holland, a more conciliatory policy towards France; and he was only restrained from sending in his resignation by the dislike he felt to break up a cabinet he had so recently joined. Lord Palmerston's policy (as is shown by his own published letters) was constantly governed by the belief that France must be regarded by England as a rival and an enemy, with whom war was, sooner or later, inevitable. Lord Clarendon, on the contrary, regarded France as a rival, but a friend; he relied on the good sense and common interests of the two nations to maintain amicable relations; and he succeeded in drawing closer for a period of thirty years, from 1840 to 1870, the ties which still happily remain unbroken between them. That was his great object, and the proudest result of his political life; and the difficulties he had to encounter were at times as great on his own side of the Channel as on the other.

The interval of Sir Robert Peel's great administration (1841–1846) was to the leaders of the Whig party a period of repose; but Lord Clarendon took the warmest interest in the progressive triumph of the principles of free trade and in the ultimate repeal of the corn-laws, of which his brother, Mr. Charles Pelham Villiers, had been the earliest, the most constant, and the most able advocate. For this reason, upon the formation of Lord John Russell's first administration, Lord Clarendon accepted the office of President of the Board of Trade. Twice in his career the Governor-Generalship of India was offered him, and once the Governor-Generalship of Canada:—these he refused from reluctance to withdraw from the politics of Europe. But in 1847 a sense of duty compelled him to take a far more laborious and uncongenial appointment. The desire of the cabinet was to abolish the Lord-Lieutenancy of Ireland, and Lord Clarendon was prevailed upon to accept that office, with a view to transform it ere long into an Irish Secretaryship of State. But he had not been many months in Dublin before he acknowledged that the difficulties then existing in Ireland could only be met by the most vigilant and energetic authority, exercised on the spot. The crisis was one of extraordinary peril. Agrarian crimes of horrible atrocity had increased threefold. The Catholic clergy were openly disaffected. This was the second year of a famine which had desolated Ireland. The population, decimated by starvation and disease, lived upon the poor-rate and the alms of England, and extraordinary measures were required to regulate the bounty of the Government and the nation. In 1848 the French Revolution let loose fresh elements of discord, which culminated in an abortive insurrection, and for a lengthened period Ireland was a prey to more than her wonted symptoms of disaffection and disorder. During those five years Lord Clarendon held the reins of the vice-regal government; a task more entirely repugnant to his own predilections and more certain to be repaid with unmerited obloquy could not have been imposed upon him. But he bore up against that flood of hostile passions and difficulties with unshaken firmness. He fed the starving; he subdued the factious; he crushed the rebellious. He left behind him permanent marks of improvement in the legislation of Ireland; and he practised, as far as possible, the broadest toleration of races and of creeds. If any name is associated in Ireland with the recollection of a government at once firm, far-sighted, and liberal, it should be that of Lord Clarendon. His services were expressly acknowledged by her Majesty in the Speech to both Houses of Parliament from the throne, on September 5, 1848,—this being the first time that any *civil* services obtained that honor; and he was made a Knight of the Garter (retaining also the Grand Cross of the Bath by special order of her Majesty) on the 23d March, 1849. Looking back to that period, after an interval of more than twenty years, it must be acknowledged that from this crisis dates the regeneration of Ireland; the population, reduced in numbers, has never ceased to advance in prosperity; wages have risen; the land has been freed from secular incumbrances; crime has diminished; and treason itself has never recovered the crushing defeat of Smith O'Brien and Meagher. Lord Clarendon had a large share in promoting these results; but he hailed with no common satisfaction the change of Government which released him from those arduous duties in 1852.

Upon the formation of the coalition ministry between the Whigs and the Peelites, in 1853, under Lord Aberdeen, the premier placed, without hesitation, the foreign office in the hands of Lord Clarendon; but incredulous himself of the peril of war, which was already casting its dark shadow over the East, Lord Aberdeen sought rather to check than to stimulate the decisions which might possibly have arrested the course of hostilities. It can hardly now be doubted that the hesitation which appeared to mark the successive steps of the Western allies encouraged the czar to more daring aggressions; and Lord Clarendon confessed, in an expression which was never forgotten, that we "drifted" into war, which a more prompt defiance and an open alliance between the Western powers and the Porte might have arrested. But the war once begun Lord Clarendon continually urged the prosecution of it with the greatest energy. He employed every means in his power to stimulate and assist the war departments, and above all he maintained the closest relations with our French allies, on whose co-operation everything depended. The Emperor Nicholas had speculated on the impossibility of the sustained joint action of France and England in council and in the field. It was mainly by Lord Clarendon at Whitehall and by Lord Raglan before Sebastopol that such a combination was rendered practicable, and did eventually triumph over the enemy. The diplomatic conduct of such an alliance for three years between two great nations jealous of their military honor and fighting for no separate political advantage, tried by excessive hardships and at moments on the verge of defeat, was certainly one of the most arduous duties ever performed by a minister. No one will ever know all the labor it cost; but the result was due in the main to the confidence with which Lord Clarendon had inspired the emperor of the French, and to the affection and regard of the empress, whom he had known in Spain from her childhood.

In 1856 Lord Clarendon took his seat at the Congress of Paris convoked for the restoration of peace, as first British Plenipotentiary, invested with full powers. It was the first time since the appearance of Lord Castlereagh at Vienna that a secretary of state for foreign affairs had been present in person at a congress on the Continent. Lord Clarendon's first care was to obtain the admission of Italy to the council chamber as a belligerent power, and to raise the barrier which still excluded Prussia as a neutral one. But in the general anxiety of all the powers to terminate the war there was no small danger that the objects for which it had been undertaken would be abandoned or forgotten. It is due, we may say, entirely to the firmness of Lord Clarendon that the principle of the neutralization of the Black Sea was preserved, that the Russian attempt to trick the allies out of the cession in Bessarabia was defeated, and that the results of the war were for a time secured.[1] The Congress was eager to turn to other subjects, and perhaps the most important result of its deliberations was the celebrated Declaration of the Maritime Powers, which abolished privateering, defined the right of blockade, and limited the right of capture to

[1] The Crimean War and the peace of 1856 had results highly beneficial to the politics of Europe. They rescued Turkey from the inimical grasp of Russia, and gave to the Ottoman empire twenty years of peace and security, which might, under abler rulers, have restored it to real independence and prosperity. They overthrew the preponderance which the Emperor Nicholas had asserted in Europe; they cemented the alliance of France and England; and they led the way to the subsequent changes which followed in Italy and Germany. These were all objects which Lord Clarendon had at heart, and although no minister can hope to have a permanent influence on the course of human affairs, the events of the last twenty-five years have not been uninfluenced by his liberal and conciliatory views.

enemy's property in enemy's ships. Lord Clarendon has been accused of an abandonment of what are termed the belligerent rights of this country, which were undoubtedly based on the old maritime laws of Europe. But he acted in strict conformity with the views of the British cabinet, and the British cabinet adopted those views because it was satisfied that it was not for the benefit of the country to adhere to practices which exposed the vast mercantile interests of Britain to depredation, even by the cruisers of a secondary maritime power, and which, if vigorously enforced against neutrals, could not fail to embroil her with every maritime state in the world. The experience of 1780, when the armed neutrality of the North reacted so fatally on the American war, is the most conclusive demonstration of the fatal results of such a system of policy; and the more enlightened views of the present day have shown that a commercial belligerent nation would lose far more than she would gain by the suppression of the neutral trade, even if such a suppression were possible.

Upon the reconstitution of the Whig administration in 1859, Lord John Russell made it a condition of his acceptance of office under Lord Palmerston that the Foreign Department should be placed in his own hands, which implied that Lord Clarendon should be excluded from office, as it would have been inconsistent alike with his dignity and his tastes to fill any other post in the Government. The consequence was that from 1859 till 1864 Lord Clarendon remained out of office, and the critical relations arising out of the civil war in the United States were left to the guidance of Earl Russell. But he re-entered the cabinet in May, 1864, as Chancellor of the Duchy of Lancaster; and upon the death of Lord Palmerston in 1865, Lord Russell again became prime minister, when Lord Clarendon returned to the Foreign Office, which was again confided to him for the third time upon the formation of Mr. Gladstone's administration in 1868. To the last moment of his existence, Lord Clarendon continued to devote every faculty of his mind and every instant of his life to the public service; and he expired surrounded by the boxes and papers of his office on the 27th June, 1870, within a few days of that great catastrophe which was about to change the face of Europe, and which he, if anybody, might possibly have retarded or averted. His death called forth expressions of the deepest sympathy and regret from all the courts and statesmen of both hemispheres; and these manifestations of more than official sorrow were collected and laid before parliament by order of the Queen. This is not the place to enlarge on the charm of Lord Clarendon's personal demeanor, or on the playfulness and grace he threw over the conduct of great affairs. We must content ourselves with a brief record of what he did in public life. But no man owed more to the influence of a generous, unselfish, and liberal disposition. If he had rivals he never ceased to treat them with the consideration and confidence of friends, and he cared but little for the ordinary prizes of ambition in comparison with the advancement of the great cause of peace and progress in the world.

A notice of Lord Clarendon, by a friendly hand, was printed in *Fraser's Magazine* for August, 1870, from which we have borrowed some details. No other biography of this eminent and accomplished statesman has been published. (H. R.)

CLARI, Giovanni Carlo Maria, chapel-master at Pistoia, was born at Pisa in 1669. The time of his death is unknown. He was the most celebrated pupil of Colonna, chapel-master of S. Petronio, at Bologna. The works by which Clari distinguished himself pre-eminently are his vocal duets and trios, with a continued bass, published in 1720. In these beautiful and learned compositions the tonal responses and modulations are in the modern style. An edition of these duets and trios, with a pianoforte accompaniment, was published at Paris in 1823, by Mirecki, a Polish musician, and a pupil of Cherubini. In such esteem were these compositions held by Cherubini, that, in the course of his studies, he repeatedly transcribed them with his own hand, as models of excellence. Clari composed one opera, *Il Savio Delirante*, and for the church a *Stabat* and four other works.

CLARINET. See Oboe, Vol. xvii.

CLARK, Sir James (1788–1870), an English physician, was born at Cullen, in Banffshire. He was educated at the grammar-school of Fordyce, and at the universities of Aberdeen and Edinburgh, at the former of which he took the degree of M.A., at the latter that of M.D. He served for six years as a surgeon in the navy; he then spent some time in travelling on the Continent, in order to investigate the effects of the mineral waters and the climate of various places commonly recommended to invalids; and for eight years he was settled at Rome. In 1824 he was chosen physician to Prince Leopold of Saxe-Coburg, and two years after he commenced to practise in London as physician to the St. George's Parochial Infirmary. He was elected a fellow of the Royal Society in 1832; in 1835 he was appointed physician to the Duchess of Kent and the Princess Victoria, and on the accession of the latter to the throne he became physician in ordinary to the Queen. On the foundation of the university of London, he was made a member of its senate; and he belonged to many medical societies both at home and abroad. In 1838 he was created baronet. Sir James Clark made a special study of sanatory science, and he was also regarded as an authority on diseases of the lungs. He published—*Medical Notes; The Sanative Influence of Climate*, containing valuable meteorological tables; *A Treatise on Pulmonary Consumption and Scrofulous Disease;* and *Clinical Instruction.*

CLARK, Thomas (1801–1867), a distingnished chemist, was born at Ayr, on the 31st March, 1801. His father was captain of a merchant vessel, and his mother began the Ayrshire needlework. He was educated at the Ayr Academy, a school of great efficiency and repute. In 1816 he entered the counting-house of Charles Macintosh & Co., the inventors of the waterproof cloth, but soon obtained the more congenial situation of chemist in Tennant's chemical works at St. Rollox. In 1826 he was appointed lecturer on chemistry to the Glasgow mechanics' institution, where he propounded advanced views on the atomic theory and the theory of salts. The same year he published his first papers, containing his discovery of the pyrophosphate of soda, which was a turning-point in chemical history. Becoming a medical student in the university of Glasgow, he took the degree of M.D. in 1831. He was for several years apothecary to the Glasgow infirmary, and published several important papers on pharmacy. In 1832 he published in the *Westminster Review* an elaborate inquiry into the existing system of weights and measures. In 1833 he obtained by competition the chair of chemistry in Marischal College, Aberdeen. About the same time he matured two important practical researches relating to the construction of hydrometers and the means of detecting arsenic. In 1835 he published a paper on the "Application of the Hot-Blast," explaining the principle of its efficacy. In 1836 appeared his letter to Mitscherlich on the Oxygen Salts. Clark's name became most generally known in connection with his water tests and his process for softening hard (chalk) waters. These came out in 1841. The tests have been in use ever since; and the softening process intended for the London waters, but not as yet adopted by any of the London companies, has been very successfully carried out in several places. In 1844 his health gave way under mental strain, and he ceased to be able to lecture to his class. Being removed also from his laboratory, he did little more chemical work, except directing his assistant in perfecting his water tests. His active mind, however, could not rest, and he took up several inquiries, the last of all, which occupied what strength he had for nearly twenty years before his death, being the historical origin of the Gospels. Proceeding from one stage to another, he finally concentrated his energies on an attempt to settle the true readings of the Greek text of the three first Gospels. His mode of proceeding displayed the peculiar sagacity and tact shown in his scientific inventions, and his results had reached a form admitting of publication at the time of his death. The work would have been very valuable in connection with the revision of the Bible, and it is to be regretted that his surviving relatives did not see fit to publish it. Clark took a leading part in all the discussions relating to the improvement of the university of Aberdeen. He was an admirable lecturer, but unfortunately his teaching career was short. He died at Glasgow on the 27th November, 1867.

CLARKE, Adam (*c.* 1760–1832), a Wesleyan divine, distinguished for his varied learning, was born at Moybeg, in the north of Ireland, in 1760 or 1762. After receiving a very limited education he was apprenticed to a linen manufacturer, but, finding the employment uncongenial, he

soon abandoned it, and devoted himself to study. His parents belonged to a Methodist congregation under the pastoral charge of Breedon, one of Wesley's earliest associates in the Methodist movement, by whose advice young Clarke was sent to the school founded by Wesley at Kingswood, near Bristol. In 1782 he entered on the duties of the ministry, being appointed by Wesley to the Bradford (Wiltshire) circuit. His popularity as a preacher was very great, and his influence in the denomination is indicated by the fact that he was three times chosen to be president of the Conference. He served twice on the London circuit, the second period being extended considerably longer than the rule allowed, at the special request of the British and Foreign Bible Society, who had employed him in the preparation of their Arabic Bible. He had found time during his itinerancy for diligent study of Hebrew and other Oriental languages, undertaken chiefly with the view of qualifying himself for the great work of his life, his *Commentary on the Holy Scriptures*, the first volume of which appeared in 1810, and the eighth and last in 1826. It is a work of much learning and ability, and it still possesses some value, though it is in great part superseded by the results of later scholarship. Dr. Clarke's other literary works were very numerous. In 1802 he published a *Bibliographical Dictionary* in six volumes, to which he afterwards added a supplement. He was selected by the Records Commission to edit Rymer's *Fœdera*, a task for which he was not well qualified, and which he did not complete. He also wrote *Memoirs of the Wesley Family* (1823), and edited a large number of religious works. He died of cholera in London on the 16th August, 1832. His Miscellaneous Works have been published in a collected form in 13 vols., and a Life by J. B. B. Clarke appeared in 1833.

CLARKE, Edward Daniel (1769–1822), LL.D., an English traveller, was born at Willingdon, Sussex, June 5, 1769. In 1786 he obtained the office of chapel clerk at Jesus College, Cambridge, but the loss of his father at this time involved him in many difficulties. In 1790 he took his degree, and soon after became private tutor to the Honorable Henry Tufton, nephew of the duke of Dorset. In 1792 he obtained an engagement to travel with Lord Berwick through Germany, Switzerland, and Italy. After crossing the Alps, and visiting a few of the principal cities of Italy, including Rome, he repaired to Naples, where he remained nearly two years. Having returned to England in the summer of 1794, he became tutor in several distinguished families. In 1799 he set out with a Mr. Cripps, on a tour through the Continent of Europe, commencing with Norway and Sweden, whence they proceeded through Russia and the Crimea to Constantinople, Rhodes, and afterwards to Egypt and Palestine. After the capitulation of Alexandria, Clarke was of considerable use in securing for England the statues, sarcophagi, maps, manuscripts, &c., which had been collected by the French savans. Greece was the country next visited. From Athens the travellers proceeded by land to Constantinople, and after a short stay in that city, directed their course homewards through Rumelia, Austria, Germany, and France. Clarke, who had now obtained considerable reputation, took up his residence at Cambridge, and there he continued chiefly to reside till the day of his death. He received the degree of LL.D. shortly after his return, on account of the valuable donations, including a colossal statue of the Eleusinian Ceres, which he had made to the university. He was also presented to the college living of Harlton, to which, four years later, his father-in-law added that of Yeldham. Towards the end of 1808 Clarke was appointed to the professorship of mineralogy, then first instituted. Nor was his perseverance as a traveller otherwise unrewarded. The MSS. which he had collected in the course of his travels were sold to the Bodleian Library for £1000; and by the publication of his travels he realized altogether a clear profit of £6595. Besides lecturing on mineralogy and discharging his clerical duties, Dr. Clarke eagerly prosecuted the study of chemistry, and made several discoveries, principally by means of the gas blowpipe, which he had brought to a high degree of perfection. His health gave way under too ardent study; and after a short illness he expired at London, March 9, 1822. In all the relations of life Dr. Clarke was a most amiable man; and his enthusiasm was united with a great capacity for enduring long-continued exertion, both mental and physical. The following is a list of his principal works:—

Testimony of Authors respecting the Colossal Statue of Ceres in the Public Library, Cambridge, 8vo, 1801–3; *The Tomb of Alexander, a Dissertation on the Sarcophagus brought from Alexandria, and now in the British Museum*, 4to, 1805; *A Methodical Distribution of the Mineral Kingdom*, fol., 1807; *A Description of the Greek Marbles brought from the Shores of the Euxine, Archipelago, and Mediterranean, and deposited in the University Library, Cambridge*, 8vo, 1809; *Travels in various Countries of Europe, Asia, and Africa*, 4to, 1810–1819.

CLARKE, Dr. Samuel (1675–1729), a celebrated English philosopher and divine, was the son of Edward Clarke, alderman of Norwich, who had represented that city in Parliament for several years. He was born October 11, 1675; and having finished his education at the free school of Norwich in 1691, removed thence to Caius College, Cambridge, where his uncommon abilities soon began to display themselves. Though the philosophy of Descartes was at that time the reigning system at the university, yet Clarke easily mastered the new system of Newton, and contributed greatly to the spread of the Newtonian philosophy by publishing an excellent translation of Rohault's *Physics* with notes, which he finished before he was twenty-two years of age. The system of Rohault was founded entirely upon Cartesian principles, and was previously known only through the medium of a rude Latin version. Clarke not only gave a new translation, but added to it such notes as were calculated to lead students insensibly to other and truer notions of science. "The success," says Bishop Hoadley, "answered exceedingly well to his hopes; and he may justly be styled a great benefactor to the university in this attempt." It continued to be used as a text-book in the university till supplanted by the treatises of Newton, which it had been designed to introduce. Whiston relates that, in 1697, he met young Clarke (at that time chaplain to Moore, bishop of Norwich), then wholly unknown to him, at a coffee-house in that city, where they entered into conversation about the Cartesian philosophy, particularly Rohault's *Physics*, which Clarke's tutor, as he tells us, had put him upon translating. "The result of this conversation was," says Whiston, "that I was greatly surprised that so young a man as Clarke then was should know so much of those sublime discoveries, which were then almost a secret to all but to a few particular mathematicians. Nor do I remember," continues he, "above one or two at the most, whom I had then met with, that seemed to know so much of that philosophy as Clarke." This translation of Rohault was first printed in 1697, 8vo. There have been four editions of it: the last and best is that of 1718, which has the following title:—*Jacobi Rohaulti Physica. Latine vertit, recensuit, et uberioribus jam Annotationibus, ex illustrissimi Isaaci Newtoni Philosophia maximam partem haustis, amplificavit et ornavit S. Clarke, S.P.T. Accedunt etiam in hac quarta editione novæ aliquot tabulæ æri incisæ et Annotationes multum sunt auctæ.* It was translated into English by Dr. John Clarke, dean of Sarum, and published in two vols. 8vo.

Clarke afterwards turned his thoughts to divinity, and in order to qualify himself for the sacred office, devoted himself to the study of Scripture in the original, and of the primitive Christian writers. Having taken holy orders, he became chaplain to Moore, bishop of Norwich, who was ever afterwards his constant friend and patron. In 1699 he published two treatises—one entitled *Three Practical Essays on Baptism, Confirmation, and Repentance*, and the other, *Some Reflections on that part of a book called Amyntor, or a Defence of Milton's Life, which relates to the writings of the Primitive Fathers, and the Canon of the New Testament.* In 1701 he published *A Paraphrase upon the Gospel of St. Matthew*, which was followed, in 1702, by the *Paraphrases upon the Gospels of St. Mark and St. Luke*, and soon afterwards by a third volume upon St. John. They were subsequently printed together in two volumes 8vo, and have since passed through several editions. He intended to have treated in the same manner the remaining books of the New Testament, but something accidentally interrupted the execution of his design.

Meanwhile Bishop Moore gave him the rectory of Drayton, near Norwich, and procured him a parish in the city. In 1704 he was appointed to the Boyle lectureship, and chose for his subject the Being and Attributes of God. Having been appointed to the same office in the following year, he chose for his subject the Evidences of Natural and Revealed Religion. These lectures were first printed in two distinct volumes, but were afterwards collected together

and published under the general title of *A Discourse concerning the Being and Attributes of God, the Obligations of Natural Religion, and the Truth and Certainty of the Christian Revelation, in opposition to Hobbes, Spinoza, the author of the Oracles of Reason, and other Deniers of Natural and Revealed Religion.*

In 1706 he wrote a refutation of some positions which had been maintained by Dr. Dodwell on the immortality of the soul, and this drew him into controversy with Collins. He also at this time wrote a translation of Newton's Optics, for which the author presented him with £500. In the same year also, through the influence of Bishop Moore, he obtained the rectory of St. Bennet's, Paul's Wharf, London; and he soon afterwards appeared at the court of Queen Anne, who appointed him one of her chaplains in ordinary, and afterwards, in 1709, presented him to the rectory of St. James's, Westminster. On his elevation to this latter office, he took the degree of doctor in divinity, defending as his thesis the two propositions:—"1. *Nullum fidei Christianæ dogma, in Sacris Scripturis traditum, est rectæ rationi dissentaneum*, no article of the Christian faith, delivered in the Holy Scriptures, is disagreeable to right reason, and 2. *Sine actionum humanarum libertate nulla potest esse religio*, without the liberty of human actions, there can be no religion. During the same year, at the request of the author, he revised and corrected Whiston's English translation of the *Apostolical Constitutions.*

In 1712 he published a carefully punctuated and annotated edition of Cæsar's Commentaries, adorned with elegant engravings. It was printed in folio, 1712, and afterwards in 8vo, 1720, and dedicated to the duke of Marlborough. During the same year he published his celebrated treatise on *The Scripture Doctrine of the Trinity.* It is divided into three parts. The first contains a collection and exegesis of all the texts in the New Testament relating to the doctrine of the Trinity; in the second the doctrine is set forth at large, and explained in particular and distinct propositions; and in the third the principal passages in the liturgy of the Church of England relating to the doctrine of the Trinity are considered. Whiston informs us that, some time before the publication of this book, a message was sent to him from Lord Godolphin and other ministers of Queen Anne, importing "that the affairs of the public were with difficulty then kept in the hands of those that were for liberty; that it was therefore an unseasonable time for the publication of a book that would make a great noise and disturbance; and that therefore they desired him to forbear till a fitter opportunity should offer itself,"—a message that Clarke of course entirely disregarded. The ministers were right in their conjectures; and the work not only provoked a great number of replies, but occasioned a formal complaint from the Lower House of Convocation. Clarke, in reply, drew up an apologetic preface, and afterwards gave several explanations, which satisfied the Upper House; and on his pledging himself that his future conduct would occasion no trouble, the matter dropped.

In 1715 and 1716 he had a discussion with Leibnitz relative to the principles of natural philosophy and religion, which was at length cut short by the death of his antagonist. A collection of the papers which passed between them was published in 1717. In 1719 he was presented by Lord Lechmere to the mastership of Wigston's hospital in Leicester. In 1724 he published seventeen sermons, eleven of which had not before been printed. In 1727, upon the death of Sir Isaac Newton, he was offered by the court the place of Master of the Mint, worth on an average from £1200 to £1500 a year. This secular preferment, however, he absolutely refused,—a circumstance which Whiston regards as "one of the most glorious actions of his life, and affording undeniable conviction that he was in earnest in his religion." In 1728 was published "A Letter from Dr. Clarke to Benjamin Hoadley, F.R.S., occasioned by the controversy relating to the Proportion of Velocity and Force in Bodies in Motion," printed in the *Philosophical Transactions.* In 1729 he published the first twelve books of Homer's *Iliad.* This edition was printed in quarto, and dedicated to the duke of Cumberland. "The translation of Homer, who was Clarke's favorite author," says Bishop Hoadley, "with his corrections, may now be styled accurate; and his notes, as far as they go, are indeed a treasury of grammatical and critical knowledge. He was called to his task by royal command, and he has performed it in such a manner as to be worthy of the young prince for whom it was labored." The year of its publication was the last of Clarke's life. Hitherto, though not robust, he had always enjoyed a firm state of health; but on the morning of Sunday, 11th May, 1729, when going out to preach before the judges at Sergeant's Inn, he was seized with a sudden illness, which caused his death on the Saturday morning following. He died, May 17, 1729 in the 54th year of his age.

Soon after his death were published, from his original manuscripts, by his brother Dr. John Clarke, dean of Sarum, *An Exposition of the Church Catechism*, and ten volumes of sermons, in 8vo. His *Exposition* is composed of the lectures which he read every Thursday morning, for some months in the year, at St. James's Church. In the latter part of his life he revised them with great care, and left them completely prepared for the press. Three years after his death appeared also the last twelve books of the *Iliad*, published in 4to by his son Mr. Samuel Clarke, the first three of these books and part of the fourth having, as he states, been revised and annotated by his father.

Clarke was of a cheerful and even playful disposition. An intimate friend relates that happening to call for him he found him swimming upon a table. At another time, when Clarke and several other men of ability and learning were indulging in diversion, on looking out at the window he saw a grave blockhead approaching the house; upon which he cried out, "Boys, boys, be wise; here comes a fool." This turn of his mind is confirmed by Dr. Wharton, who, in his observations upon the line of Mr. Pope,

> "Unthought-of frailties cheat us in the wise,"

says, "Who could imagine that Locke was fond of romances; that Newton once studied astrology; that Dr. Clarke valued himself on his agility, and frequently amused himself in a private room of his house in leaping over the tables and chairs; and that our author himself was a great epicure?"

Clarke, although in no department a genius of the first order, was a man of great general ability. He was eminent as a theologian, a mathematician, a metaphysician, and a philologist. His chief strength lay in his logical power. He was so disciplined and skilful a reasoner as to be able to contend on equal terms even with a Butler or a Leibnitz. Few have defended so well so many good causes. The materialism of Hobbes, the pantheism of Spinoza, the empiricism of Locke, the determinism of Leibnitz, Collins's necessitarianism, Dodwell's denial of the natural immortality of the soul, rationalistic attacks on Christianity, and the selfish morality of the sensationalists, —all found in him a formidable opponent, possessed of great strength of mind, extraordinary dialectic skill, and a thorough conviction of the importance and truth of the principles which he advocated.

His fame as a theologian and philosopher rests to a large extent on his demonstration of the existence of God and his theory of the foundation of rectitude. The former is not, as it is often described, a purely *a priori* argument, nor is it presented as such by its author. It starts from a fact, and it often explicitly appeals to facts. The intelligence, for example, of the self-existence and original cause of all things—the main question between theists and atheists—is admitted to be "not easily proved *a priori*," but argued to be "demonstrably proved *a posteriori* from the variety and degrees of perfection in things, and the order of causes and effects, from the intelligence that created beings are confessedly endowed with, and from the beauty, order, and final purpose of things." The propositions maintained in the argument are—"1. That something has existed from eternity; 2. That there has existed from eternity some one immutable and independent being; 3. That that immutable and independent being, which has existed from eternity, without any external cause of its existence, must be self-existent, that is, necessarily existing; 4. What the substance or essence of that being, which is self-existent or necessarily existing, is, we have no idea, neither is it at all possible for us to comprehend it; 5. That though the substance or essence of the self-existent being is itself absolutely incomprehensible to us, yet many of the essential attributes of his nature are strictly demonstrable, as well as his existence, and, in the first place, that he must be of necessity eternal; 6. That the self-existent being must of necessity be infinite and omnipresent, 7. Must be but one, 8. Must be an intelligent being, 9. Must be not a necessary agent, but a

being indued with liberty and choice, 10. Must of necessity have infinite power, 11. Must be infinitely wise, and 12. Must of necessity be a being of infinite goodness, justice, and truth, and all other moral perfections, such as become the supreme governor and judge of the world."

In order to establish his six propositions, Dr. Clarke contends that time and space, eternity and immensity, are not substances but attributes,—the attributes of a self-existent being. Edmund Law, Dugald Stewart, Lord Brougham, and many other writers, have, in consequence, represented Clarke as arguing from the existence of time and space to the existence of Deity. This is a serious mistake. The existence of an immutable, independent, and necessary being is supposed to be proved before any reference is made to the nature of time and space. Clarke has been generally supposed to have derived the opinion that time and space are attributes of an infinite immaterial and spiritual being from the *Scholium Generale*, first published in the second edition of Newton's *Principia* (1714). The truth is that his work on the Being and Attributes of God appeared nine years before that *Scholium*. The view propounded by Clarke may have been derived from the Midrash, the Kabbalah, Philo, Henry More, or Cudworth, but not from Newton. It is a view difficult to prove, and probably few will acknowledge that Clarke has conclusively proved it.

His theory as to the nature, foundation, and obligation of virtue is to the following effect. Things differ from one another in their natures. They necessarily, therefore, stand in different relations to one another. From these different relations of things there must arise an agreement or disagreement of some things to others, a fitness or unfitness of the application of different things one to another. Thus there is a fitness or suitableness of certain acts in certain circumstances to certain persons and an unsuitableness of others founded on the nature of things and persons, apart from all positive appointment whatsoever. It is only imperfection or perversion of intelligence which can make the relations of things, and the fitness and unfitness involved in them, appear to be other than what they are. The fundamental truths of morals are absolutely and in themselves what they seem, no less than the truths of geometry. The obligation to virtue is involved in the very recognition of the moral relations which arise out of the necessary and eternal differences of things. It is impossible for us to apprehend them otherwise than as laws of reason which ought to guide our actions. Prior to all consideration of the divine will or law there is obligation; and God, although under no necessity to create, must, having resolved to create, have respect to certain proportions, abstractly of eternal necessity, and, having resolved to act, must determine His will according to eternal reason. His own law to himself is the law which He has given to every rational being, and which He has sanctioned by rewards and punishments. These are a secondary source of obligation.

This theory has been misunderstood and misrepresented in various ways. Jouffroy, Amédée Jacques, Sir James Mackintosh, Dr. Thomas Brown, &c., criticise it on the assumption that Clarke made virtue consist in conformity to the relations of things universally, although the whole tenor of his argument shows him to have had in view only conformity to such relations as belong to the sphere of moral agency. We may admit, however, that he might have profitably insisted more on the fact that the relations and fitnesses spoken of are those which afford a reason and rule of action to the will. In this respect the doctrine of the distinguished German philosopher Herbart, which, while resolving morality into relations, lays stress on the fact that these relations are relations of will, may be regarded as an improvement of that of Clarke. It is erroneous to represent Clarke as confounding mathematical and moral relations, as overlooking that the relations involved in morality must be distinct from those involved in mere truth, or as meaning by the "fitness" which is constitutive of morality the adaptation of means and ends. In reality, he simply states an analogy between mathematical and moral truths, assigns to moral principles the distinctive peculiarity of being related to the will, and being liable to be set aside, and denotes by fitness the accordance of things with a standard by which they can be judged.

When Clarke's doctrine, that rectitude is a conformity to certain relations, has been accurately understood, it cannot fail to be obvious that, although it must be vindicated from many of the objections which have been urged against it, no one can justly regard it as more than the mere starting-point of a theory. It must be followed up by a great amount of research before it can approximate to what a theory should be. But there is no reason why it should not be followed up by research in various directions, nor why it should not be made much more precise and definite than it has yet been. The relations involved in morality may be compared with those involved in pure science, in utility both personal and general, and in beauty, and ought to be, for it is only thus that what is distinctive of them can be brought clearly and completely out. More, perhaps, than any other theory on the nature of virtue, the theory of relations suggests and implies the necessity of a minute scientific inquiry into how truth, beauty, utility, and goodness are connected and distinguished. By Socrates and Wollaston truth and goodness, by Plato, Shaftesbury, and Herbart beauty and goodness, and by the selfish school and the utilitarian school of moralists, utility and goodness, have been, if not identified, too nearly so, while there have been held errors as great although directly contrary to these, separating unnaturally goodness from truth, or from beauty, or from utility; and it lies directly in the way of those who adopt the theory of relations to institute an investigation into the whole subject of the connection of truth, beauty, utility, and goodness, so thorough and comprehensive as to show what is true and what erroneous in all these views, and what are the resemblances and differences, the identities and distinctions, in the things themselves.

As to the biography of Clarke see the *Life* by Bishop Hoadley, and Whiston's *Historical Memoirs*. As to his philosophical, ethical, and theological tenets, there may be consulted Bishop Law's *Inquiry into the Ideas of Space, Time, &c.*, several works of Dr. John Balguy (referred to in article Balguy), Dugald Stewart's *Dissertation*, Sir James Mackintosh's *Dissertation*, Lord Brougham's *Discourse on Natural Theology*, Dr. Turton's *Natural Theology*, Wardlaw's *Christian Ethics*, Dr. Chalmers's *Natural Theology*, and Hunt's *Religious Thought in England, passim*, but particularly in vol. ii. 447–457, and vol. iii. 20–29 and 109–115, &c. The most elaborate essay on his philosophy as a whole is, perhaps, that by Prof. Zimmermann in the *Denkschriften d. k. Akademie der Wissenschaften, Phil.-Hist. Classe*, Bd. xix., Vienna, 1870. It treats of English rationalism before Clarke, his life, the general character of his philosophy, his criticism of materialism, his defence of natural religion, his discussion with Leibnitz, and his moral philosophy. (R. F.)

CLARKSON, Thomas (1760–1846), was born on the 28th March, 1760, at Wisbeach, in Cambridgeshire, where his father was head-master of the free grammar school. He was educated at St. Paul's School and at St. John's College, Cambridge. Having taken the first place among the middle bachelors as Latin essayist, he succeeded in 1785 in gaining a similar honor among the senior bachelors. The subject appointed by the vice-chancellor, Dr. Peckhard, was one in which he was himself deeply interested—*Anne liceat invitos in servitutem dare?* (Is it right to make men slaves against their will?) In preparing for this essay Clarkson consulted a number of works on African slavery, of which the chief was Benezet's *Historical Survey of New Guinea;* and the atrocities of which he read affected him so deeply that he determined to devote all his energies to effect the abolition of the slave trade, and gave up his intention of entering the church. His first measure was to publish, with additions, an English translation of his prize-essay (June, 1786). He then commenced to search in all quarters for information concerning slavery. He soon discovered that the cause had already been taken up to some extent by others, most of whom belonged to the Society of Friends, and among the chief of whom were William Dillwyn, Joseph Wood, and Granville Sharp. With the aid of these gentlemen, a committee of twelve was formed in May, 1787, to do all that was possible to effect the abolition of the slave trade. Meanwhile Clarkson had also gained the sympathy of Wilberforce, Whitbread, Sturge, and several other men of influence. Travelling from port to port, he now commenced to collect a large mass of evidence; and much of it was embodied in his *Summary View of the Slave Trade, and the Probable Consequences of its Abolition*, which, with a number of other anti-slavery tracts, was published by the committee. Pitt, Grenville, Fox, and Burke looked favorably on the move-

ment; in May, 1788, Pitt introduced a parliamentary discussion on the subject, and Sir W. Dolben brought forward a bill providing that the number of slaves carried in a vessel should be proportional to its tonnage. A number of Liverpool and Bristol merchants obtained permission from the House to be heard by counsel against the bill, but on the 18th June it passed the Commons. Soon after Clarkson published an *Essay on the Impolicy of the Slave Trade;* and for two months he was continuously engaged in travelling that he might meet men who were personally acquainted with the facts of the trade. From their lips he collected a considerable amount of evidence; but only nine could be prevailed upon to promise to appear before the privy council. Meanwhile other witnesses had been obtained by Wilberforce and the committee, and on the 12th May, 1789, the former led a debate on the subject in the House of Commons, in which he was seconded by Burke and supported by Pitt and Fox. It was now the beginning of the French Revolution, and in the hope that he might arouse the French to sweep away slavery with other abuses, Clarkson crossed to Paris, where he remained six months. He found Necker head of the Government, and obtained from him some sympathy but little help. Mirabeau, however, with his assistance, prepared a speech against slavery, to be delivered before the National Assembly, and the Marquis de la Fayette entered enthusiastically into his views. During this visit Clarkson also met a deputation of negroes from St. Domingo, who had come to France to present a petition to the National Assembly, desiring to be placed on an equal footing with the whites; but the storm of the Revolution permitted no substantial success to be achieved. Soon after his return home he engaged in a search, the apparent hopelessness of which finely displays his unshrinking laboriousness and his passionate enthusiasm. He desired to find some one who had himself witnessed the capture of the negroes in Africa; and a friend having met by chance a man-of-war's man who had done so, Clarkson, though ignorant both of the name and of the residence of the sailor, at once set out in search of him, and after many disappointments actually discovered him. His last tour was undertaken in order to form anti-slavery committees in all the principal towns. At length, in the autumn of 1794, his health, which had long been impaired by his uninterrupted exertions, gave way, and he was obliged to cease active work. He did not, however, entirely give up the cause. At the suggestion of Wilberforce and others, he occupied his time in writing a *History of the Abolition of the Slave Trade*, which appeared in 1808. In 1818 he had an interview at Paris with the emperor of Russia, to whom he presented an address against the negro slave trade. He again visited the emperor during the conference of the European monarchs which was held at Aix-la-Chapelle, and, through him, the address was also presented to the emperor of Austria and the king of Prussia. In 1823, the slave trade having been abolished in 1807, the Anti-Slavery Society was formed, and Clarkson was one of its vice-presidents. He was for some time blind from cataract; but several years before his death his sight was restored. He died at the age of eighty-six, at his patrimonial house, Playford Hall, Suffolk.

Besides the works already mentioned, he published the *Portraiture of Quakerism* (1806), *Memoirs of William Penn* (1813), *Researches, Antediluvian, Patriarchal, and Historical* (1836), intended as a history of the interference of Providence for man's spiritual good, and *Strictures* on several of the remarks concerning himself made in the *Life of Wilberforce*, in which his claim as originator of the anti-slavery movement is denied. See his *Memoirs* by Thomas Elmes and Thomas Taylor.

CLAUBERG, John (1622–1665), one of the most noted of the immediate followers of Descartes, was born at Solingen, in Prussia, in the year 1622. After travelling in France and England, he came to Leyden, where he studied philosophy under the Cartesian John Ray. He became professor of philosophy at Herborn, and afterwards at Duisburg, and was one of the earliest teachers of the new doctrines in Germany. Clauberg is justly celebrated as an exact and methodical commentator on his master's writings; but he was no mere commentator, and his speculations anticipate in a marked degree the subsequent course of thought in the Cartesian school. His theory of the connection between the soul and the body is hardly to be distinguished from that afterwards advanced by Malebranche; while his view of the relation which God holds to his creatures is a distinct foreshadowing of the pantheism of Spinoza. All creatures exist only through the continuous creative energy of the Divine Being, and are no more independent of his will than are our thoughts independent of us,—or rather less, for there are thoughts which force themselves upon us whether we will or not. Clauberg died at Duisburg in 1665. His chief works are—*De conjunctione animæ et corporis humani scriptum; Exercitationes centum de cognitione Dei et nostri; Logica vetus et nova; Initiatio philosophi, seu Dubitatio Cartesiana.* He also wrote a commentary on Descartes's *Meditations.* A complete edition of his works in two vols. was published at Amsterdam in 1691.

CLAUDE, Jean (1619–1687), a famous French Protestant preacher and controversialist, was born at Sauvetat near Agen, where his father was a Protestant minister. He held for eight years the office of professor of theology in the Protestant college of Nîmes; but in 1661, having opposed a suggestion which was made at a provincial synod for reuniting Catholics and Protestants, he was forbidden to preach in Lower Languedoc. On visiting Paris in order to appeal against this command, he became engaged in a controversy with Bossuet and Arnauld concerning the Eucharist. In 1662 he obtained a post at Montauban similar to that which he had lost; but after four years he was removed from it also. He next became pastor in Paris, where he continued his controversy with Bossuet. On the revocation of the Edict of Nantes he fled to Holland, and received a pension from the Prince of Orange. He continued to preach occasionally at the Hague till his death.

His principal works are the *Réponse aux deux traités intitulés La Perpétuité de la Foi de l'Église Catholique touchant l'Eucharistie* (1665); *Réponse au livre de P. Nouet sur l'Eucharistie* (1668); *Défense de la Réformation, ou réponse aux préjugés légitimes de Nicole* (1678); *Plaintes des Protestants cruellement opprimés dans le Royaume de France* (1686); *Œuvres posthumes* (Amsterdam, 1688), containing the *Traité de la Composition d'un Sermon*, which was translated into English in 1778. See biographies by Nicéron and Laderize.

CLAUDE of Lorraine, or Claude Gelée (1600–1682), the celebrated landscape-painter, was born of very poor parents at the village of Chamagne in Lorraine. When it was discovered that he made no progress at school, he was apprenticed, it is commonly said, to a pastry-cook, but this is extremely dubious. At the age of twelve, being left an orphan, he went to live at Freiburg with an elder brother, Jean Gelée, a wood-carver of moderate merit, and under him he designed arabesques and foliage. He afterwards rambled to Rome to seek a livelihood; but from his clownishness and ignorance of the language, he failed to obtain permanent employment. He next went to Naples, to study landscape painting under Godfrey Waals, a painter of much repute. With him he remained two years; then he returned to Rome, and was domesticated until April, 1625, with another landscape-painter, Augustin Tassi, who hired him to grind his colors and to do all the household drudgery. His master, hoping to make Claude serviceable in some of his greatest works, advanced him in the rules of perspective and the elements of design. Under his tuition the mind of Claude began to expand, and he devoted himself to artistic study with great eagerness. He exerted his utmost industry to explore the true principles of painting by an incessant examination of nature; and for this purpose he made his studies in the open fields, where he very frequently remained from sunrise till sunset, watching the effect of the shifting light upon the landscape. He generally sketched whatever he thought beautiful or striking, marking every tinge of light with a similar color; from these sketches he perfected his landscapes. Leaving Tassi, he made a tour in Italy, France, and a part of Germany, including his native Lorraine, suffering numerous misadventures by the way. Karl Dervent, painter to the duke of Lorraine, kept him as assistant for a year; and he painted at Nancy the architectural subjects on the ceiling of the Carmelite church. He did not, however, relish this employment, and in 1627 returned to Rome. Here, painting two landscapes for Cardinal Bentivoglio, he earned the protection of Pope Urban VIII., and rapidly rose into celebrity.

Claude was not only acquainted with the facts, but also

with the laws, of nature; and Sandrart relates that he used to explain, as they walked together through the fields, the causes of the different appearance of the same landscape at different hours of the day, from the reflections or refractions of light, or from the morning and evening dews or vapors, with all the precision of a natural philosopher. He elaborated his pictures with great care; and if any performance fell short of his idea, he altered, erased, and repainted it several times over.

His skies are aërial and full of lustre, and every object harmoniously illumined. His distances and coloring are delicate, and his tints have a sweetness and variety till then unexampled. He frequently gave an uncommon tenderness to his finished trees by glazing. His figures, however, are very indifferent; but he was so conscious of his deficiency in this respect, that he usually engaged other artists to paint them for him, among whom were Curtois and Filippo Lauri. Indeed, he was wont to say that he sold his landscapes and gave away his figures. In order to avoid a repetition of the same subject, and also to detect the very numerous spurious copies of his works, he made tinted outline drawings (in six paper books prepared for this purpose) of all those pictures which were transmitted to different countries; and on the back of each drawing he wrote the name of the purchaser. These books he named *Libri di Verità*. This valuable work has been engraved and published, and has always been highly esteemed by students of the art of landseape. Claude died at Rome at the age of eighty-two, on the 21st of November, 1682, leaving his wealth, which was considerable, between his only surviving relatives, a nephew and niece. Many choice specimens of his genius may be seen in the National Gallery, and in the Louvre; the landscapes in the Altieri and Colonna Palaces in Rome are also of especial celebrity. He himself regarded a landscape which he painted in the Villa Madama, being a cento of various views with great abundance and variety of leafage, and a composition of Esther and Ahasuerus, as his finest works; the former he refused to sell, although Clement IX. offered to cover its surface with gold pieces. He etched a series of twenty-eight landscapes, fine impressions of which are greatly prized. Full of amenity, and deeply sensitive to the graces of nature, Claude has long been deemed the prince of landscape painters, and indeed he must always be accounted a prime leader in that form of art, and in his day a great enlarger and refiner of its province. Within the last century, however, he has been vastly exceeded—in grasp, power, knowledge, subtlety, variety, and general mastery of all kinds—by many painters, one in one quality and another in another; in proof we need only name Turner, whose range, in comparison with Claude's, was as that of a continent to a canton, or a mountain to a hillock.

Claude was a man of amiable and simple character, very kind to his pupils, a patient and unwearied worker; in his own sphere of study, his mind was stored (as we have seen) with observation and knowledge, but he continued an unlettered man till his death. (W. M. R.)

CLAUDET, Antoine François (1797–1867), an eminent photographer, was born at Lyons. Shortly after the publication of Daguerre's results (1839), Claudet, by the addition of bromide and chloride of iodine to the iodide of silver employed by the former discoverer, greatly accelerated the process of production. This, with the use of iodide of gold in fixing the image, may be said to have completed the invention. In 1848 Claudet produced the photographometer, an instrument designed to measure the intensity of photogenic rays; and in 1849 he brought out the focimeter, for securing a perfect focus in photographic portraiture. In 1850 he received a medal from the Society of Arts and Manufactures for a machine to cut glass of any curvature of surface. This was followed in 1851, 1855, and 1862 by the medals awarded by the French and English universal exhibitions for eminence in and discoveries connected with his profession, and in 1853 by his election into the Royal Society. In 1858 he produced the stereomonoscope, in reply to a challenge from Sir David Brewster. Claudet, who was photographer in ordinary to Her Majesty, was also a *decoré* of the Legion of Honor, and had received tokens of admiration and regard from Louis Philippe and the Czar Nicholas.

CLAUDIANUS, Claudius, the gifted poet who shed lustre on the last decrepid era of Roman literature, was, as we learn from himself (Epist. 1), an Egyptian by birth, and probably a native of Alexandria. It may be conjectured from his name that he was of Roman extraction, and it is hardly possible that he should have acquired such mastery over the Latin language if it had not been familiar to him from his boyhood. We have, however, his own authority for the assertion that his first poetical compositions were in Greek, and that he had written nothing in Latin before 395 A.D. In that year he appears to have come to Rome, and made his *début* as a Latin poet by a panegyric on the consulship of Olybrius and Probinus, the first brothers not belonging to the imperial family who had ever simultaneously filled the office of consul. This piece proved the precursor of the series of panegyrical poems which compose the bulk of his writings. In 396 appeared the encomium on the third consulship of the Emperor Honorius, and the epic on the downfall of Rufinus, the unworthy minister of Arcadius at Constantinople. This revolution was principally effected by the contrivance of Stilicho, the great general and minister of Honorius. Claudian's poem appears to have obtained his patronage, or rather perhaps that of his wife Serena, by whose interposition the poet was within a year or two enabled to contract a wealthy marriage in Africa (Epist. 2). Previous to this event he had produced (398) his panegyric on the fourth consulship of Honorius, his epithalamium on the marriage of Honorius to Stilicho's daughter, Maria, and his poem on the Gildonic war, celebrating the repression of a revolt in Africa. To these succeeded his piece on the consulship of Mallius Theodorus (399), the unfinished or mutilated invective against the Byzantine prime minister Eutropius, in the same year, the epics on Stilicho's first consulship and on his repulse of Alaric (400 and 403), and the panegyric on the sixth consulship of Honorius (404). From this time all trace of Claudian is lost, and he is generally supposed to have perished with his patron Stilicho in 408. It may, however, be plausibly conjectured that he must have died in 404, as he could hardly otherwise have omitted to celebrate the greatest of Stilicho's achievements, the destruction of the barbarian host led by Radagaisus in the following year. Nor, on the other hand, is ground wanting for the surmise that he may have survived Stilicho, as in the dedication to the second book of his epic on the *Rape of Proserpine*, he speaks of his disuse of poetry in terms hardly reconcilable with the fertility which, as we have seen, he displayed during his patron's lifetime. From the manner in which Augustine alludes to him in his *De Civitate Dei*, it may be inferred that he was no longer living at the date of the composition of that work, between 415 and 428.

We have already enumerated Claudian's chief poems, to which only remain to be added a number of short descriptive pieces and epigrams, his lively Fescennines on the emperor's marriage, his panegyric on Serena, and the *Gigantomachia*, a fragment of an unfinished epic. Several poems expressing Christian sentiments are undoubtedly spurious. There can be no question of his paganism, which, however, neither prevented his celebrating Christian rulers and magistrates nor his enjoying the distinction of a court laureate. We have his own authority for his having been honored by a bronze statue in the forum, although the inscription on the pedestal which Pomponius Lætus professed to have discovered in the 15th century is almost certainly spurious.

Claudian's position in literature is unique. It is sufficiently remarkable that, after nearly three centuries of torpor, the Latin muse should have experienced any revival in the age of Honorius, nothing less than amazing that this revival should have been the work of a foreigner, most surprising of all that a just and enduring celebrity should have been gained by official panegyrics on the generally uninteresting transactions of an inglorious epoch. The first of these particulars bespeaks Claudian's taste, rising superior to the prevailing barbarism, the second his command of language, the third his rhetorical skill. As remarked by Gibbon, "he was endowed with the rare and precious talent of raising the meanest, of adorning the most barren, and of diversifying the most similar topics." This gift is especially displayed in his poem on the down fall of Rufinus, where the punishment of a public malefactor is exalted to the dignity of an epical subject by the magnificence of diction and the ostentation of supernatural machinery. The noble exordium, in which the fate of Rufinus is propounded as the vindication of divine justice,

places the subject at once on a dignified level; and the council of the infernal powers has afforded a hint to Tasso, and through him to Milton. The inevitable monotony of the panegyrics on Honorius is relieved by just and brilliant expatiation on the duties of a sovereign. In his celebration of Stilicho's victories Claudian found a subject more worthy of his powers, and some passages, such as the description of the flight of Alaric, and of Stilicho's arrival at Rome, and the felicitous parallel between his triumphs and those of Marius, rank among the brightest ornaments of Latin poetry. Claudian's panegyric, however lavish and regardless of veracity, is in general far less offensive than usual in his age, a circumstance attributable partly to his more refined taste and partly to the genuine merit of his patron Stilicho. He is a valuable authority for the history of his times, and is rarely to be convicted of serious inaccuracy in his facts, whatever may be thought of the coloring he chooses to impart to them. As correctly observed by his latest critic, Mr. Hodgkin, he was animated by true patriotic feeling, in the shape of a reverence for Rome as the source and symbol of law, order, and civilization. Outside the sphere of actual life he is less successful; his *Rape of Proserpine*, though the beauties of detail are as great as usual, betrays his deficiency in the creative power requisite for dealing with a purely ideal subject. This denotes the rhetorician rather than the poet, and in general it may be said that his especial gifts of vivid natural description and of copious illustration, derived from extensive but not cumbrous erudition, are fully as appropriate to eloquence as to poetry. In the general cast of his mind and character of his writings, and especially in his faculty for bestowing enduring interest upon occasional themes, we may fitly compare him with Dryden, remembering that while Dryden exulted in the energy of a vigorous and fast-developing language, Claudian was cramped by an artificial diction, confined to the literary class.

Claudian's works must have been carefully edited in his own time, for his epigrams include several short pieces evidently prepared for insertion in or rejected from poems of greater compass. The *editio princeps* was printed at Vicenza in 1482; the best subsequent editions are those by Gesner (1759), Burmann (1760), and Jeep (1872). There is a complete English translation of little merit, by Abraham Hawkins (London, 1817), and a version of the *Rape of Proserpine*, by Dean Howard. Some excellent criticism on Claudian will be found in Professor Ramsay's article in Smith's Classical Dictionary, and in two lectures by Mr. Thomas Hodgkin (Newcastle, 1875). (R. G.)

CLAUDIUS, Appius, Cæcus, a Roman patrician and author of the 4th century B.C. In 312 B.C. he was elected censor without having passed through the office of consul. His censorship was remarkable for the actual or attempted achievement of several great constitutional changes. He filled vacancies in the senate with men of low birth; and when his list was rejected, and C. Plautius, his colleague, resigned, he continued, in defiance of custom, to hold the office alone. He also retained it for five years, despite the Æmilian law, which limited the duration of its tenure to a year and a half. He transferred the charge of the public worship of Hercules in the Forum Boarium from the hands of the Politian gens to that of public slaves. He distributed the *libertini* among all the tribes; and he further invaded the exclusive rights of the patricians by directing his secretary Cneius Flavius (whom, though a freedman, he made a senator) to publish the *legis actiones* and the list of *dies fasti* (or days on which legal business could be transacted). And lastly, he gained enduring fame by the construction of a road and an aqueduct, which—a thing unheard of before—he called by his own name. In the year after his resignation of the censorship (307) he was elected consul. In 298 he was made interrex; and in 296, as consul, he led the army in Samnium, and the armies of the two consuls gained a victory over the Etruscans and Samnites; but he never triumphed, nor does his military career appear to have been at all distinguished. Next year he was prætor, and he was once dictator. To the Ogulnian law admitting the plebeians to the offices of augur and pontifex he was strongly opposed; and his advocacy of the cause of the democracy seems to have ended with his censorship. His ambition and his pride of race were, however, accompanied by a passionate love of Rome. He was already blind and tottering with age when Cineas, the minister of Pyrrhus, visited him, but so vigorously did he oppose every concession that all the eloquence of Cineas was in vain, and the Romans forgot past misfortunes in the inspiration of his patriotism. The story of his blindness, however, may be merely a method of accounting for his cognomen.

Appius Claudius Cæcus is also remarkable as the first of the Roman writers, both in verse and prose, of whom we know anything. He wrote a poem which is mentioned by Cicero, but of which the remaining fragments are of the smallest, and a legal work entitled *De Usurpationibus*. It is very likely also that he was concerned in the drawing up of the *Legis Actiones* published by Flavius. His *Sententiæ*, which include the famous dictum "Every one is the architect of his own fortunes," were read by Panætius, but are now lost.

CLAUDIUS, Appius Crassus, was, according to Livy, a patrician notorious for his pride and cruelty and his bitter hatred of the plebeians. Twice they refused to fight under him, and, fleeing before their enemies, brought upon him defeat and disgrace. He retaliated by decimating the army. At length they effected his banishment, but he quickly returned, and again became consul. In the same year (451 B.C.) he was made one of the decemviri who had been appointed to draw up a code of written laws, and so carefully did he act during his first year of office that he was the only one of the ten who was re-elected. With Claudius at their head, the new decemviri appear to have resolved on retaining permanent authority, but an outburst of popular feeling suddenly crushed their power. Enamored of the beautiful daughter of the plebeian centurion Virginius, Claudius attempted to seize her by an abuse of justice. One of his clients, Marcus Claudius, swore that she was the child of a slave belonging to him, and that she had been stolen by the childless wife of the centurion. Virginius was summoned from the army, but a private message was sent at the same time instructing the general to detain him. The first messenger was more speedy than the second, and on the day of trial Virginius was present to expose the conspiracy. Still judgment was given according to the evidence of Marcus, and Claudius commanded Virginia to be given up to him. There was but one way of escape, and in despair, her father seized a knife from a neighboring stall and plunged it in her side. The popular passion was deeply stirred. Virginius, with Icilius, the betrothed lover of his daughter, and Numitorius, her uncle, hurried to arouse the army; Horatius and Valerius put themselves at the head of the people. The decemviri were overthrown; and Appius Claudius died in prison, either by his own hand or by that of the executioner. Mommsen rejects the view given as above by Livy, and is inclined to hold that Claudius, as decemvir, was the pretended champion of the plebs, and that the revolution which ruined him was a return of the people to the rule of the patricians, who are represented by Horatius and Valerius. See appendix to vol. i. of his *History of Rome*.

CLAUDIUS, or Tiberius Claudius Drusus Nero Germanicus (10 B.C.–54 A.D.), the first Roman emperor of the name, born at Lugdunum (Lyons), in 10 B.C., was the son of Drusus and Antonia, and grandson of Livia, the wife of Augustus. Paralyzed and lame, and unable to speak with distinctness, he was an object of scorn even to his mother; and the natural diffidence and timidity of his character were increased by neglect and insult, till he was regarded as little better than an imbecile. His time was spent chiefly in the society of servants, and devoted to the industrious pursuit of literature; and until his accession he took no real part in public affairs, though Caligula honored him with the dignity of consul. His first wife was Plautia Urgulanilla, whom he divorced because he suspected her of designs against his life; his second, Ælia Petina, was also divorced; and his third was the infamous Valeria Messalina. In 41 A.D., on the murder of Caligula, Claudius was seized by the prætorians, and declared emperor. As soon as he gained resolution to assume the authority of his office, he proclaimed an amnesty for all except Chærea, the assassin of his predecessor, and one or two others. The account, however, of his painstaking government, his laborious personal administration of justice, his conquest of Britain, his extension of the *jus honorum* to the Gauls, his construction of the Claudian aqueduct and the harbor of Ostia, are matters of history (see Roman History). The cruelties of his reign appear to have been due to the

facility of character which placed him completely under the influence of his favorite freedmen, of whom the most conspicuous were Narcissus, Pallas, and Polybius, and of his wife, the vicious and shameless Messalina, whom he fondly loved and honored. At length, according to the account of Tacitus, Messalina went through the ceremony of marriage with one of her lovers, and urged by her former confederate Narcissus, the emperor allowed her to be seized, and Narcissus put her to death. Suetonius throws a somewhat different light on the story, making it rather more probable, for he tells us that there was a rumor that the emperor desired and assisted in the marriage, because he had been warned by a soothsayer that the husband of Messalina was about to fall into misfortune. The next and fourth wife of Claudius was his niece Agrippina, a woman as criminal as any of her predecessors. She prevailed upon him to set aside his own son Britannicus in favor of Nero, her son by a former marriage; and in 54 A.D., that she might place the act beyond recall, she put the emperor to death by means of poison.

Encouraged by Livy, as Suetonius asserts, and assisted by the freedmen who attended him, Claudius produced a history of Rome, commencing with the battle of Actium (31 B.C.), in 41 books, a defence of Cicero against Asinius Pollio, memoirs of his own life, and, in Greek, a history of Carthage and a history of Etruria; but none of his writings have come down to us. He introduced three new letters into the Latin alphabet—the digamma, the ψ, and another not now known; but they appear to have been dropped at his death.

The principal authority for the life and times of Claudius is the *Annals* of Tacitus, in whose high-colored pictures there is much that gives rise to a suspicion of exaggeration. Suetonius and Dion Cassius are even less trustworthy.

CLAUDIUS, Marcus Aurelius, Gothicus, the second of the Roman emperors of the name of Claudius, was born in Illyria or Dardania in the first half of the 3d century. On account of his military ability he was placed in command of an army by Decius; and Valerian appointed him general on the Illyrian frontier, and ruler of the provinces of the lower Danube. During the reign of Gallienus, he was called to Italy in order to crush Aureolus; and, on the death of the emperor (268 A.D.) he was chosen as his successor, in accordance, it was said, with his express desire. He enjoyed great popularity, and, as far as we can now judge, he appears to have been a man of considerable ability and strength of character. The account of his reign belongs to the history of Rome.

CLAUDIUS, Matthias (1743–1815), a German poet, otherwise known by the *nom de plume* of Asmus, was born in 1743 at Rheinfeld, near Lubeck, and studied at Jena. With the exception of a short time in 1776 and 1777, when he held the office of superior commissioner or Oberlandcommissar at Darmstadt, he spent his life in the little town of Wandsbeck, near Hamburg, for which he had conceived so strong an attachment that he would not accept any appointment which required him to settle elsewhere. Here he earned his first literary reputation by the publication, from 1770 to 1775, of a weekly periodical called the *Wandsbecker Bote* or *Wandsbeck Messenger*, in which he gave to the world a large number of prose essays and poems of various kinds. They were written in very pure and simple German, and appealed to the popular taste; in many there was a vein of extravagant humor or even burlesque, while others were full of quiet meditation and solemn sentiment. In his later days, perhaps through the influence of Klopstock, with whom he had formed an intimate acquaintance, Claudius became strongly pietistic, and the graver side of his nature was alone permitted to display itself. Instead of firing the German heart with a *Rheinweinlied*, or shaking the German sides with a *Wenn Jemand eine Reise thut*, he translated the works of Saint Martin and Fénelon. At the same time, he thought it no harm to publish a complete collection of his writings, under the whimsical title of *Asmus omnia sua secum portans, oder Sämmtliche Werke des Wandsbecker Bothen*, 8 vols., 1774–1812. His biography has been written by Herbst (Gotha, 1857); and Kahle has given us *Claudius und Hebel* (Berlin, 1864).

CLAVIJO, Ruy Gonzalez de, a Spanish traveller of the 15th century, whose narrative is the first important one of its kind contributed to Spanish literature. He was a native of Madrid, and belonged to a family of some antiquity and position. On the return of the ambassadors Solomayor and Palazuelos from the East, Henry III. determined to send another embassy to the court of Timur, who had just risen to power, and for this purpose he selected Clavijo, Gomez de Salazar, and a master of theology named Fray Alonzo Paez de Santa Maria. They sailed from Seville in May, 1403, touched at the Balearic Isles, Gaeta, and Rhodes, spent some time at Constantinople, sailed along the southern coast of the Black Sea to Trebizond, and proceeded inland, probably by Etchimazin, Tabreez, Tehran, and Meshud, to Samarcand, where they were well received by the conqueror. Their return was safely accomplished, and they landed in Spain in 1406. Clavijo proceeded at once to the court, at that time in Alcala de Henares, and served as chamberlain till the king's death in the following year; he then returned to Madrid, and lived there in opulence till his own death in April, 1412. He was buried in the chapel of the monastery of San Francisco, which he had rebuilt at great expense. His itinerary was first published in 1582 at Seville, by Argote de Molina, with the title of *Historia del gran Tamorlan e itinerario y narracion del viage y relacion de la embaxada que Ruy Gonzalez de Clavijo le hizo*,—the editor appending "a short discourse," for the better intelligence of his author. Another edition was brought out at Madrid in 1782, by Antonio de Sancha; and from this an English translation was prepared by Clements Markham, and published by the Hakluyt Society in 1860. The identification of a great number of the places mentioned by Clavijo is a matter of considerable difficulty, and has given rise to some discussion (see Khanikof's list in *Geographical Magazine*, 1874). A short account of his life is given by Alvarez y Baena in the *Hijos de Madrid*, vol. ix.

CLAY, Henry (1777–1852), a celebrated American statesman, born near Richmond, in Virginia, on the 12th April, 1777, was the son of a Baptist minister, who died when Henry was only five years old. His youth was consequently spent in some hardship, and for a time he worked on a farm; but at the age of fifteen he obtained a situation in the office of the clerk of the Court of Chancery. Having gained some influential friends, he began in 1796 to study law under Robert Brooke, the attorney-general. In 1797 he was admitted to the bar, and in the end of that year he commenced to practise in Lexington, Ky. His great power of influencing a jury soon brought him a flourishing practice; and having taken a prominent part in the discussions as to the constitution which was drawn up for the State of Kentucky, he was in 1803 chosen member of the legislature of that State. Three years later he became for a few months member of the Senate of the United States. In the next year he again took his seat in the legislature of Kentucky, of which in 1808 he was appointed speaker. It was during this session that he challenged Humphrey Marshall, who had attacked him warmly in debate. The meeting took place; two shots were fired, and both parties were slightly wounded. In 1811 he became at once member for the first time and speaker of the House of Congress, and he subsequently held the latter position four times. All his energies were now devoted to bringing about a declaration of war with Great Britain, and maintaining the contest with all the vigor possible. At the end of the war (1814) he was appointed one of the commissioners who were sent to Ghent to conclude the treaty of peace, and it was he who caused the erasure of the clause allowing Great Britain to navigate the Mississippi. During his visit to Europe he spent two months at Paris, enjoying the society of which Mme. de Staël was the queen. On his return to America he was again made speaker of Congress. In 1824 he allowed himself to be nominated for the office of president; but the election did not give to any one the required majority, and the decision between the three who had obtained the greatest number of votes had to be made by Congress. Clay, who had been fourth on the list, gave his support to Quincy Adams, whence arose his second duel, that with John Randolph, in which neither was hurt. Under Adams Clay accepted the post of secretary of state. In 1832 he was again candidate for the presidency, and again unsuccessfully; and in 1844 he was nominated for the third time with a similar result. He now retired from public life; but in 1848 he was again called into the Senate; and in 1850 he carried a bill, which sought to avert the great battle on the slavery question. In 1851, however, the weakness of his health prevented him from taking any

part in public life; and on the 29th July of the next year he died. On receiving the news of his death Congress adjourned; next day orations in his praise were delivered in both houses; and the day of his funeral was observed in New York and in all the chief towns of the State to which he belonged.

Henry Clay commenced his political career in 1799 by attempting to persuade the State of Kentucky to abolish slavery. He never, however, made any attempt to free the whole country from the system; indeed the effect of his policy (and the most important of his measures were those concerning slavery) was to maintain it. His name is connected with the "Missouri Compromise," which, while abolishing slavery in all Territories north of lat. 36° 30′, permitted it in Missouri, and with several other measures sanctioning slavery in the slave States. His bill of 1850, nicknamed the "omnibus bill," provided that New Mexico and Utah, Territories newly acquired from Mexico, should be left to their own discretion as to slavery, and that California should be received into the Union as a free State; while, on the other hand, the slave trade should be prohibited in Columbia.[1] Another most important feature of Clay's policy was the desire to free America from European control, which led him to advocate, in some of his most powerful speeches, the recognition of the independence of the South American republics which had revolted from Spain. The part he took in the war with England has been already noticed. His action with regard to the tariff was not uniform; in 1832 he proposed to reduce gradually a large number of duties, but afterwards he more than once sought to make it more protective. Though first opposed to the establishment of a national bank, he subsequently spoke vigorously in its favor. For some time he was president of the Colonization Society. See the edition of his speeches and writings, with a life by Calvin Colton (1857 and 1864).

CLAYMORE, the Gaelic for "the great sword," is the name given to a peculiar kind of sword, which, though it found most favor with the Highland warriors, may yet be regarded as having been at one time the national weapon of Scotland. Its weight was somewhat greater than that of ordinary swords, being from six to seven pounds. It had a blade forty-three inches long, two broad, and with a double edge. The handle was frequently more than a foot in length, so that it could be grasped with both hands. It is a weapon rarely met with in our day, except it be in the collections of antiquarians.

CLAZOMENÆ, now KELISMAN, a town of Ionia, and a member of the Ionian Dodecapolis, or Confederation of Twelve Cities, on the Gulf of Smyrna, about 20 miles from that city in a south-west direction. It stood originally on the isthmus connecting the mainland with the peninsula on which were Erythræ and other towns of note; but the inhabitants, alarmed by the encroachments of the Persians, abandoned the continent and removed to one of the small islands of the bay, and there established their city in security. This island was connected with the mainland by Alexander the Great by means of a pier, the remains of which are still visible. Though Clazomenæ was not in existence before the arrival of the Ionians in Asia, its original founders were only partly Ionians, the great proportion being Phliasians and Cleonæans. It remained for some time subject to the Athenians, but about the middle of the Peloponnesian war it revolted. After a brief resistance, however, it again acknowledged the Athenian supremacy, and repelled the Lacedæmonians when they attempted to gain possession of the town. Under the Romans Clazomenæ was included in the province of Asia, and enjoyed an immunity from taxation. The site of the city can still be made out, in the neighborhood of Vourla, but nearly every portion of its ruins has been removed. Anaxagoras the philosopher was born at Clazomenæ, 499 B.C.

CLEANTHES, a Stoic philosopher, born at Assos in Asia Minor, about 300 B.C., was originally a boxer. He first listened to the lectures of Crates the Cynic, and then to those of Zeno the Stoic, supporting himself meanwhile by working all night as water-carrier to a gardener. His apparent idleness aroused suspicion, and he was summoned before the Areopagus; but when his story became known the court offered him a present of ten minæ, which he refused to accept. His power of patient endurance, or perhaps his slowness, earned him the title of the Ass; but such was the esteem awakened by his high moral qualities that, on the death of Zeno in 263, he became the leader of the school. He still, however, continued to support himself as before by the labor of his own hands. Among his pupils were his successor, Chrysippus, and Antigonus, king of Macedon, from whom he accepted 2000 minæ. The story of his death, which took place about 220 or 225 B.C., is thus related: Being troubled by an ulcer, he had been directed to fast for a short time, but when that time had expired, he still refused to eat on the ground that he was now half-way on the road to death, and need not take the trouble of twice performing the journey.

Cleanthes produced very little that was original, though he wrote some fifty works, of which fragments have come down to us. The principal is the large portion of the *Hymn to Jupiter* which has been preserved in Stobæus. He regarded the sun as the abode of God, the intelligent providence, or (in accordance with Stoical materialism) the vivifying fire or æther of the universe. Virtue, he taught, is life according to nature; but pleasure is not according to nature. He also originated a new theory as to the individual existence of the human soul; for he held that the degree of its vitality after death depends upon the degree of its vitality in this life. The principal fragments of Cleanthes's works are contained in Diogenes Laertius and Stobæus; some may be found in Cicero and Seneca. See Zeller, *Stoics, Epicureans, and Skeptics;* and Ritter, *Geschichte der Philosophie.*

CLEARCHUS, a Spartan general of the 5th century B.C. After serving in the Hellespont and at the battle of Cyzicus, he became harmost of Byzantium; but, during his absence, the town was surrendered, and he was consequently punished by a fine. He continued, however, to be employed in matters of importance; but at length, after being sent into Thrace to protect the Greek colonies, he was recalled by the Ephors. He refused to obey, and made himself master of Byzantium. Being driven thence, he visited the court of Cyrus, for whom he levied a little army of Greek mercenaries, which he led on the famous Expedition of the Ten Thousand. He was the only one of the Greeks who was acquainted with the real intention of Cyrus; and it was not till they had proceeded too far to retire with safety that he made known the object for which they had been collected. He commanded a division of his countrymen in the battle of Cunaxa (401 B.C.); and he led them on their difficult return journey till, being treacherously seized by Tissaphernes, he was sent to the court of Artaxerxes, where he was put to death.

CLEMENS ALEXANDRINUS. The little we know of Clemens Alexandrinus is mainly derived from his own works. The earliest writer after himself who gives us any information with regard to him is Eusebius. The only points on which his works now extant inform us are his date and his instructors. In the *Stromata*, while attempting to show that the Jewish Scriptures were older than any writings of the Greeks, he invariably brings down his dates to the death of Commodus, a circumstance which at once suggests that he wrote in the reign of the Emperor Severus, from 193 to 211 A.D. (see *Strom.*, lib. i. cap. xxi. 140, p. 403, Potter's edition). The passage in regard to his teachers is corrupt, and the sense is therefore doubtful (*Strom.*, lib. i. cap. i. 11, p. 322, P.).

"This treatise," he says, speaking of the *Stromata*, "has not been contrived for mere display, but memoranda are treasured up in it for my old age to be a remedy for forgetfulness,—an image, truly, and an outline of those clear and living discourses, and those men truly blessed and noteworthy I was privileged to hear. One of these was in Greece, the Ionian, the other was in Magna Græcia; the one of them was from Cœle Syria, the other from Egypt; but there were others in the East, one of whom belonged to the Assyrians, but the other was in Palestine, originally a Jew. The last of those whom I met was first in power. On falling in with him I found rest, having tracked him while he lay concealed in Egypt. He was in truth the Sicilian bee, and, plucking the flowers of the prophetic and apostolic meadow, he produced a wonderfully pure knowledge in the souls of the listeners."

Some have supposed that in this passage seven teachers are named, others that there are only five, and various conjectures have been hazarded as to what persons were meant. The only one about whom conjecture has any basis for speculating is the last, for Eusebius states (*Hist. Eccl.*, v. 11) that Clement made mention of Pantænus as his teacher in the *Hypotyposes*. The reference in this passage is plainly to one whom he might well designate as his teacher.

To the information which Clement here supplies subse-

[1] [The Fugitive Slave Law was part of the omnibus bill.—AM. ED.]

quent writers add little. By Eusebius and Photius he is called Titus Flavius Clemens, and "the Alexandrian" is added to his name. Epiphanius tells us that some said Clement was an Alexandrian, others that he was an Athenian (*Hær.*, xxxii. 6), and a modern writer imagined that he reconciled this discordance by the supposition that he was born at Athens, but brought up at Alexandria. We know nothing of his conversion except that he passed from heathenism to Christianity. This is expressly stated by Eusebius (*Præp. Evangel.*, lib. ii. cap. 2), though it is likely that Eusebius had no other authority than the works of Clement. These works, however, warrant the inference. They show a singularly minute acquaintance with the ceremonies of pagan religion, and there are indications that Clement himself had been initiated in some of the mysteries (*Protrept.*, cap. ii. sec. 14, p. 13, P.). There is no means of determining the date of his conversion. He attained the position of presbyter in the church of Alexandria (Eus., *Hist. Eccl.*, vi. 11, and Jerome, *De Vir. Ill.*, 38), and became the successor of Pantænus in the catechetical school of that place. Among his pupils were Origen (Eus., *Hist. Eccl.*, vi. 7) and Alexander, bishop of Jerusalem (Eus., *Hist. Eccl.*, vi. 14). How long he continued in Alexandria, and when and where he died, are all matters of pure conjecture. The only further notice of Clement that we have in history is in a letter written in 211 by Alexander, bishop of Jerusalem, to the Antiochians, and preserved by Eusebius (*Hist. Eccl.*, vi. 11). The words are as follows:—"This letter I sent through Clement the blessed presbyter, a man virtuous and tried, whom ye know and will come to know completely, who being here by the providence and guidance of the Ruler of all strengthened and increased the church of the Lord." A statement of Eusebius in regard to the persecution of Severus in 202 (*Hist. Eccl.*, vi. 3) would render it likely that Clement left Alexandria on that occasion. It is conjectured that he went to his old pupil Alexander, who was at that time bishop of Flaviada in Cappadocia, and that when his pupil was raised to the see of Jerusalem Clement followed him there. The letter implies that he was known to the Antiochians, and that it was likely he would be still better known. Some have conjectured that he returned to Alexandria, but there is not the shadow of evidence for such conjecture.

Eusebius and Jerome give us lists of the works which Clement left behind him. Photius has also described some of them. They are as follows:—1. πρὸς Ἕλληνας λόγος ὁ προτρεπτικός, *A Hortatory Address to the Greeks.* 2. ὁ παιδαγωγός, *The Tutor*, in three books. 3. Στρωματεῖς, or *Patch-work*, in eight books. 4. τίς ὁ σωζόμενος πλούσιος, *Who is the Rich Man that is Saved?* 5. Eight books of Ὑποτυπώσεις, *Adumbrations or Outlines.* 6. *On the Passover.* 7. *Discourses on Fasting.* 8. *On Slander.* 9. *Exhortation to Patience, or to the Newly Baptized.* 10. The κανὼν ἐκκλησιαστικός, the *Rule of the Church, or to those who Judaize*, a work dedicated to Alexander, bishop of Jerusalem.

Of these, the first four have come down to us complete, or nearly complete. The first three form a series. The *Hortatory Address* to the Greeks is an appeal to them to give up the worship of their gods, and to devote themselves to the worship of the one living and true God. Clement exhibits the absurdity and immorality of the stories told with regard to the pagan deities, the cruelties perpetrated in their worship, and the utter uselessness of bowing down before images made by hands. He at the same time shows the Greeks that their own greatest philosophers and poets recognized the unity of the divine Being, and had caught glimpses of the true nature of God, but that fuller light had been thrown on this subject by the Hebrew prophets. He replies to the objection that it was not right to abandon the customs of their forefathers, and points them to Christ as their only safe guide to God.

The *Pædogogue* is divided into three books. In the first Clement discusses the necessity for and the true nature of the Pædagogus, and shows how Christ as the Logos acted as Pædagogus, and still acts. In the second and third books Clement enters into particulars, and explains how the Christian following the Logos or Reason ought to behave in the various circumstances of life—in eating, drinking, furnishing a house, in dress, in the relations of social life, in the care of the body, and similar concerns, and concludes with a general description of the life of a Christian. Appended to the *Pædagogue* are two hymns, which are, in all probability, the production of Clement, though some have conjectured that they were portions of the church service of that time.

Stromata, or rather Στρωματεῖς, are coverlets made out of miscellaneous pieces of cloth. The title is used by Clement to designate a miscellaneous collection of materials, and Clement's work is unquestionably of this nature. It is impossible to give a brief account of its varied contents. Sometimes he discusses chronology, sometimes philosophy, sometimes poetry, entering into the most minute critical and chronological details; but one object runs through all, and this is to show what the true Christian Gnostic is, and what is his relation to philosophy. The work was in eight books. The first seven are complete. The eighth now extant is really an incomplete treatise on logic. Some critics have rejected this book as spurious, since its matter is so different from that of the rest. Others, however, have held to its genuineness, because in a Patch-work or Book of Miscellanies the difference of subject is no sound objection, and because Photius seems to have regarded our present eighth book as genuine (Phot., cod. 111, p. 89b, Bekker).

The treatise *Who is the Rich Man that is Saved?* is an admirable exposition of the narrative contained in St. Mark's Gospel, x. 17–31. It was in all probability preached.

The *Hypotyposes* have not come down to us. Cassiodorus translated them into Latin, freely altering to suit his own ideas of orthodoxy. Both Eusebius and Photius describe the work. It was a short commentary on all the books of Scripture, including some of the apocryphal works, such as the Epistle of Barnabas and the revelation of Peter. Photius speaks in strong language of the impiety of some opinions in the book (*Bibl.*, cod. 109, p. 89a, Bekker), but his statements are such as to prove conclusively that he must have had a corrupt copy, or read very carelessly, or grossly misunderstood Clement. Notes in Latin on the first epistle of Peter, the epistle of Jude, and the first two of John have come down to us; but whether they are the translation of Cassiodorus, or indeed a translation of Clement's work at all, is a matter of dispute.

The treatise on the Passover was occasioned by a work of Melito on the same subject. Two fragments of this treatise were given by Petavius, and are contained in the modern editions.

We know nothing of the work called *The Ecclesiastical Canon* from any external testimony. Clement himself often mentions the ἐκκλησιαστικὸς κανών, and defines it as the agreement and harmony of the law and the prophets with the covenant delivered at the appearance of Christ (*Strom.*, vi. cap. xv. 125, p. 803, P.). No doubt this was the subject of the treatise. Jerome and Photius call the work *Ecclesiastical Canons*, but this seems to be a mistake.

Of the other treatises mentioned by Eusebius and Jerome nothing is known. A fragment of Clement, quoted by Antonius Melissa, is most probably taken from the treatise on slander.

Besides the treatises mentioned by Eusebius, fragments of treatises on Providence and the Soul have been preserved. Mention is also made of a work by Clement on the Prophet Amos, and another on Definitions.

In addition to these Clement often speaks of his intention to write on certain subjects, but it may well be doubted whether in most cases, if not all, he intended to devote separate treatises to them. Some have found an allusion to the treatise on the Soul already mentioned. The other subjects are Marriage (γαμικὸς λόγος), Continence, the Duties of Bishops, Presbyters, Deacons, and Widows, Prophecy, the Soul, the Transmigration of the Soul and the Devil, Angels, the Origin of the World, First Principles and the Divinity of the Logos, Allegorical Interpretation of Statements made with regard to God's anger and similar affections, the Unity of the Church, and the Resurrection.

Two works are incorporated in the edition of Clement which are not mentioned by himself or any ancient writer. They are ἐκ τῶν Θεοδότου καὶ τῆς ἀνατολικῆς καλουμένης διδασκαλίας κατὰ τοὺς Οὐαλεντίνου χρόνους ἐπιτομαί, and ἐκ τῶν προφητικῶν ἐκλογαί. The first, if it is the work of Clement, must be a book merely of excerpts, for it contains many opinions which Clement opposed. Mention is made of Pantænus in the second, and some have thought it more worthy of him than the first. Others have regarded it as a work similar to the first, and derived from Theodorus.

Clement occupies a profoundly interesting position in the history of Christianity. He is the first to bring all the culture of the Greeks and all the speculations of the Christian heretics to bear on the exposition of Christian truth. He does not attain to a systematic exhibition of Christian doctrine, but he paves the way for it, and lays the first stones of the foundation. In some respects Justin anticipated him. He also was well acquainted with Greek philosophy, and took a genial view of it; but he was not nearly so widely read as Clement. The list of Greek authors whom Clement has quoted occupies upwards of fourteen of the quarto pages in Fabricius's *Bibliotheca Græca*. He is at home alike in the epic and the lyric, the tragic and the comic poets, and his knowledge of the prose writers is very extensive. He made a special study of the philosophers. Equally minute is his knowledge of the systems of the Christian heretics. And in all cases it is

plain that he not merely read but thought deeply on the questions which the civilization of the Greeks and the various writings of poets, philosophers, and heretics raised. He pondered on all he read that he might gain a clearer insight into the truth. But it was in the Scriptures that he found his greatest delight. He believed them to contain the revelation of God's wisdom to men. He quotes all the books of the Old Testament except Ruth and the Song of Solomon, and amongst the sacred writings of the Old Testament he evidently included the Book of Tobias, the Wisdom of Solomon, and Ecclesiasticus. He is equally full in his quotations from the New Testament, for he quotes from all the books except the epistle to Philemon, the second epistle of St. Peter, and the epistle of St. James, and he quotes from the pastor of Hermas, and the epistles of Clemens Romanus and of Barnabas, as inspired. He appeals also to many of the lost Gospels, such as those of the Hebrews, of the Egyptians, and of Matthias.

Notwithstanding this adequate knowledge of Scripture, the modern theologian is disappointed to find very little of what he deems characteristically Christian. In fact Clement regarded Christianity as a philosophy. The ancient philosophers sought through their philosophy to attain to a nobler and holier life, and this also was the aim of Christianity. The difference between the two, in Clement's judgment, was that the Greek philosophers had only glimpses of the truth, that they attained only to fragments of the truth, while Christianity revealed in Christ the absolute and perfect truth. All the stages of the world's history were therefore preparations leading up to this full revelation, and God's care was not confined to the Hebrews alone. The worship of the heavenly bodies, for instance, was given to man at an early stage that he might rise from a contemplation of these sublime objects to the worship of the Creator. Greek philosophy in particular was the preparation of the Greeks for Christ. It was the schoolmaster or pædagogue to lead them to Christ. Plato was Moses atticizing. Clement varies in his statement how Plato got his wisdom or his fragments of the Reason. Sometimes he thinks that they came direct from God, like all good things, but he is also fond of maintaining that many of Plato's best thoughts were borrowed from the Hebrew prophets; and he makes the same statement in regard to the wisdom of the other philosophers. But however this may be, Christ was the end to which all that was true in philosophies pointed. Christ himself was the Logos, the Reason. God the Father was ineffable. The Son alone can manifest Him fully. He is the Reason that pervades the universe, that brings out all goodness, that guides all good men. It was through possessing somewhat of this Reason that the philosophers attained to any truth and goodness; but in Christians He dwells more fully and guides them through all the perplexities of life. It is easy to see that this doctrine in regard to Christ may be misconstrued. If Jesus were the Reason, thus visible in all goodness, how could there be a real difference between Him and the Father, or how could He really become incarnate? Photius, probably on a careless reading of Clement, argued that he could not have believed in a real incarnation. But the words of Clement are quite precise and their meaning indisputable. He believed in a personal God different from the universe. He believed in a personal Son of God who was the Reason and Wisdom of God; and he believed that this Son of God really became incarnate. The object of His incarnation and death was to free man from his sins, to lead him into the path of wisdom, and thus in the end elevate him to the position of a god. But man's salvation was to be gradual. It began with faith, passed from that to love, and ended in full and complete knowledge. There could be no faith without knowledge. But the knowledge is imperfect, and the Christian was to do many things in simple obedience without knowing the reason. But he has to move upwards continually until he at length does nothing that is evil, and he knows fully the reason and object of what he does. He thus becomes the true Gnostic, but he can become the true Gnostic only by contemplation and by the practice of what is right. He has to free himself from the power of passion. He has to give up all thoughts of pleasure. He must prefer goodness in the midst of torture to evil with unlimited pleasure. He has to resist the temptations of the body, keeping it under strict control, and with the eye of the soul undimmed by corporeal wants and impulses, contemplate God the supreme good, and live a life according to reason. In other words, he must strive after likeness to God as He reveals himself in his Reason or in Christ. Clement thus looks entirely at the enlightened moral elevation to which Christianity raises man. He believed that Christ instructed men before He came into the world, and he therefore viewed heathenism with kindly eye. He was also favorable to the pursuit of all kinds of knowledge. All enlightenment tended to lead up to the truths of Christianity, and hence knowledge of every kind not evil was its handmaid. Clement had at the same time a strong belief in evolution or development. The world went through various stages in preparation for Christianity. The man goes through various stages before he can reach Christian perfection. And Clement conceived that this development took place not merely in this life, but in the future through successive grades. The Jew and the heathen had the gospel preached to them in the world below by Christ and His apostles, and Christians will have to pass through processes of purification and trial after death before they reach perfect knowledge and perfect bliss.

The beliefs of Clement have caused considerable difference of opinion among modern scholars. He sought the truth from whatever quarter he could get it, believing that all that is good comes from God, wherever it be found. He belongs, therefore, to no school of philosophers. Some have insisted that he was an eclectic. Daehne has tried to show that he was Neo-Platonic, and Reinkens has maintained that he was essentially Aristotelian. His mode of viewing Christianity does not fit into any classification. It is the result of the period in which he lived, of his wide culture and the simplicity and noble purity of his character.

It is needless to say that his books well deserve study; but the study is not smoothed by beauty of style. Clement despised ornament. He wished to avoid everything that might seem to deceive. He thought also that it was quite possible to throw pearls before swine, and that care should be taken to prevent this by digressions and difficulties which only the earnest student would encounter. He is singularly simple in his character. In discussing marriage he refuses to use any but the plainest language. A euphemism is with him a falsehood. But he is temperate in his opinions; and the practical advices in the second and third books of the *Pædagogue* are remarkably sound and moderate. He is not always very critical, and he is passionately fond of allegorical interpretation; but these were the faults of his age.

All early writers speak of Clement in the highest terms of laudation, and he certainly ought to have been a saint in any Church that reveres saints. But Clement is not a saint in the Roman Church. He was a saint up till the time of Benedict XIV., who read Photius on Clement, believed him, and struck the Alexandrian's name out of the calendar. The Pope was unquestionably wrong; and many Roman Catholic writers, though they yield a practical obedience, have adduced good reason why the decision of the Pope should be reversed (Cognat, p. 451).

The editions of Clement's works are by (1) Petrus Victorius, 1550; (2) Sylburg, 1592; (3) Heinsius, 1616; (4) Fronto Ducaens, 1629, 1641, 1688; (5) Potter, London, 1715 (this was by far the best edition, and has formed the basis of subsequent editions; it was reprinted at Venice, 1757, and in Gallandi's *Bibliotheca*, in Oberthür, and in Migne's *Cursus Patrologiæ Græcæ*); (6) Klotz, Leipsic, 1831; (7) W. Dindorf, Oxford, 1869. There are separate editions of *Quis dives salvetur* by Ghislar, Combefisius, Fell, Ittig, Segaar, and Lindner.

The writings that discuss Clement are very numerous. Notice is taken of him by ecclesiastical historians, and by the historians of Christian literature, among whom Lumper, Permaneder, and Kontogones deserve special mention. There are monographs on Clement and his doctrine by J. and F. Tribbechovius, Bieleke, Guerike, Hofstede de Groot, Daehne, Lentzen, Reinkens, Reuter, Laemmer, Duperron, Cognat, Lipsius, Müller, and Freppel, by Miss Cornwallis in her *Small Books on Great Subjects*, No. vii., and by Bishop Kaye. Clement's works have been translated in Clarke's Ante-Nicene Christian Library, by the Rev. W. Wilson. (J. D.)

CLEMENT, the name borne by fourteen Popes.

CLEMENT I. (Clemens Romanus). See APOSTOLIC FATHERS, vol. ii. p. 171.

CLEMENT II. (Suidger, a Saxon, bishop of Bamberg) was chancellor to the Emperor Henry III., to whom he was indebted for his elevation to the Papacy upon the abdication of Gregory VI. (December, 1046). His short

pontificate was only signalized by the convocation of a council in which decrees were enacted against simony. He died in October, 1047, and was interred at Bamberg.

CLEMENT III. (Paulino Scolari, bishop of Prænestе) was elected Pope in December, 1187, and died in March, 1191. He succeeded shortly after his accession in allaying the discords which had prevailed for half a century between the Popes and the citizens of Rome, in virtue of an agreement by which the latter were allowed to elect their magistrates, while the nomination of the governor of the city remained in the hands of the Pope. He incited Henry II. of England and Philip Augustus to undertake the third crusade, and introduced several minor reforms in ecclesiastical matters.

CLEMENT IV. (Gui Foulques, archbishop of Narbonne) was elected Pope in February, 1265. Before taking orders he had been successively a soldier and a lawyer, and in the latter capacity had acted as secretary to Louis IX. of France, to whose influence he was chiefly indebted for his elevation. At this time the Holy See was engaged in a conflict with Manfred, the usurper of Naples; and Clement, whose election had taken place in his absence, was compelled to repair to Italy in disguise. He immediately took steps to ally himself with Charles of Anjou, the French pretender to the Neapolitan throne, who marched into Naples, and having defeated and slain Manfred in the great battle of Benevento, established himself firmly in the kingdom. Clement is said to have disapproved of the cruelties committed by Charles, and there seems no foundation for the charge of his having advised the latter to execute the unfortunate Conradin, the last of the church's hereditary antagonists of the house of Hohenstaufen. His private character was unexceptionable, and he is especially commended for his indisposition to promote and enrich his own relatives. He also did himself great honor by his encouragement and protection of Roger Bacon. He died in November, 1268, and was buried at Viterbo, where he had resided throughout his pontificate.

CLEMENT V. (Bertrand de Goth, archbishop of Bordeaux) is memorable in history for his suppression of the order of the Templars, and as the Pope who removed the seat of the Roman see to Avignon. He was elected in June, 1305, after a year's interregnum occasioned by the disputes between the French and Italian cardinals, who were nearly equally balanced in the conclave. According to Villani he had bound himself to subserviency towards the French monarch by a formal agreement previous to his elevation; however this may be, it is unquestionable that he conducted himself throughout his pontificate as the mere tool of that monarch. His first act was to create nine French cardinals. The removal of the seat of the Papacy to Avignon (1308) might seem palliated by the factious and tumultuary condition of Rome at the period, but it proved the precursor of a long "Babylonish captivity," in Petrarch's phrase, and marks the point from which the decay of the strictly Catholic conception of the Pope as universal bishop is to be dated. The guilt or innocence of the Templars is one of the most difficult of historical problems, the discussion of which belongs, however, to the history of the order. Clement may have acted conscientiously in his suppression of an order which had heretofore been regarded as a main bulwark of Christianity, but there can be little doubt that his principal motive was complaisance towards the king of France, or that the latter was mainly actuated by jealousy and cupidity. Clement's pontificate was also disastrous for Italy. The Emperor Henry VII. entered the country, established the Visconti in Milan, and was crowned by Clement's legates in Rome, but was unable to maintain himself there, and died suddenly, leaving great part of Italy in a condition of complete anarchy. The dissensions of the Roman barons reached their height, and the Lateran palace was destroyed in a conflagration. Other remarkable incidents of Clement's reign are his sanguinary repression of the heresy of Fra Dolcino in Lombardy and his promulgation of the Clementine Constitutions in 1313. He died, leaving an inauspicious character for nepotism, avarice, and cunning, in April, 1314. He was the first Pope who assumed the triple crown.

CLEMENT VI. (Pierre Roger, archbishop of Rouen), the fourth of the Avignon popes, was elected in May, 1342. Like his immediate predecessors, he was devoted to France, and he further evinced his French sympathies by refusing a solemn invitation to return to Rome, and by purchasing the sovereignty of Avignon from Joanna, queen of Naples, for 80,000 crowns. The money was never paid, but Clement may have deemed that he gave the queen a full equivalent by absolving her from the murder of her husband. The other chief incidents of his pontificate were his disputes with Edward III. of England on account of the latter's encroachments on ecclesiastical jurisdiction, his excommunication of the Emperor Louis of Bavaria, his negotiations for reunion with the Eastern Church, and the commencement of Rienzi's agitation at Rome. He died in December, 1352, leaving the reputation of "a fine gentleman, a prince munificent to profusion, a patron of the arts and learning, but no saint" (Gregorovius; see also Gibbon, chap. 66).

CLEMENT VII. (Giulio de' Medici), the most unfortunate of the Popes, was the son of Giuliano de' Medici, assassinated in the conspiracy of the Pazzi, and consequently a nephew of Lorenzo the Magnificent and cousin of Pope Leo X. Upon the latter's accession to the Papacy, Giulio became his principal minister and confidant, especially in the maintenance of the Medici interest at Florence. At Leo's death, Cardinal Medici, though unable to gain the Papacy for himself or his ally Farnese, took a leading part in determining the unexpected election of Adrian V., to whom he succeeded in the next conclave (November, 1523). He brought to the Papal throne a high reputation for political ability, and possessed in fact all the accomplishments of a wily diplomatist, but the circumstances of the times required a man of far different mould. His worldliness and lack of insight into the tendencies of his age disqualified him from comprehending the great religious movement which then convulsed the church; while his timidity and indecision no less disabled him from following a consistent policy in secular affairs. At first attached to the imperial interest, he was terrified by the overwhelming success of the emperor in the battle of Pavia into joining the other Italian princes in a league with France. This policy in itself was sound and patriotic, but Clement's zeal soon cooled; by his want of foresight and unseasonable economy he laid himself open to an attack from the turbulent Roman barons which obliged him to invoke the mediation of the emperor. When this danger seemed over he veered back to his former engagements, and ended by drawing down upon himself the host of the imperialist general, the Constable Bourbon, who, compelled to satisfy his clamorous mercenaries by pillage, embraced the opportunity of leading them against Rome. The city was assaulted and sacked on May 5, 1527, and Clement, who had displayed no more resolution in his military than in his political conduct, was shortly afterwards obliged to surrender himself together with the castle of St. Angelo, where he had taken refuge. After six months' captivity he was released upon very onerous conditions, and for some years subsequently followed a policy of subserviency to the emperor, endeavoring on the one hand to induce him to act with severity against the Lutherans in Germany, and on the other to elude his demands for a general council. One momentous consequence of this dependence on Charles V. was the breach with England occasioned by Clement's refusal, justifiable in point of principle, but dictated by no higher motive than his fear of offending the emperor, to sanction Henry VIII.'s divorce from Catherine of Aragon. Towards the end of his reign Clement once more gave indications of a leaning towards a French alliance, which was prevented by his death in September, 1534. As a man he possessed few virtues and few vices; as a pontiff he did nothing to disgrace the church and nothing to restore its lustre; his adroitness and dexterity as a statesman were counteracted by his suspicion and irresolution; his administration affords a proof that at eventful crises of the world's history mediocrity of character is more disastrous than mediocrity of talent.

CLEMENT VIII. (Ippolito Aldobrandini) was elected in January, 1592. The most remarkable event of his reign was the reconciliation to the church of Henry IV. of France after long negotiations carried on with great dexterity by Cardinal D'Ossat. Europe is principally indebted to this Pope for the peace of Vervins (1598), which put an end to the long contest between France and Spain. Clement also annexed Ferrara to the States of the Church upon the failure of the line of Este, the last addition of importance to the Pope's temporal dominions. The execution of Giordano Bruno, February 17, 1600, is a blot upon an

otherwise exemplary pontificate. Clement was an able ruler and a sagacious statesman, the general object of whose policy was to free the Papacy from its undue dependence upon Spain. The conferences to determine the questions of grace and free will, controverted between the Jesuits and Dominicans, were commenced under him, but he wisely abstained from pronouncing a decision. He died in March, 1605, leaving a high character for prudence, munificence, and capacity for business. His reign is especially distinguished by the number and beauty of his medals.

CLEMENT IX. (Giulio Rospigliosi) was elected Pope in June, 1667. Nothing remarkable occurred under his short administration beyond the temporary adjustment of the disputes between the Roman see and those prelates of the Gallican church who had refused to join in condemning the writings of Jansenius. He died in December, 1669.

CLEMENT X. (Emilio Altieri) was elected in April, 1670, at the age of eighty. His years and infirmities led him to devolve the charge of the government upon his nephew, Cardinal Altieri, whose interference with the privileges of ambassadors occasioned disputes in which the Pope was obliged to yield. Little else of importance occurred during his reign, which terminated in July, 1676.

CLEMENT XI. (Giovanni Francesco Albani) was elevated to the pontificate in November, 1700, and died in March, 1721. The most memorable transaction of his administration was the publication in 1713 of the bull *Unigenitus*, which so greatly disturbed the peace of the Gallican church. By this famous document 101 propositions extracted from the works of Quesnel were condemned as heretical, and as identical with propositions already condemned in the writings of Jansenius. The resistance of many French ecclesiastics and the refusal of the French parliaments to register the bull led to controversies extending through the greater part of the 18th century. Another important decision of this Pope's was that by which the Jesuit missionaries were forbidden to take a part in idolatrous worship, and to accommodate Christian language to pagan ideas under plea of conciliating the heathen. The political troubles of the time greatly embarrassed Clement's relations with the leading Catholic powers, and the moral prestige of the Holy See suffered much from his compulsory recognition of the Archduke Charles of Austria as king of Spain. His private character was irreproachable; he was also an accomplished scholar, and a patron of letters and science.

CLEMENT XII. (Lorenzo Corsini) was Pope from July, 1730, to February, 1740. His first act was the trial and condemnation of Cardinal Coscia, guilty of malversation under his predecessor. Nothing else of importance occurred under his administration, during the greater part of which, according to some historians, he was afflicted with blindness. He was the first pontiff who condemned the Freemasons.

CLEMENT XIII. (Carlo Rezzonico, bishop of Padua) was elected in July, 1758. Notwithstanding the meekness and affability of his character, his pontificate was disturbed by perpetual contentions respecting the investiture of Parma, and subsequently by the demands of France, Spain, and Portugal for the suppression of the Jesuits. Clement warmly espoused the cause of the order in an apostolical brief issued in 1765. The pressure put upon him by the Catholic powers, however, was so strong that he seemed about to give way, when, having convoked a consistory to receive his decision, he died suddenly, February 3, 1769, not without suspicion of poison.

CLEMENT XIV. (Giovanni Vincenzo Antonio Ganganelli), the best and most calumniated of the popes, was born in 1705, and was originally a Franciscan monk. Having acquired a great reputation as a preacher, he became the friend and confidant of Pope Benedict XIV., and was created a cardinal by his successor. He was elected Pope on May 19, 1769, after a conclave extremely agitated by the intrigues and pretensions of the Catholic sovereigns, who were resolved to exclude every candidate favorable to the Jesuits. Theiner has satisfactorily vindicated Ganganelli from the charge of having given a formal pledge on this subject. He may probably have leant to the views of the Catholic powers, but if so his motive was widely different from the subservience which had induced his predecessor Clement V. to gratify Philip the Fair by the suppression of the Templars. The breach between the temporal and the spiritual authorities had become threatening, and the guiding principle of Clement's policy was undoubtedly the reconciliation of the European sovereigns, whose alienation threatened to produce the results which we have seen accomplished in our own times. By yielding the Papal pretensions to Parma, he obtained the restitution of Avignon and Benevento, and in general he succeeded in placing the relations of the spiritual and the temporal authorities on a satisfactory footing. Whether from scruple or policy he proceeded with great circumspection in the suppression of the Jesuits, the decree to this effect not being framed until November, 1772, and not signed until July in the following year. This memorable measure, which takes rank in history as the most remarkable, perhaps the only really substantial, concession ever made by a Pope to the spirit of his age, has covered Clement's memory with obloquy in his own communion. There cannot be any reasonable doubt of the integrity of his conduct, and the only question is whether he acted from a conviction of the pernicious character of the Society of Jesus, or merely from a sense of expediency. In either case his action was abundantly justified, and to allege that though beneficial to the world it was detrimental to the church is merely to insist that the interests of the Papacy are not the interests of mankind. His work was hardly accomplished ere Clement, whose natural constitution was exceedingly vigorous, fell into a languishing sickness, generally and plausibly attributed to poison. No conclusive evidence of this, however, has been produced; and it is but just to remark that poison would more probably have been administered before the obnoxious measure had been taken than when it was already beyond recall. Clement expired on September 22, 1774, execrated by the Ultramontane party, but regretted by his subjects for his excellent temporal administration. No Pope has better merited the title of a virtuous man, or has given a more perfect example of integrity, unselfishness, and aversion to nepotism. Notwithstanding his monastic education, he approved himself a statesman, a scholar, an amateur of physical science, and an accomplished man of the world. As Leo X. indicates the manner in which the Papacy might have been reconciled with the Renaissance had the Reformation never taken place, so Ganganelli exemplifies the type of Pope which the modern world might have learned to accept if the movement towards free thought could, as Voltaire wished, have been confined to the aristocracy of intellect. In both cases the requisite condition was unattainable; neither in the 16th nor in the 18th century has it been practicable to set bounds to the spirit of inquiry otherwise than by fire and sword, and Ganganelli's successors have been driven into assuming a position analogous to that of Paul IV. and Pius V. in the age of the Reformation. The estrangement between the secular and the spiritual authority which Ganganelli strove to avert is now irreparable, and his pontificate remains an exceptional episode in the general history of the Papacy, and a proof how little the logical sequence of events can be modified by the virtues and abilities of an individual. The history of Clement's administration has been written in a spirit of the most violent detraction by Cretineau-Joly, and perhaps too unreservedly in the opposite spirit by Father Theiner, the custodian of the archives of the Vatican. Theiner calls attention to the disappearance of many documents which have apparently been abstracted by Clement's enemies. Ganganelli's familiar correspondence has been frequently reprinted, and is much admired for its elegance and urbanity. (R. G.)

CLÉMENT, FRANÇOIS (1714–1793), a French historian, was born at Brézé, near Dijon, and was educated at the Jesuit College at Dijon. At the age of seventeen he entered the society of the Benedictines at Saint Maur, and worked with such intense application that at the age of twenty-five he was obliged to take a protracted rest. He now resided in Paris, where he wrote the 11th and 12th vols. of the *Histoire littéraire de la France*. Clément also revised the *Art de vérifier les dates* (1783–92). The king appointed him on the committee which was engaged in publishing maps, acts, and other documents connected with French history, and the Academy of Inscriptions chose him as a member. He was engaged in preparing another edition of the *Art de vérifier les dates*, which was to include the period before the Christian era, when he died suddenly of apoplexy at the age of sixty-nine. (The work was

afterwards brought down from 1770 to 1827 by De Courcelles and D'Urban.)

CLEMENTI, Muzio (1752–1832), an Italian pianist and composer, was born at Rome in 1752. His father, a jeweller, encouraged his son's musical talent, which was evinced at a very early age. Buroni and Cordicelli were his first masters, and at the age of nine Clementi's theoretical and practical studies had advanced to such a degree that he was able to compete successfully for the position of organist at a church. He continued his contrapuntal studies under Carpini, and at the age of fourteen wrote a mass which was performed in public and excited universal admiration. About this time Beckford, the author of *Vathek*, persuaded Clementi to follow him to England, where the young composer lived in retirement at one of the country seats of his protector in Dorsetshire up to 1770. In that year he first appeared in London, where his success, both as a composer and pianist, was rapid and brilliant. In 1777 he was for some time employed as conductor of the Italian opera, but he soon afterwards left London for Paris. Here also his concerts were crowded by enthusiastic audiences, and the same success accompanied Clementi on an artistic tour to Southern Germany and Austria which he undertook about 1780. At Vienna he was received with high honor by the Emperor Joseph II., in whose presence he met Mozart, and sustained a kind of musical duel with him. His technical skill proved to be equal if not superior to that of his great rival, who on the other hand infinitely surpassed him by the passionate beauty of his rendering. Such seems to have been the opinion of most of the witnesses of this remarkable meeting, and it is confirmed to some extent by the two musicians themselves. Apropos of the connection of these great men the fact may be mentioned that one of the finest of Clementi's sonatas, that in B flat, shows an exactly identical opening theme with Mozart's overture to the *Flauto Magico*, also that at the concert given by the Philharmonic Society in commemoration of Clementi's death, the German composer's *Recordare* was the chief item of the programme. Soon after his meeting with Mozart, Clementi returned to London, where he continued for the next twelve years his lucrative occupations of fashionable teacher and performer at the concerts of the aristocracy. He also started a pianoforte manufacturing firm of his own, and the commercial shrewdness characteristic of his nation greatly contributed to the lasting success of the business. Amongst his pupils on the pianoforte during this period may be mentioned John Field, the composer of the celebrated *Nocturnes*. In his company Clementi paid, in 1804, a prolonged visit to the large cities of the Continent, including Paris, Vienna, St. Petersburg, and Berlin. At the Prussian capital he made a prolonged stay, and there counted Meyerbeer among his pupils. He also revisited his own country after an absence of more than thirty years. In 1810 Clementi returned to London, but refused to play again in public, devoting the remainder of his life to composition. Several symphonies belong to this time, and were played with much success at contemporary concerts, but none of them seem to have been published. His intellectual and musical faculties remained unimpaired up to his death, which took place at Evesham, Worcestershire, March 9, 1832. Clementi has been called the "father of pianoforte playing," and it cannot be denied that the modern style of execution owes a great deal to his teaching and example. His *technique* is described as all but unequalled at his time, and remarkable even according to our present advanced notions. Moscheles, a pianist of a very different school, gives a vivid description of the effect produced by Clementi's playing. At a dinner given in his honor in 1828 the composer was induced to play once more to a larger audience. "Smart, Cramer (another of Clementi's pupils), and I," Moscheles writes in his diary, "conducted him to the piano. Every one's expectation is raised to the utmost pitch, for Clementi has not been heard for years. He improvises on a theme of Handel and carries us all away to the highest enthusiasm. His eyes shine with the fire of youth, those of his hearers grow humid. . . . Clementi's playing in his youth was marked by a most beautiful *legato*, a supple touch in lively passages, and a most unfailing *technique*. The remains of these qualities could still be discovered and admired, but the most charming things were the turns of his improvisation full of youthful genius." Amongst his compositions the most remarkable are 60 sonatas for pianoforte, and the great collection of *Etudes* called *Gradus ad Parnassum*. As a work of instruction combining absolute artistic beauty with the highest usefulness for the purposes of teaching and self-practice the *Gradus* remains unrivalled.

CLEOBULUS, one of the Seven Sages, was son of Evagoras, and a native of Lindus, which town he ruled, though whether as monarch or as head of a republic is uncertain. He was distinguished for his strength and his handsome person, for the wisdom of his sayings, the acuteness of his riddles, and the beauty of his lyric poetry. Diogenes Laertius quotes a letter in which Cleobulus invites Solon to take refuge with him against Pisistratus; and this would imply that he was alive in 560 B.C. He is said to have held advanced views as to female education, and he was the father of the wise Cleobuline, whose riddles were not less famous than his own.

CLEOMENES (Κλεομένης), the name of three kings of Sparta, the 16th, 25th, and 31st of the Agid line. The second of these does not call for particular notice.

Cleomenes I. succeeded as one of the two joint kings about 519 B.C. He led a Spartan force to Athens in 510 to aid the Alcmæonids and their followers in the expulsion of Hippias. He was called in subsequently to support the oligarchical party there, headed by Isagoras, against the party of Clisthenes. He forcibly expelled from the city, on a technical charge of pollution, no less than 7000 families, and established an entirely new constitution, transferring the government from the old senate to 300 of the oligarchical party. Eventually, however, he and his small force were blockaded by their opponents in the Acropolis, and forced to capitulate and to quit the city. On his return home he at once raised a force of Spartans and allies in order to avenge his failure, and to establish a despotism at Athens in the person of Isagoras. But when the expedition had reached Eleusis on its march, not only some of the subject-allies but also his brother-king Demaratus (of the Proclid junior branch) refused to proceed further, and he had to return without effecting his object. When the Ionian colonies revolted from Persia, in 500, their leader Aristagoras came to seek aid from Sparta. Cleomenes was at first inclined to entertain the tempting offers of Asiatic conquest which the Ionian, in his eagerness to secure the alliance, laid before him. But when Aristagoras, in reply to his questions, was forced to confess that Susa, the Persian capital, was no less than three months' journey inland from the sea, the king was startled, and bade his visitor quit Sparta before sunset. The Ionian then tried to bribe him; and as his offers mounted higher and higher, his little daughter Gorgo, some eight or nine years old (afterwards the wife of Leonidas), said, "Father, go away, or the stranger will corrupt you." Such at least is the story told by Herodotus, though Grote doubts its authenticity.

During a local war between Sparta and Argos, Cleomenes by a stratagem defeated the Argive forces near Tiryns. Those who escaped from the battle took refuge in a consecrated grove, which was set on fire by order of Cleomenes, and no less than 6000 men, the flower of the Argive citizens, are said either to have been killed in the battle, or to have perished in the flames,—a loss from which Argos was very long in recovering. For some reason he did not pursue his victory, but returned at once to Sparta, to the great dissatisfaction of his own people. One legend relates that the city of Argos was successfully defended against him by its women.

When Darius (491) sent heralds to demand the submission of all the Greeks, and the inhabitants of Ægina had consented to give the tributary "earth and water," Cleomenes proceeded to the island to punish its treachery to the national cause. His fellow-king Demaratus, who was always jealous of him, privately encouraged the Æginetans in their resistance, and the feud between the two became so bitter, that Cleomenes brought up an old charge of illegitimacy against his colleague, and succeeded in driving him into exile. Retributive fate very soon overtook himself; he was convicted of having procured the deposition of Demaratus by tampering with the priestess of the Delphian oracle, and had to retire for safety into Thessaly, and thence into Arcadia. There he endeavored to raise war against his countrymen, who in their alarm were weak enough to recall him. His renewed reign was not long. He soon after showed symptoms of madness, attacking violently with his staff those who came

to him for audience. Some attributed this derangement to a habit of hard drinking which had grown upon him; others saw in it the just punishment of his impiety, both in his intrigues with the oracle at Delphi, and in the burning of the sacred grove at Argos and the massacre of those who had taken sanctuary there. At length he had to be placed in close confinement, when he persuaded the slave who had charge of him to bring him a knife, with which he deliberately slashed himself to pieces.

CLEOMENES III., the last of the Agid line, succeeded 240 B.C.,—a king of strong and determined character, who wished to restore at Sparta the old constitution and discipline of Lycurgus, and to destroy the Achæan League. He met Aristomachus, the "captain" of the League, with a force of 5000 men against 25,000 at Palantium, but the Achæans, even with this advantage, declined the engagement. The next year he defeated them in a great battle at the foot of Mount Lycæum. He found active opponents at Sparta in the Ephors, whose anomalous authority he held to have been gradually usurped in derogation of the royal prerogative, affecting dangerously the independence of the kings, and which it was therefore his great object to crush. He succeeded in this at last by an unscrupulous *coup d'état*, surrounding the hall in which the Ephors were feasting with a body of armed mercenaries, and slaughtering them on the spot. He met with no resistance from the panic-stricken citizens, and at once proceeded to inaugurate his new constitution, abolishing the Ephorate entirely, restoring the old prerogatives of the kings, and amongst other reforms making a re-distribution of lands, and extending the franchise.

He had still to contend with the Achæan League for the supremacy of Greece. In the war which ensued he was finally defeated by Antigonus of Macedonia, who had become virtually the master of the League, in the battle of Sellasia (222), when the death-blow was given to the independence of Sparta. Cleomenes took refuge in Egypt with Ptolemy Euergetes, who received him kindly. But the succeeding Ptolemy neglected and even imprisoned him. He escaped and attempted to head an insurrection against the king, failing in which, he committed suicide.

CLEON (Κλέων), one of those popular leaders who rose to great temporary influence at Athens during the Peloponnesian War, and especially after the death of Pericles. He was emphatically a man of the people, sprung from their own ranks, his father Cleænetus having been a tanner or leather-dresser. He possessed considerable ability and was a powerful public speaker, though coarse and violent in manner and language. At first he seems to have formed one of the large party at Athens who protested against the policy of the war, and on that ground became a bitter opponent of Pericles. But his views must afterwards have changed, since we find him repeatedly urging active warlike measures in opposition to the peace party of which Nicias and others were the representatives. He was at the height of his political influence when in 427 B.C. the revolted citizens of Mitylene, after a long siege, submitted to the Athenian forces, and the question of their punishment was discussed in a public assembly. Cleon proposed and carried, though against strong opposition, the terrible decree that all the males who were able to bear arms (Grote estimates them at as many as 6000) should be put to death, and the women and children sold for slaves. However, in a second assembly held next day, the decree was rescinded in spite of Cleon's remonstrances. A vessel hastily despatched was barely in time to stay its execution. Even as it was, a thousand of those who were considered the ringleaders of the revolt were put to death. But it was perhaps fortunate for Cleon's future influence with the Athenian commons that he had not to bear the odium of a cruelty which they might have bitterly repented. He was hated at all times by the aristocracy of Athens, and on one occasion they succeeded in convicting him of something like extortion of money from certain of the islanders who were subject to the Athenian rule. In 425, the seventh year of the war, he achieved his greatest military and political triumph. The Athenians had succeeded in cutting off from their ships and supplies a strong detachment of Lacedæmonian infantry, and blockading them in the small island of Sphacteria, off Pylos (the modern Navarino). At first it seemed that they must speedily surrender; Cleon persuaded the Athenians to dictate, as the price of their release, hard conditions of peace, which the Lacedæmonians rejected. Time wore on, and the Lacedæmonians still held out, while the blockade was maintained with great difficulty and hardship. Then Cleon came forward, and publicly declared that if *he* were general, he would undertake to bring the men who were on the island prisoners to Athens, dead or alive, within twenty days. Nicias, who at that time held the command-in-chief, anxious probably to discredit a political opponent, offered to take him at his word, and make over to him the command at Pylos. Cleon's own party were loud in their encouragements; and willingly or unwillingly, after obtaining a strong reinforcement of troops, and getting Demosthenes, an able general then employed on the station, joined with him in the command, he set out for the scene of operations. The historian Thucydides calls his boast "insane," but admits that he fulfilled it. Within the days named he landed on the island of Sphacteria, compelled the Lacedæmonian force there, after great loss, to surrender at discretion, and brought 300 prisoners to Athens. It is very probable that much of the credit was due to the skilful dispositions of Demosthenes, his colleague in command of the forces; but nevertheless, the man who dared and succeeded where others had so long failed must have had a well-grounded confidence in his own energy and resources. He did not long enjoy his new glories. Two years afterwards he was sent to act against Brasidas, the Lacedæmonian commander in Thrace, and to attempt the reconquest of Amphipolis. At first he was successful; he took Torone, and made an advance upon Amphipolis; but a sudden sally of Brasidas from the town utterly routed the Athenian forces, and Cleon fell there with half his men. Brasidas was at the same time mortally wounded.

We have to judge of the character and conduct of Cleon almost entirely from the history of Thucydides and the satiric comedies of Aristophanes. But the historian, even if his judgment were not warped by the fact asserted by some writers, that Cleon had been instrumental in procuring his disgrace and banishment whilst holding a military command, had at any rate strong oligarchical prejudices, and regarded him as a restless and dangerous agitator. If we might trust the picture given of him by Aristophanes in his comedy of *The Knights*, he is the unscrupulous and shifty demagogue, always by lies and cajolery pandering to the worst passions of his master, the populace, filching from other men their glory, and resisting all the efforts of the peace party for his own selfish ends. But, besides the general mark which all public characters presented to the license of the satirist, he had in this case his own private grudge against Cleon, who had laid a complaint before the Athenian senate that in his comedy called *The Babylonians* he had held up to ridicule the policy and institutions of his country before the eyes of foreigners, and this in the midst of a great national war. With all his real faults, it is likely that Cleon has had less than justice done to him in such portraits of him as have come down to us. (W. L. C.)

CLEOPATRA (Κλεοπάτρα), the name of several Egyptian princesses of the house of the Ptolemies. The best known was the daughter of Ptolemy Auletes, born 69 B.C. Her father left her at the age of seventeen, heir to his kingdom jointly with her younger brother Ptolemy, whose wife, in accordance with Egyptian custom, she was to become. A few years afterwards her brother, or rather her guardians, deprived her of all royal authority. She withdrew into Syria, and there made preparation to recover her rights by force of arms. It was at this juncture that Julius Cæsar followed Pompey into Egypt, resolved to settle there, if possible, the existing dispute as to the throne. The personal fascinations of Cleopatra, which she was not slow in bringing to bear upon him, soon won him entirely to her side; and as Ptolemy and his advisers still refused to admit her to a share in the kingdom, Cæsar undertook a war on her behalf, in which Ptolemy lost his life, and she was replaced on the throne in conjunction with a younger brother, to whom she was also contracted in marriage. Her relations with Cæsar were matter of public notoriety, and soon after his return to Rome she joined him there, in company with her boy-husband (of whom, however, she soon rid herself by poison), but living openly with her Roman lover, somewhat to the scandal of his fellow-citizens. After Cæsar's assassination, aware of her unpopularity, she returned at once to her native country. But subsequently, during the civil troubles at Rome, she took the part of Antony, on whom she is said to have already made some impression in her earlier years, when he was campaigning

in Egypt. When he was in Cilicia, she made a purpose journey to visit him, sailing up the Cydnus in a gorgeously-decked galley, arrayed in all the attractive splendor which Eastern magnificence could bring in aid of her personal charms. Antony became from that time forth her infatuated slave, followed her to Egypt, and lived with her there for some time in the most profuse and wanton luxury. They called themselves "Osiris" and "Isis," and claimed to be regarded as divinities. His marriage with Octavia broke this connection for a while, but it was soon renewed, and Cleopatra assisted him in his future campaigns both with money and supplies. This infatuation of his rival with a personage already so unpopular at Rome as Cleopatra, was taken advantage of by Octavianus Cæsar (Augustus), who declared war against her personally. In the famous sea-fight at Actium, between the fleets of Octavianus and Antony, Cleopatra, who had accompanied him into action with an Egyptian squadron, took to flight while the issue was yet doubtful, and though hotly pursued by the enemy succeeded in escaping to Alexandria, where she was soon joined by her devoted lover. When the cause of Antony was irretrievably ruined, and all her attempts to strengthen herself against the Roman conqueror by means of foreign alliances had failed, she made overtures of submission. Octavianus suggested to her, as a way to his favor, the assassination of his enemy Antony. She seems to have entertained the base proposal,—enticing him to join her in a mausoleum which she had built, in order that "they might die together," and where he fulfilled his part of the compact by committing suicide, in the belief that she had already done so. The charms which had succeeded so easily with Julius and with Antony failed to move the younger Cæsar, though he at once granted her an interview; and rather than submit to be carried by him as a prisoner to Rome, she put an end to her life—by applying an asp to her bosom, according to the common version of the story—in the thirty-ninth year of her age. With her ended the dynasty of the Ptolemies in Egypt. Besides her remarkable charms of person, she had very considerable abilities, and unusual literary tastes. She is said to have been able to converse in seven languages. She had three children by Antony, and, as some say, a son, called Cæsarion, by Julius Cæsar. (W. L. C.)

CLEPSYDRA (from *κλέπτειν*, to steal, and *ὕδωρ*, water), the chronometer of the Greeks and Romans, which measured time by the flow of water. In its simplest form it was a short-necked globe of known capacity, pierced at the bottom with several small holes, through which the water placed in it escaped or stole away. The instrument was employed to set a limit to the speeches in courts of justice, hence the phrases *aquam dare*, to give the advocates speaking time, and *aquam perdere*, to waste time; it was also very generally used instead of the sun-dial. Its defects were—first, that the flow of water varied with the temperature and pressure of the air, and secondly, that the rate of flow became less as the vessel emptied itself. The latter was remedied by keeping the level of the water in the clepsydra uniform, the volume of that discharge being noted. In the clepsydra or hydraulic clock of Ctesibius of Alexandria, made about 135 B.C., the movement of water-wheels caused the gradual rise of a little figure, which pointed out the hours on an index attached to the machine. The rate of the flow of water through an orifice being proportional to the square of the vertical distance of its upper surface from the orifice, a clepsydra of simple construction can be formed by making in the bottom of a glass cylinder an opening through which its contents can escape in twelve hours, and graduating the vessel into 144 ($=12^2$) equal parts. A mark made at division 121 ($=11^2$) from the bottom indicates the quantity of water remaining at the end of the first hour, and in like manner the squares of 10, 9, 8, and the lower numbers give the divisions to which the level of the water descends at the end of the second, third, fourth, and succeeding hours.

CLERC, Le. See Leclerc.

CLERGY, a collective term signifying the body of "clerks," that is, in English, men in holy orders. *Clericus*, however, has, both itself and its equivalents in the languages of the Catholic countries of the Continent, a wider ecclesiastical signification; while in England a use of the word, originally abusive, but now so entirely accepted as to constitute a proper secondary meaning of the term, comprises in the class of persons signified by it all those employed in duties the discharge of which demands the acquirements of reading and writing, which were originally supposed to be the exclusive qualification of the clergy.

The word is derived from the Greek *κλῆρος*, which signifies a lot; but the authorities are by no means agreed in which sense the root is connected with the sense of the derivative, some conceiving that the original idea was that the clergy received the service of God as their lot or portion; others that they were the portion of the Lord; and others again, with, as Bingham (*Orig. Eccl.*, lib. i. cap. 5, sec. 9) seems to think, more reason, maintain that the word has reference to the choosing by lot, as was the case in early ages, of those to whom public offices were to be entrusted.

In the primitive times of the church the term canon was used as synonymous with clerk, from the names of all the persons in the service of any church having been inscribed on a roll or *κανών*, whence they were termed *canonici*, a fact which shows that the practice of the Roman Catholic Church in modern times of including all persons of all ranks in the service of the church, ordained or unordained, in the term clerks, or clergy, is at least in conformity with the practice of antiquity. The Roman hierarchy now reckons four grades of clerks:—1st, those who are merely tonsured as a sign of the ecclesiastical destination, but have received no orders of any kind; 2d, those who have received any of the four minor orders, as *hostiarii*, readers, exorcists, or acolytes; 3d, those who have received orders as subdeacons, deacons, or priests; 4th, those who have been consecrated to bishoprics, archbishoprics, or other of the higher dignities of the church. Monks, whether eremitic or cœnobite, have not at any time formed as such any part of the body of the clergy. But it would seem that in the earliest ages of the church they were not deemed even eligible to the priesthood, inasmuch as it is said that St. Siricius, who became Pope in the year 384, first permitted them to receive priest's orders. And we read in the epistles of St. Ambrose that monks began to be ordained priests towards the end of the 4th century,—St. Athanasius having been the first who ordained monks to the church of Alexandria, in which course he was imitated in the West by St. Eusebius, bishop of Vercelli.

At a very early period the church began to find the necessity of taking measures to stem the evil arising from the numbers of persons who embraced an ecclesiastical career from improper motives, and often without any intention of performing any of the duties of it. Of course the same evil has vexed the church in every age. From the first moment in which she became rich, worldly men were, and have always been, found eager to share her riches without sharing her work. But in the early times, even while she was poor, the state of society was such that many unworthy motives operated to induce men who neither had nor fancied themselves to have any call to the priesthood, to seek its immunities. Not only was an ecclesiastical career the only one which offered to the studious or the lazy man any hopes of a tranquil life, and to the unwarlike immunity from the necessity of fighting, but it offered very solid and valuable privileges in the shape of specialties of jurisdiction both in civil and criminal causes, and in exemption from taxes. There is a very early decree of a congregation of bishops, ordering that no more persons shall be ordained than are needed for the service of each church. And the germ of a politico-economical idea may be observed in the reason given for the prohibition, which one would hardly have expected to find at that period, and which both ecclesiastical and civil rulers altogether lost sight of at a later time. Clerks, it was decreed, should not be unnecessarily multiplied to the prejudice of the poorer laity. Casuists of a later age have pronounced it to be sinful to receive first orders, without the intention of proceeding to take full orders. Gregory the Great likens those who entered the ecclesiastical state merely for the sake of a benefice to the crowds who followed the Saviour only because he multiplied the miraculous loaves. The Council of Trent also at its twenty-fourth sitting, chap. 4, directs the refusal of ordination to those who may with probability be supposed to desire it for other than godly reasons.

Soldiers, slaves, comedians, tax-gatherers, those who had been married twice, and all persons exercising a mean and servile occupation could not be ordained. To which classes Bingham, particularizing more accurately, adds (*Orig. Eccl.*, lib. 4):—"No stranger from another diocese, unless by letters dismissory; no one who has performed

public penance; no homicide, adulterer, or who had in time of persecution denied the faith; no usurer; no one who had mutilated any of his members; no one who had been baptized only by a medical attendant, or by a heretic, or whose baptism was in any wise irregular; no one belonging to any guild of artificers; no legal official of the Roman court; no guardian of a ward, so long as that office lasted; none who had ever suffered from insanity or diabolic possession; to which certain other canonical impediments might be added."

Bingham (*Orig.*, lib. 2. cap. 6, sec. 4) says that in some churches the clergy lived in common. Moroni says (article "Clero," *Dict. Eccles.*) that in the 4th and following centuries it is certain that almost everywhere the clergy adopted the practice of living in common. The first assertion seems to be somewhat too narrow in its scope, the second too wide. It is certain that the practice was more common than seems to be indicated by the phrase, "in some churches;" but the instance which Moroni gives in support of his assertion seems to show that the practice was far from universal. We read in a chronicle of the church of Augsburg, that in the time of Constantine, when a church was dedicated to St. Afra, "clerks were established there living in common, according to the apostolic rule." Of the church of Rinocotura in Mauritania, Sozomen tells us that the clerks there had "their dwelling, their table, all things, in short, in common." The venerable Bede says that Gregory I. ordered that the same rule should be observed in England. Eusebius, bishop of Vercelli, is praised by St. Ambrose for restoring the practice in question in his church. Leo IX. ordered that cloisters should be established in connection with the churches in order that the clergy might live in common. Hence divers churches were anciently called monasteries, and in a history of the church of Besançon it is stated "that nothing is more common in ancient writings than to find any church called a monastery."

The immunities enjoyed by clerks of course differed largely at different times and in different countries, the extent of them having been gradually curtailed from a period a little earlier than the close of the Middle Ages. They consisted mainly in exemption from public burdens, both as regarded person and pocket, and in immunity from lay jurisdiction. This last enormous privilege, which became one of the main and most efficient instruments of the subjection of Europe to clerical tyranny, extended to matters both civil and criminal; though, as Bingham shows, it did not (always and everywhere) prevail in cases of heinous crime. The reader will find the whole subject lucidly set forth in the 5th book of Bingham's work.

This diversity of jurisdiction, and subjection of the clergy only to the sentences of judges bribed by their *esprit de corps* to judge leniently, led to the adoption of a scale of punishments for the offences of clerks avowedly much lighter than that which was inflicted for the same crimes on laymen. This part of the subject will be found fully elucidated in the 1st chapter of Bingham's 17th book; in the remaining chapter of which the penal portion of the canon law regarded clerks is succinctly treated. (T. A. T.)

CLERGY, Benefit of, an obsolete but once very important feature in the English criminal law. It was a relic of the claim of exemption from the authority of the common law tribunals on the part of the clergy, and marked the extent to which the demand was acceded to in England. The conclusion of the protracted conflict was that the common law courts abandoned the extreme punishment of death assigned to some offences, when the person convicted was a *clericus*, in holy orders, and the church was obliged to accept the compromise and let a secondary punishment be inflicted. For the more atrocious crimes the partial exemption was not obtained, and hence offences came to be divided into clergyable and unclergyable. According to the common practice in England of working out modern improvements through antiquated forms, this exemption was made the means of modifying the severity of the criminal law. It became the practice for every convict to claim and be allowed the benefit of clergy; and when it was the intention by statute to make a crime really punishable with death, it was awarded "without benefit of clergy." A full account of the origin and progress of the system will be found in the 28th chapter of the fourth book of Blackstone's *Commentaries*. The benefit of clergy in cases of felony was abolished in the modifications of the criminal law by Sir Robert Peel in 1827 (8 Geo. IV. c. 28).

CLERMONT, or Clermont Ferrand, a city of France, formerly the chief town of Basse Auvergne, and now of the department of Puy-de-Dôme, is situated on a hill composed chiefly of volcanic tufa, in the fertile district of Limagne, and surrounded on the S. and W. by a line of mountains, of which the Puy-de-Dôme is the culminating point. It lies in 45° 46′ N. lat. and 3° 5′ E. long., and is 220 miles S. by E. from Paris. Since 1633 it is composed of the two towns of Clermont and Mount Ferrand, connected by a fine avenue of walnut trees and willows, two miles in length. The streets are generally ill laid out, narrow, and crooked; and the houses are built of dull, grey lava, which had a gloomy effect until the fashion was introduced of covering them with white-wash. It has several handsome squares ornamented with fountains, and is well supplied with water brought by subterranean conduits from Royat, a league distant. The principal public building is the cathedral, a Gothic edifice of the 13th century, and though still unfinished its interior is considered one of the finest existing specimens of Gothic architecture. The church of Nôtre-Dame-du-Port is curiously decorated externally with mosaic work and bas-reliefs, and is very ancient—parts of it dating from 870. Clermont has also a university-academy, a royal college, a botanic garden, a public library of 30,000 vols. (among which are several ancient MSS. of great value), museums of natural history and antiquities, two hospitals, and a theatre. The manufactures are woollen and linen goods, silk stockings, paper, cutlery, and jewelry. Being the entrepôt for the produce of the surrounding departments, the town carries on a considerable trade in hemp, flax, corn, wine, cheese, wool, hides, and cattle. In the suburb of St. Allyre, to the north-west of the city, is a remarkable calcareous spring, the copious deposits of which have formed a curious natural bridge over a small stream. The population of Clermont in the end of the 18th century was about 16,000; in 1851, 30,566; and in 1872, 32,963.

Clermont (*i.e.*, Clarus Mons, or Clarimontium) is identified with the ancient Augustonemetum, the chief town of the Arverni, and it still preserves some remains of the Roman period. The present name occurs as early as the 8th century, but was at first applied to the castle alone. During the disintegration of the Roman empire Clermont suffered as much perhaps from capture and pillage as any city in the country; but it preserved its municipal liberties down to the Middle Ages, and, even after it was incorporated in the domain of its bishops, maintained the rights of its communal charter. It was the seat of no fewer than seven ecclesiastical councils, held respectively in the years 535, 549, 587, 1095, 1110, 1124, and 1130; and of these the council of 1095 is for ever memorable as that in which Pope Urban II. first formally organized the great crusade. In the national wars of the 15th and the civil wars of the 16th century the town had its full participation; and in 1665 it acquired a terrible notoriety by the trial and execution of a number of robber chieftains who had infested the neighboring district. The proceedings lasted six months, and the episode is still known as *les Grands Jours de Clermont*. Before the great Revolution the town possessed several monastic establishments, of which the most important was the abbey of Saint Allyre, founded, it is said, by St. Austramonius, the apostle of Auvergne, and the abbey of St. André, where the counts of Clermont were interred. Among the great men whom the town has produced are Gregory of Tours, Pascal, and Montlosier.

CLERMONT EN BEAUVOISIS, frequently but by mistake called Clermont sur Oise, a town of France, at the head of an arrondissement in the department of Oise, is situated about 36 miles by rail to the north of Paris, near a small tributary of the Oise, called the Brêche. The town-hall and the church of St. Samson date from the 13th century, and the hill on which the town is built is surmounted by an old castle partly of the 10th or 11th, now transformed into a penitentiary capable of accommodating upwards of 1000 female prisoners. The principal industries are the manufacture of cotton goods and stained paper. Clermont was an important post in the Middle Ages. It was frequently taken and retaken in the wars of the English, and in 1437 it was surrendered to them as a ransom for the great national leader La Hire. In 1569 it was sold to the duke of Brunswick by Charles IX., and about thirty years later it was resold by the duchess of Brunswick to the duke of Lorraine. In 1595 it was captured by Henry IV., and in 1615 it was held by Condé. Cassini the as-

tronomer was a native of the town. Population in 1872, 5774.

CLERMONT-L'HÉRAULT, or Clermont de Lodève, a town of France, in the department of Hérault, and about ten miles by rail south of Lodève, is built on the slope of a hill which is crowned by an ancient castle and skirted by the Ydromiel, a tributary of the Ergue or Lergue. It owes its importance to its woollen manufacture, which was introduced in 1678; and it also produces vinegar and vitriol, has quarries of building-stone, plaster, and lime, and deals in brandy, oil, cattle, and wool. Population in 1872, 5487.

CLEVELAND, a city and lake-port, and the capital of Cuyahoga county, in the State of Ohio, situated at the mouth of Cuyahoga River, on the S. shore of Lake Erie, in 41° 30′ N. lat. and 81° 47′ W. long. Next to Cincinnati, it is the largest and most important city in the State. It was founded in 1796, and named in honor of General Moses Cleveland of Connecticut, who then had charge of the surveying of this region. It was an important point in the war of 1812, and was incorporated as a village in 1814, and as a city in 1836. Its population was 1075 in 1830, 6071 in 1840, 17,034 in 1850, 43,417 in 1860, and 92,829 in 1870. The number of inhabitants in 1876 is estimated at 140,000. Of the total population in 1870, 38,815 were foreigners — including 15,856 born in Germany, 9964 in Ireland, 4008 in England, 2634 in British America, and 2155 in Austria. The city is built on both sides of the river, which is here crossed by several bridges, and chiefly on a plain from 50 to 100 feet above the lake, of which a magnificent view is thus obtained. The streets are regularly laid out, and are generally from 80 to 100 feet wide. Many of them are lined with trees, chiefly maple, whence Cleveland is known as the "Forest City." Monumental Park, near the centre of the city, contains 10 acres divided into four squares by the extension of Ontario and Superior Strects. Besides a fountain and other attractive objects, the park contains a statue of Commodore Perry, erected in 1860, in commemoration of his victory on Lake Erie in 1813. It is of Italian marble, is 8 feet high, and stands upon a granite pedestal 12 feet high. The most noteworthy buildings are that of the United States (containing the post-office, the custom-house, and the federal courts), the city hall, the county court-house, the house of correction and workhouse, the city infirmary, the Cleveland medical college, Case Hall, and the two high-school buildings. The Union Railway dépôt, an immense structure of stone near the lake shore, is one of the largest of the kind in the United States. Cleveland has important commercial advantages. Five railways pass through or terminate in the city,—including the Lake Shore and Michigan Southern, a grand trunk line between the east and the west; a division of the Atlantic and Great Western, a leading channel of communication between the east and the south-west; and the Cleveland, Columbus, Cincinnati, and Indianapolis, a direct line to Cincinnati and the south. Other lines afford communication with the extensive coal and petroleum regions of Pennsylvania. Cleveland is the northern terminus of the Ohio Canal, which extends southwards to Portsmouth on the Ohio River. For the accommodation of the lake commerce a capacious harbor has been formed at the mouth of Cuyahoga River by extending two piers, 200 feet apart, 1200 feet into the lake. The city has an extensive trade in copper and iron ore shipped from the Lake Superior mining region, and in coal, petroleum, wool, and lumber, received by railroad, canal, and lake transportation. In 1873 the number of vessels entered in the coast-wise trade was 3238, having an aggregate tonnage of 1,053,232 tons; 3204 vessels of 1,048,196 tons cleared. The foreign commerce, which is exclusively with Canada, is considerable,—the imports amounting in 1874 to $449,118, and the domestic exports to $1,426,990; 316 vessels of 64,213 tons entered in this trade, and 325 of 55,152 tons cleared. The total number of vessels registered, enrolled, and licensed in this district was 466, of 86,519 tons. Twenty vessels of 11,242 tons were built during the year. About $20,000,000 of capital is invested in manufactures, the most important industries being those of iron and the production of refined petroleum. There are also several pork-packing establishments and breweries. The city contains six national banks with a capital of $4,550,000, and two savings banks. The government of the city is vested in a mayor and a common council of two members from each of the eighteen wards. These officers are elected by the people. The city has an efficient police, a paid fire department, a board of public improvement, and a board of health. Besides the usual county and municipal courts, the United States circuit and district courts for the northern district of Ohio are held here. The city is supplied with water obtained from the lake by means of a tunnel 1¼ mile long, and forced into a large reservoir on high ground in the western part of the city. The streets are well paved, are lighted with gas, and are supplied with sewers. The reformatory and charitable institutions are numerous and varied. The house of correction and workhouse is for the confinement of persons convicted of minor offences. The city infirmary, connected with which are a farm and a house of refuge for the care and instruction of children, besides maintaining its inmates, affords relief to outdoor poor. The city hospital is supported by money received from those patients who are able to pay and from private charity. The charity hospital is maintained partly by contributions and partly by revenue from paying patients; connected with it is a lying-in hospital. There are also a homœopathic hospital founded by the Cleveland homœopathic college, a foundling hospital, and a United States marine hospital, which is supported by appropriations made by Congress and by a tax on sailors. The Cleveland Protestant orphan asylum has an endowment fund of about $50,000, from the interest of which, and by private contributions, it is maintained. St. Vincent's orphan asylum for males and St. Mary's orphan asylum for females are Roman Catholic institutions, accommodating about 150 inmates each. An orphan asylum is also maintained by the Jews. Among other benevolent institutions are the home for the aged poor, the home for working women under the management of the women's charitable association, and the Bethel home for destitute sailors. The children's aid society, since its organization in 1857, has secured homes for nearly 1500 children, besides extending aid to more than 5000. There are three industrial schools, maintained partly by the city, and partly by benevolent citizens, for the benefit of destitute children. The total debt of the city in 1875 was $7,397,500; and the property taxed for city purposes was valued at $73,210,144. The public schools in 1874 comprised 18 primary, 17 grammar, and 3 high schools, in which were enrolled, including those in the evening schools, 19,021 pupils, with an average daily attendance of 12,085. The total number of teachers was 261. The expenditure for the public schools during the year amounted to $382,921. Besides the above, there were enrolled in private and parochial schools 8808 pupils. Cleveland has no college or university, but there are several excellent seminaries, academies, and private schools for the advanced education of both sexes. Professional instruction is afforded by the Cleveland medical college, the homœopathic hospital college, and the medical department of the university of Wooster (each having about fifteen professors), the Ohio State and union law school, and St. Mary's theological seminary (Roman Catholic). The Cleveland library association has about 11,000 volumes, the public library, supported by taxation, about 20,000, and the law library about 2000. The Bethel free reading-rooms are open to the public, and the western reserve historical society has a valuable collection of books. There are published in the city 51 newspapers and periodicals; of these 6 appear daily, 4 thrice a week, 18 weekly, 2 fortnightly, 11 monthly, and 1 every two months. Of these 7 are published in the German language, and 1 in the Bohemian. Cleveland has about 100 churches, the following being the largest denominations: — the Methodist-Episcopal 18, Roman Catholic 15, Protestant Episcopal 11, Baptist 9, Presbyterian 8, and Congregational 4 churches.

CLEVELAND, John (1613–1658), a poet and satirist, was born at Loughborough. He was educated at Hinckley school, whence he repaired to Cambridge, becoming in 1634 a fellow of St. John's, and being appointed college-tutor and reader in rhetoric. The Latinity and oratorical ability displayed by him in the exercise of the latter function were warmly praised by Fuller, who also commends the "lofty fancy" of his verse. He was the most distinguished and the earliest of loyal satirists. Joining the Cavaliers at Oxford, he was warmly received by the king; and having lost his fellowship and his college places, he was named judge-advocate in the garrison at Newark. The captain in

command at that fortress, however, deprived him (1646) of this office, and he was fain to wander through the country depending on the alms of Royalists for bread. Arrested at Norwich, as one "whose great abilities rendered him able to do the greater disservice," he was held in durance of some months at Yarmouth, but was released at last by Cromwell (who seems to have behaved admirably towards the strolling libeller), and went to London, where he resided till his death, in the enjoyment of much consideration from his party. Cleveland, who was more highly esteemed than Milton by his contemporaries, was exceedingly popular. His serious poetry is perhaps the most extravagantly conceited in the language; his satires are more deserving, the best being the *Petition to the Lord-Protector for the Scots Rebel.* See Nichols, *History of Leicestershire,* and Cleveland's *Works,* London, 1687.

CLEVES (in German KLEVE), a town of Prussia, formerly the capital of the duchy of its own name, and now the chief town of a circle in the government of Düsseldorf, 46 miles N.W. of Düsseldorf and 12 E. of Nimeguen. It is a neatly built town in the Dutch style, situated on the declivities of three hills known as Kirchberg, Schlossberg, and Heideberg, in a fertile district near the frontiers of Holland, and about two miles from the Rhine, with which it has been connected since 1848 by a canal. The old castle of Schwanenburg (formerly the residence of the dukes of Cleves, and the birthplace of Anne of Cleves, one of the wives of Henry VIII.) has a massive tower 180 feet high, which was built in 1439 on the traditional site of Cæsar's Tower and commands an extensive view. Cleves has two Roman Catholic and three Protestant churches, a synagogue, a gymnasium, a house of correction, and a zoological garden. The collegiate church dates from 1345, and contains a number of fine ducal monuments, among which the first place is held by that of Adolf VI. of the 14th century. The chief manufactures are linens, cottons, silks, woollens, and tobacco. To the south and west of the city a large district is laid out as a park; in the southern part, known as the Old Park, there is a statue to the memory of the founder, John Maurice of Nassau-Siegen, who governed the town from 1650 to 1679, and in the western part there are mineral wells with a pump-room and bathing establishment, which date from about 1848. The town was the seat of the counts of Cleves as early as the 11th century, but it did not receive its incorporation till 1242. It was raised, with the surrounding district on both sides of the Rhine, to the rank of a duchy by the Emperor Sigismund in 1417. On the death of Duke William in 1609, without issue, his inheritance, which also included Jülich and Berg, became the object of a violent contest between no fewer than six competitors; and it was not till 1614 that the dispute was settled by the treaty of Xanten, which assigned the duchy of Cleves to Sigismund, elector of Brandenburg, who had married a niece of the late duke. In 1805 it was ceded by Prussia to France; and in 1806 it was made a grand-duchy by Napoleon and bestowed on Murat. In 1815 it was restored to Prussia. The population of the town in 1871 was 9038.

END OF VOLUME FIFTH.

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conducting that case, the trial having ended a few months before. On January 10, 1874, while his father was still living, he was created Baron Coleridge of Ottery St. Mary, Devonshire. The next year he was elected a Fellow of the Royal Society, and in 1877 Oxford gave him the degree of D.C.L. For seven years he was the head of the Common Pleas Court, after which that office was abolished by law. He was then, in 1880, upon the death of Cockburn, appointed chief justice of the Court of Queen's Bench, commonly known as Lord Chief Justice of England. In that place he presided over a number of celebrated cases, including the Franconia case, involving the territorial jurisdiction of a government at sea within three miles of the coast, the suit of Bradlaugh vs. Newdegate, and that of the Queen vs. Dudley and Stephens, the only case in which a sentence of death had been passed in a royal court of justice. He was a jurist of profound learning, a scholar of wide and varied culture, and a man of irresistible personal charm and sympathy. He died on June 14, 1894. W.F.J.

COLES, ABRAHAM, author, was born at Scotch Plains, New Jersey, on December 26, 1813, and was graduated in 1835 from the Jefferson Medical College at Philadelphia. He wrote several volumes in poetry and prose, including thirteen original translations of the famous Latin hymn, *Dies Iræ*. He lived at Scotch Plains most of his life, but died at Monterey, California, on May 3, 1891. W.F.J.

COLES, EDWARD, statesman, was born in Virginia on December 15, 1786, was private secretary to President Madison, in 1814 urged the abolition of slavery, went on a special mission to Russia in 1816, and was one of the organizers of the state of Illinois. When he settled in Illinois he took his slaves thither, set them free, and gave each one 160 acres of land. In 1822 he was elected by the anti-slavery party as the second governor of Illinois. Afterward he founded the first agricultural society in Illinois. He died on July 7, 1868. W.F.J.

COLEUS, an ornamental plant. See HORTICULTURE, Vol. XII, p. 275.

COLEWORT, a name given to some of the many cultivated varieties of the common cabbage (*Brassica oleracea*). The name is also applied to cabbages cut for use before their leaves have fully closed into heads.

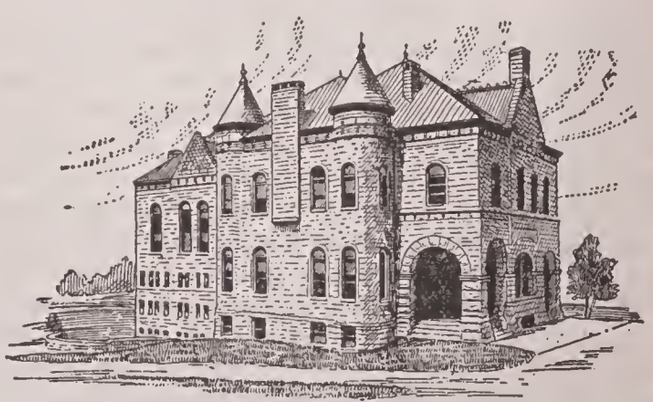
SCHUYLER COLFAX.

COLFAX, SCHUYLER, statesman, was born in New York on March 23, 1823, the grandson of General William Colfax, commander of Washington's Life Guards. In his boyhood he was taken to Indiana, where in 1845 he established the *St. Joseph Valley Register* at South Bend, and was its editor until 1863. He was secretary of the river and harbor convention at Chicago in 1847, secretary of the Whig national convention in 1848, a member of the Indiana constitutional convention in 1850, secretary of the Whig national convention in 1852, one of the organizers of the Republican party in 1854, and a representative in Congress from 1855 to 1869. He was an enemy of slavery, and made a notable speech on *The Conflict between Slavery and Freedom in Kansas*, in 1856. In December, 1863, he was elected Speaker of the House of Representatives, and in 1865 crossed the continent on a stage coach, in order to report to Congress and the nation upon the feasibility of building a railroad to the Pacific. He was elected Vice-President of the United States in 1868, and was the only man ever elected to be Speaker of the House and also Vice-President. In 1871 he declined the office of Secretary of State. In 1872 he was implicated in charges of improper connection with the Credit Mobilier, the company which had built the Pacific railroad, but earnestly denied them and was never brought to trial. At the end of his term as Vice-President he retired from political life, but was afterward prominent as a popular lecturer and also as a writer for the periodical press. He was a graceful speaker and possessed much personal charm. He died on January 13, 1885. W.F.J.

COLFAX, a flourishing town of Whitman County, southeastern Washington, on the Union Pacific railroad, 85 miles S. of Spokane. It is the trade center of an extensive and fertile agricultural district. Population 1890, 1,649; 1900, 2,121.

COLGATE, JAMES BOORMAN, banker and philanthropist; was born in New York city on March 4, 1818, and became a banker. He did much during the Civil War to maintain the financial credit of the nation. In 1864 he became a trustee of Madison University, at Hamilton, N. Y., which institution he richly endowed, and the name of which was changed in 1890 to Colgate University. W.F.J.

COLGATE UNIVERSITY, originally Madison University, but changed in 1889 to Colgate, in honor of



COLGATE UNIVERSITY.

James B. Colgate and family, by whose benefactions the institution has been benefited greatly. This university is the outgrowth of Hamilton Seminary, founded in 1820 at Hamilton, New York, which became Madison University in 1846. The endowment is nearly $2,000,000, in great part the gifts of J. B. Colgate. Since its first class, 2,150 have been graduated.

There were, in 1900, 32 in the faculty, 360 students, and 30,000 volumes in the library. The president in 1900 was G. E. Merrill, D.D., LL.D.

COLISEUM OR COLOSSEUM. See AMPHITHEATRE, Vol. I, p. 680.

COLL, one of the western islands of Scotland, off the west coast of Mull, 2½ miles N.E. of Tiree Island. It is 12 miles in length. Population, 640; engaged in agriculture and fishing.

COLLAMER, JACOB, statesman; was born in Troy, New York, on January 8, 1791, and was graduated from the University of Vermont in 1810. He served in the War of 1812, became a member of the Vermont legislature, and in 1833–42 a justice of the supreme court of that state. He was elected to Congress in 1842, 1844, and 1846. In 1849 he was appointed Postmaster-General by President Taylor, and held the office until Taylor's death. Afterward he was a supreme court justice in Vermont again, and from 1854 to his death a United States Senator from Vermont. He died on July 9, 1865. W.F.J.

COLLAO is the name which was given by the Spanish Conquistadors to the region surrounding Lake Titicaca, in Peru, from the native name of a tribe living near the lake. The region is in the Department of Puna. W.F.J.

COLLE, a town of Tuscany, western central Italy, on the Elsa, 24 miles S.W. of Florence. It has an old cathedral and castle. Population, 5,791.

COLLECT, a name given to certain brief and comprehensive prayers found in all liturgies of the Roman Catholic and Protestant Episcopal churches. The origin of the term is not certain. According to some, it is from these prayers being said in the congregation, or collection, of the people; to others, because they are a brief and comprehensive summary of many longer petitions collected into one. Such prayers are of ancient origin, mention being made of them by writers of the third century.

COLLEGE FRATERNITIES, societies of students in almost all the colleges and universities of the United States. These organizations are sometimes known as "Greek-letter societies," an appellation derived from the fact that the majority of the societies have taken for their names two or more Greek letters which, to the members of the order, have some special significance; as, for instance, *Beta Theta Pi*. The college fraternities are, with one exception, secret societies. The general purpose is association for social privileges and the benefits naturally to be derived from united effort. The term *fraternity*, although masculine, is also applied to the organizations of young women, properly designated as sororities. The fraternities are divided into the fraternity proper, the honorary fraternity and the professional. The professional fraternity, as the term implies, is confined to the students taking the various scientific and literary professional courses. The honorary fraternity selects its members from the members of the senior classes, as a reward of scholarship. The following descriptions have to do with the collegiate fraternities, which may be termed the fraternities proper. These fraternities are divided into national and local. The national fraternity is made up of allied branches, or "chapters," in a number of colleges. The branches are under one general government, and are known by the general collective name of the national organization, and are distinguished from one another by individual Greek letters. Generally, the first chapter chartered is given the name *Alpha*, and the others, in the order of their founding, the consecutive letters of the Greek alphabet. The chapter is then designated, for instance, the *Alpha* of *Beta Theta Pi*. The union of individual chapters thus gives the national organization great strength, and each chapter is made more stable. There is never more than one chapter of any fraternity in any one college, although the number of fraternities represented in some institutions amounts to 25 or 30. The local fraternities have but one chapter, which has no connection with any similar organization. The number of chapters in a national fraternity varies from 20 to 70 or 80. The number of members in a chapter varies from 8 to 25 or 30. The various fraternities have badges by which their members are known. A student does not sever his connection with his fraternity upon graduation at college, but becomes an alumni member, to distinguish him from the active men still in college. Recently, many of the larger fraternities have established alumni chapters in many of the larger cities, where members of the alumni are naturally to be found. These chapters hold regular meetings and keep up the general organization of the active chapter. Members of fraternities are selected from the student-body,—in some cases on account of scholarship entirely, in others on account of prominence in social life or athletics. A man is asked to join, and can never seek admission. This asking is known as "spiking." Often spirited contests for desirable men take place between rival organizations. The inducements offered and attentions shown such men are included in the term *rushing*. Should a member see fit to leave one fraternity and join another, the action of the second fraternity is called "lifting," and the man is "lifted." At times some fraternities have taken into membership persons not in college, but eminent in public life. This action is, however, discountenanced by the better organizations. A number of chapters in various colleges live in rented or owned houses known as "chapter-houses." The national fraternities, with few exceptions, publish some kind of a periodical, and also possess song-books, etc. The authorities of some educational institutions—Princeton College, for instance—exclude fraternities from the college. In other institutions the term of membership is governed by faculty regulations.

The first Greek-letter society formed was the *Phi Beta Kappa*, at William and Mary College, Virginia, in 1776. This was at first a secret society, but is now classed among the honorary fraternities. Since its foundation there have been organized 28 national fraternities, with 800 chapters. Among them are *Alpha Delta Phi*, founded in 1832, at Hamilton College, New York; *Kappa Alpha*, at Union College, New York, in 1825; *Beta Theta Pi*, at Miami College, Ohio, in 1839; *Delta Kappa Epsilon*, at Yale College, in 1844; and *Psi Upsilon*, at Union College,

New York, in 1833. There are 11 women's societies. *Pi Beta Phi*, the oldest, was founded at Monmouth, Illinois, in 1867. The professional societies number 16, with 50 chapters.

COLLEGE OF NEW JERSEY. See PRINCETON UNIVERSITY, in these Supplements.

COLLEGE POINT, a village of Queens County, southern New York, situated on the northern shore of Long Island, about ten miles E. of New York City. It contains a variety of manufactories and many fine residences of the business men of the metropolis.

COLLEGES, HISTORY OF AMERICAN. See EDUCATION IN THE UNITED STATES, in these Supplements; see also college names, under separate titles.

COLLEGEVILLE, a village of Montgomery County, Pennsylvania, in the southeastern part of the state, 20 miles from Philadelphia. It is the seat of Ursinus College and the Pennsylvania Female College. Its population, excluding the college, was 611 in 1900. W.F.J.

COLLEGIANTS OR COLLEGIANS, a religious sect which arose in Holland in 1619, founded by three brothers, John James, Adrian, and Gisbert Koddous. It had no definite creed, but invited all to join it who desired advancement in Scriptural knowledge and spiritual growth. In the main it united the characteristics of the Baptists and Quakers, and has by some been called the "Holland Quakers." It took its name from the circumstance that its conventions, twice a year, were held at or near the College of Leyden. Upon the proscription of Socinianism in various countries many of its adherents became Collegiants. The sect flourished for more than a hundred years, and then gradually declined and vanished. W.F.J.

COLLEGIATE CHURCHES, in England, one which, while not being a cathedral, nevertheless possesses a college or chapter, consisting of a dean or provost and canons, attached to them. They date from the ninth century, when such foundations in large towns became frequent. They are under the jurisdiction of the bishop of the diocese in which they are situated, and he exercises visitorial powers over them. Examples of such are Westminster Abbey and St. George's Chapel, Windsor. In the United States the term is applied to a collection of churches having their pastors in common, as the Dutch Collegiate Church of New York.

COLLEMBOLA. See INSECTS, Vol. XIII, p. 160.

COLLETT, JAKOBINE CAMILLA, authoress, sister of the Norwegian poet Wergeland (q.v., NORWAY, Vol. XVII, p. 605); born at Christiansand, Jan. 23, 1813; died at Christiania, Mar. 7, 1895. She was a novelist of wide reputation. Her works include *The Magistrate's Daughters; Tales; Against the Stream;* and *Last Leaves: Recollections and Confessions.*

COLLIER, JOHN PAYNE, an English Shakespearean critic and commentator; born in London, Jan. 11, 1789; died in Maidenhead, Sept. 17, 1883. While still a boy he became Parliamentary reporter for the London *Times* and subsequently for the *Morning Chronicle;* but his real literary career commenced in 1820 with the publication of *The Poetical Decameron.* The more important of his publications were a *History of English Dramatic Poetry to the Time of Shakespeare; Notes and Emendations to the Plays of Shakespeare; Bibliographical and Critical Account of the Rarest Books in the English Language* (1865); and *An Old Man's Diary Forty Years Ago* (1872). In one of his publications he announced the discovery of an extensive series of marginal annotations, in a seventeenth-century hand, on a copy of the second Shakespeare folio (1631–32), the famous Perkins folio. These annotations he soon placed in the text of his next edition of Shakespeare, and attempted to pass them as genuine Shakespeare emendations. This announcement caused a great commotion in the literary world, but it was subsequently shown that they were forgeries, and the discovery, after his death, of some manipulated books, in his own library, greatly injured his reputation.

COLLIMATOR, a subsidiary telescope used to detect or correct errors in collimation; that is, in directing the sight to a fixed object when adjusting for transit-observations. When the vertical thread in the field of view exactly coincides with the vertical axis of a telescope, the instrument is collimated vertically, and when the horizontal spider's thread just covers the horizontal axis, the instrument is correct in horizontal collimation. See also OPTICS, Vol. XVII, p. 824.

COLLIN D'HARLEVILLE, JEAN FRANÇOIS, a French poet and writer of comedies; born in 1755, at Maintenon, France; died in Paris, Feb. 24, 1806. His comedies were of such merit that they not only were successful during the life of the writer, but are popular to-day. His first drama was *The Inconstant Lover*, produced in 1786. His later works include *The Optimist; Old Bachelor;* and *Chateaus in Spain. Old Bachelor* is his best work.

COLLINGWOOD, a town of Simcoe, northern central Ontario, Canada, situated on the south shore of Georgian Bay, on the Grand Trunk railroad, 94 miles N.W. of Toronto. It has a large variety of manufactures, and is an important center of trade and transportation. Population 1901, 5,755.

COLLINGWOOD, CUTHBERT, British naturalist; born Dec. 25, 1826, at Greenwich, England; studied at Christ Church, Oxford, Edinburgh University, and in Paris and Vienna; from 1858 to 1866, professor of botany in the Liverpool Medical College and professor of biology in the School of Science. He traveled in China, Borneo and Singapore in 1866–67, on a voyage for studying marine zoölogy, sanctioned by the British Admiralty. He embodied the results of his investigations in *Rambles of a Naturalist on the Shores and Waters of the China Sea.* He is also the author of various scientific papers; among them, *Traveling Birds* and *A Vision of Creation.*

COLLINS, WILLIAM WILKIE, an English novelist; born in London, Jan. 8, 1824; died there, Sept. 23, 1889. He was educated partly at Highbury, but from 1836 to 1839 was with his parents in Italy. After his return to London he spent four years in business, but finding it uncongenial, he entered Lincoln's Inn as a student at law. Here his literary bent manifested itself in 1848, the *Life* of his father (WILLIAM COLLINS, 1787–1847, Vol. VI, p. 134) being his

earliest production. He now entered upon an active career, devoting himself principally to works of fiction, several of them being first published as serial stories, in *Household Words; All the Year Round;* the *Cornhill;* and other periodicals to which he contributed. He formed the acquaintance of Charles Dickens in 1850, and owed much to the help and encouragement of that writer. His best-known works are *Antonina; or, The Fall of Rome* (1850); *Basil* (1852); *Hide and Seek* (1854); *The Dead Secret* (1857); *The Woman in White* (1860); *No Name* (1862); *Armadale* (1866); *The Moonstone* (1868); *The New Magdalen* (1873); *The Law and the Lady* (1875); *Alice Warlock* (1875); *The Evil Genius;* and *The Guilty River* (1886). Doubtless the best of these productions was *The Woman in White*, and the reputation this masterpiece of fiction made for him in England spread rapidly to America and the Continent, until his readers could be found in every civilized country on the globe. The powerful interest of his novels always lay in the mystery that was continued to the end of them, and in the art by which the reader's attention was held fixed and curious through the succeeding chapters. He visited the United States in 1873–74, and the distinguished consideration with which he was received everywhere afforded him great pleasure.

WILKIE COLLINS.

COLLINSIA, a genus of handsome plants found chiefly on the Pacific Coast of the United States. They belong to the family *Scrophulariaceæ*. Several species are cultivated for the beauty of their flowers. *C. verna*, of the eastern United States, is a handsome little vernal plant with its upper petals white and the lower blue. It was named in honor of Zaccheus Collins of Philadelphia.

COLLINSON, Peter, British manufacturer and botanist; born at Hugal Hall, near Windermere, Jan. 14, 1694; died Aug. 11, 1768. Although he became an extensive manufacturer of hosiery, in connection with which he did a large business with the American colonies, he was distinguished chiefly as a botanist. To him Benjamin Franklin first wrote regarding his theories on electricity, and by him they were read to the British Society, the members of which scoffed at Franklin's, to them, absurd conclusions. He established a system of exchange with the colonies which was of great advantage to the respective countries. A genus of *Lamiaceæ*, *Collinsonia*, was named after him by Linnæus. R.C.A.

COLLINSONIA, a North American genus of *Labiatæ*, of few species, the most common being *C. Canadensis*, a tall, large-leaved, strong-scented plant, of rich, moist woods, with panicled racemes of pale yellow flowers. Some common names are horse-balm, rich-weed and stone-root.

COLLINSVILLE, a manufacturing town of Hartford County, central northern Connecticut, on the Farmington River, and on the New York, New Haven and Hartford railroad, 13 miles W. of Hartford. Paper, plows, axes and cutlery are here manufactured. Population, 2,500.

COLLINSVILLE, a city of Madison County, southwestern Illinois, on the Terre Haute and Indianapolis railroad, pleasantly situated in the midst of a fertile agricultural district, 12 miles E. of St. Louis. Population, 1890, 3,498; 1900, 4,021.

COLLISION, the act of striking or dashing together. In maritime law, although the term *collision* is applied to all cases of vessels running foul, technically it only applies to the act of two vessels striking together; when one vessel strikes against another, it is called "allision." In either case, the injured parties have, under the general maritime laws of all civilized nations, a claim against the offending vessel for any damage resulting. See Navigation, Vol. XVII, p. 285; Seamanship, Vol. XXI, p. 631; and Rule of the Road at Sea, in these Supplements.

COLLITZ, Hermann, a German philologist; born in Bleckede, February 4, 1855. He was educated at the University of Berlin, and studied at Göttingen. In 1883 he was appointed assistant librarian at Halle. In 1884 he removed to the United States and became professor of comparative philology at Bryn Mawr College. He has written *Modern Philology* and the *Relationship of the Greek Dialects*. He is a well known contributor on philology to the magazines and reviews. W.M.C.

COLLOID, in chemistry a term used to describe a peculiar state of aggregation in which substances are characterized by little or no tendency to diffuse through animal membrane and do not readily crystallize. See also Diffusion, Vol. VII, p. 188. W.R.B.

COLLUSION, a deceitful agreement between two or more persons to defraud or prejudice a third person, or for some improper purpose. The most common cases of collusion occur in arrangements between bankrupts and their creditors, such as payment, by anticipation, to a favored creditor on the approach of bankruptcy, arrangements for granting preferences by circuitous transactions or otherwise. In judicial proceedings, collusion is an agreement between two persons that one should institute a suit against the other in order to obtain a judicial decision for some improper purpose. Judgments so obtained are void.

COLLYER, Robert, clergyman, was born in Yorkshire, England, on December 8, 1823, and became a blacksmith. In 1850 he came to America and worked at his trade. A few years later he became a "local preacher" of the Methodist Episcopal Church, but in 1859 became a Unitarian. He founded Unity Church (Unitarian) in Chicago in 1860 and was its pastor until 1879, when he removed to New York and became pastor of the Church of the Messiah, of which he is now pastor emeritus. He has written many books, and was for years a popular lecturer. W.F.J.

COLMAR, a town of Germany in Alsace Lorraine. Pop. 1905, 41,791. See Colmar, VI, 135.

COLOBUS. See Ape, Vol. II. p. 133.

COLOCZA OR KALOCSA, a town of southwestern Hungary, situated on the Danube, 68 miles S. of Budapest. It has a cathedral, a college and a gymnasium. Population, 11,380.

COLOGNE, a city of Prussia on the Rhine. It has made steady progress both in improvements and population since its description was written for Vol. VI, p. 136 of this work. The city purchased the site formerly occupied by the circular wall and constructed a fine boulevard upon it, in 1885. The fortifications were rebuilt beyond this boulevard, extending the city limits to twice their former area and incorporating suburban towns on both sides of the river. The imposing and historic cathedral was completed in 1880. It contains a bell of 543 cwt. Some of the modern structures of note are the post office, the Imperial Bank, municipal library and archives, all in Gothic architecture; an artistic, central railway station and a large harbor building. The combined receiving and clearing of tonnage at the port approximate a million and a half annually. Industrially and commercially, Cologne ranks high among the manufacturing cities of the world. Pop. 1905, 428,722.

COLOGNE WATER. See Vol. VII, p. 533.

COLOGNE YELLOW, a pigment composed of two parts of yellow chromate of lead, one of sulphate of lead and seven of sulphate of lime or gypsum.

COLOMBES, a town in France, 7 miles N. of Paris, on railway from Paris to Havre. Pop. 1901 22,697.

COLOMBIA, REPUBLIC OF, known from 1863 to 1886 as the "United States of Colombia," and since 1886 as the Republic of Colombia, composed of nine states. See COLOMBIA, Vol. VI, p. 137. The independence of Panama and her separation from the jurisdiction of Colombia, in 1903, reduced the republic to eight states—made into 17 departments in 1886—and to an area of 444,980 square miles and an estimated population of 4,279,674. Under the new constitution of 1886, the legislative power rests with a Congress of two houses, the Senate and House of Representatives. The former consists of three members from each department, elected by the legislatures thereof, and the latter elected by vote of the people, on the basis of one representative for every 50,000 inhabitants. The President is elected by electoral colleges for a term of six years. He has a Cabinet of eight ministers, who are responsible to Congress, but chosen by the President. These ministers are in charge of the departments of the Treasury, Interior, Finance, War, Foreign Affairs and Public Instruction. The judicial authority is vested in a supreme court, composed of seven judges, appointed by the President and holding office during good behavior, removable only by impeachment by the Senate; the district courts and circuit courts, appointed by the President upon the nomination of the supreme court. In each municipality there are as many judges as the municipal council may determine. The Congress assembles every two years; its members are elected for four years. Suffrage is limited to those male citizens who are able to read and write or who have an income of five hundred dollars a year or real estate worth fifteen hundred dollars. In each department there is a legislative body, known as the departmental assembly, composed of one deputy for each twelve thousand inhabitants, elected by direct vote of the citizens. This assembly convenes every two years in the capital of its department. Each department is divided into municipal districts, in charge of a municipal council, at whose head is the alcalde, the official representative of the governor. The only department whose government was in any way different from the system explained was Panama, which was ruled directly by the national government. The republic maintains a standing army of 5,000, since having had to contend with civil war and strife with Venezuela. A national university has been established, which includes four colleges, with 1,083 students in attendance. In all the cities, libraries have been founded, and some valuable collections are the result. At Bogotá, the capital, a city of 120,000 inhabitants, is the seat of an astronomical observatory at an elevation of 8,600 feet above sea-level. The Roman Catholic is the state religion, but freedom in religious belief is constitutional.

The greatest industry of the republic is mining. The production of gold amounts to about $3,000,000 annually; that of silver, $1,250,000 annually. The unhealthy climate of the interior, where the mines are located principally, prevents active operations that would probably result in greater outputs. Salt-mining and the refining of the salt-waters of a number of springs is one of the greatest sources of revenue to the government. Agriculture engages the greater part of the population. The articles exported include coffee, cotton, tobacco, cacao and hides. Very little manufacturing is done. In some departments cattle-raising is engaged in to a great extent. In 1905 the exports amounted to $9,400,000, and the imports, $14,900,000. The external debt (1901) of the republic was about $22,000,000, besides a considerable internal debt, consolidated and floating, including the paper money in circulation. The estimated revenues for 1901–02 were $21,148,600, while the expenditures, it was estimated, would be $28,163,368.

In 1905 there were 410 miles of railroad, and 6,500 miles of telegraph. Since 1887 an extradition treaty has been in force with the United States. The presidents of the Republic were Nunez (1886–94), Caro (1894–98), Sanclamentes (1898–1900), Marroquin (1900–04). During his administration the revolution led by General Uribe and aided by President Castro, of Venezuela was suppressed in 1902. The fighting on the Isthmus of Panama caused the United States to send (in 1891), a detachment of marines for the protection of the Panama railroad. In 1903, Marroquin concluded a treaty with the United States which provided that the United States should pay to Colombia a bonus of $10,000,000 and an annual rental of $250,000 for the construction and operation of the Panama Canal. The rejection of this treaty on the part of Colombia caused the Department of Panama to secede from Colombia, November 3, 1903. President Marroquin was in 1904 succeeded by General Reyes.

COLOMBO-ROOT (*Jateorhiza calumba*), a climbing shrub native of Africa. Its roots, resembling parsnips cut into slices and dried, form the Calumba root of medicine, a bitter stomachic tonic. W.R.B.

COLON, a department in the N.E. part of Honduras, extending from the Cuero River to the Rio Segovia, from the Caribbean Sea to the departments of Yoro and Olancho. In the west it is mountainous, but the eastern part contains fertile plains. Area, 7,000 Sq. m.; pop. 15,000; capital, Truxillo, 4,000.

COLON, a city of the Republic of Panama, on the northern coast of Panama and at the terminus of the Isthmian Canal connecting with the Atlantic Ocean. Estimated population 1903, 10,000.

COLONEL, the chief officer of a regiment in the United States army, ranking next below brigadier-general and first above lieutenant-colonel. In Great Britain regimental colonels are general officers who have had a regimental command given to them as a reward for long service, and virtually as an honorary retirement. Under this system, except in the artillery and engineers, the position is a sinecure, the real commander being the lieutenant-colonel. In 1888 it was decided to discontinue these appointments as soon as those who have a vested right to succeed to them have been satisfied, and it has been decided that no officer shall obtain the rank of colonel except by brevet, or on being selected for certain appointments carrying with them that rank. In the German, Austrian and Russian armies, where the regiments are very large, the colonelcies are mostly honorary posts, held by members of royalty and other distinguished personages. In the United States the pay of a colonel varies, according to length of service, from $3,500 to $4,500. The pay of the British colonel ranges from $2,000 to $3,000, according to the branch of the service to which he is attached.

COLONIA DO SANTISSIMO SACRAMENTO, a port of Uruguay, or Banda Oriental, capital of the department of Colonia. It is situated on the left bank of the Plata, about one hundred miles above Montevideo, the capital of the state. It is one of the oldest towns on the Plata, and has one of the best harbors on that estuary. It has considerable trade with Argentine, and Uruguay. Pop. 3,000.

COLONIAL ANIMALS OR COMPOUND ANIMALS. These terms are applied to groups or colonies of animals which have originated from a single ovum. The individual which develops directly from the ovum produces the others by processes of incomplete budding or fission, so that the individual animals remain more or less intimately united. Examples of colonial animals are found among the protozoa, sponges, corals, hydroids, worms, bryozoa and ascidians. Many colonial forms exhibit polymorphism or physiological division of labor to a greater or less degree.

COLONIAL COLLEGE, a British industrial school for training young men, preparatory to sending them to some of the British colonies. The institution is located at Hollesley Bay, Suffolk, England. Instruction is given in all branches of manual training, agriculture, surveying and veterinary science. A large farm covering 1,800 acres is owned by the college, and the income from it assists largely in the maintenance of the institution.

COLONIAL DAMES OF AMERICA. See COLONIAL SOCIETIES, in these Supplements.

COLONIAL OFFICE, that department of the executive branch of the government of Great Britain which has to do with the relations of the crown government with colonial dependencies. The chief officer is the Colonial Secretary, who is *ex officio* a member of the Cabinet, and whose appointment is political, the holder of the office changing with the changes in the government. The Colonial Secretary nominates the governors of colonies, subject to the ratification of the crown. All enactments of colonial legislatures are brought before him for approval or disapproval. All diplomatic relations of the colonies is governed by him. See MINISTRY, Vol. XVI, p. 495.

COLONIAL SOCIETIES. Under this head are included those organizations of descendants of men who took some part in the American Revolution, or who were of active service in the founding of the colonies. The general intent common to all these societies is the perpetuation of the memory of colonial history and the memory of the men who helped make that history. The first of the colonial societies was the *Society of the Cincinnati*, organized in May, 1783, by the officers of the Continental army, then encamped on the Hudson. There were a number of French officers in the army at the time, and the society was organized in part, as stated in the constitution of the society, "to perpetuate . . . the mutual friendships which have been formed." Thirteen states formed societies, and one was organized in France. At the time, the privilege of membership was confined to all Continental officers in good standing and all officers of the French auxiliaries. Honorary membership was granted all signers of the Declaration of Independence. Membership to-day descends to the eldest son, with the same conditions of inheritance as restricts the heirs to the English crown. There were, in 1895, eight state societies, and in 1893 the roll showed a membership of 499.

Similar were the purposes of the founding of the *Society of Tammany*, or *Columbian Order;* but the organizers, to some extent, were moved by a spirit of jealousy of what they termed the "aristocratic tendencies" of the Society of the Cincinnati, and also were inspired by political designs. The political phase soon was in the ascendency, and the organization of to-day is purely a political one. It was founded in 1789, in New York City. It never spread beyond the city.

The *Sons of the Revolution*, organized in 1876, in New York City, was the first of the dozen or more general colonial societies. Membership is confined to male descendants of any military or naval soldier and civil official of the thirteen original states who took some part in the Revolutionary struggle from 1775 to 1783. In 1895 there were 27 state societies, with a membership of 5,151.

The *Sons of the American Revolution* was founded in New York in 1889. Its purposes and rules ar

the same as those of the Sons of the Revolution. In 1895 there were 30 societies, in as many states, with a membership of 5,492.

The *Naval Order of the United States* was instituted at Boston in 1890. The rules limit membership to officers of the United States navy who have taken part in some of the wars of the United States.

Lineal descendants of the *Mayflower* Pilgrims organized, in 1894, the *Society of Mayflower Descendants*, at New York. The purpose of the society is to preserve the records of those who came to America in the *Mayflower* on its first voyage in 1620. The descendants, over 18 years of age, of any of those passengers, and of all who signed the famous compact, are eligible to membership.

The *Society of Colonial Wars* was organized in 1892, and includes in its membership the male descendants of all who took any part, civil or military, in the founding and subsequent growth of the colonies from 1607 to 1775.

The *Military Order of Foreign Wars* was founded in 1895. It includes the descendants of all soldiers of the Revolutionary War, the war of 1812, the Mexican War and the war with Tripoli.

The *Colonial Dames of America*, *Daughters of the Revolution*, *Daughters of the American Revolution* and *United States Daughters* are organizations of women, and include the female descendants of all those Colonial and Revolutionary soldiers and men of civil prominence that are remembered in the constitutions of the male societies. These societies have all been organized since 1890. The *Daughters of the Revolution*, founded in 1891, had, in 1895, societies in 32 states. The *Daughters of the American Revolution*, founded in Washington, District of Columbia, in 1890, had 42 societies and a membership of over ten thousand in 1895. The *United States Daughters* was instituted in 1892. Its membership includes descendants of veterans of the War of 1812. The *Colonial Dames of America* was founded in 1893. It has 13 societies.

COLONIAL SYSTEM, a term applied to the regulations of the commercial maritime relations between a home government and its colonies. The phrase was used almost exclusively with respect to Great Britain. The establishment of free trade between the colonies and all countries has ended all such legislation. During the seventeenth and eighteenth centuries these laws and regulations, known in Great Britain as Navigation Acts, played an important part in bringing about some of the wars of those periods. The American Revolution was in part brought about by the enforcement of those regulations. At that time the struggle for commercial supremacy was at its height. Deeming the colonies to be solely for the benefit of the mother-countries, it was enacted by the European maritime nations that all exports and imports of the colonies should be carried in vessels belonging to the parent-country, and all trade must be carried on with that parent-country exclusively. These rules, while intended to encourage trade, prevented it. Until the middle of the eighteenth century it had been the custom of a nation at war to throw open the ports of its colonies to the vessels of neutral nations. But in 1756 England took the stand that such neutral vessels as engaged in trade with the colonies of an enemy were no longer neutral, and were to be considered a part of the shipping of the enemy, and therefore lawful prey. Shortly afterward, in order to avoid complications that constantly were arising, England took the still bolder stand that a neutral vessel that had taken a cargo at the port of an enemy, although it afterward touched at a neutral port and reshipped its cargo, was under the rule, and liable to seizure; in other words, that the voyage from the colonial port homeward was to be considered continuous. It was not until 1849 that the navigation acts were repealed; but before that time their provisions were no longer put into effect. While to England is given the credit for many of the maritime laws in relation to the system, Spain carried to the farthest extent the restricting of colonial trade. See also SHIPPING, Vol. XXI, pp. 866, 867.

COLONIAL WARS, SOCIETY OF. See COLONIAL SOCIETIES, in these Supplements.

COLONIZATION SOCIETY, THE AMERICAN, a society organized in 1816 by Bishop Meade of Virginia, Rev. Dr. Finley of New Jersey, Charles F. Mercer of Virginia, and others, for the purpose of transferring negroes from the United States and colonizing them in Africa. It was intended not only for the good of the negro, but also to relieve the South of the burden of the free negro population. The first president of the society was Bushrod Washington. Henry Clay was for many years president of the society. The first colonists, consisting of 86 persons, were sent in 1820 to the west coast of Africa, where they founded what in 1847 became the Republic of Liberia. The society merged into the abolition party in 1831, and its practical work terminated soon after the emancipation of the colored people of the United States.

COLONNA, CAPE (ancient Sunium Promontorium), a headland of Greece, forming the southmost point of Attica. Its summit, crowned by the ruins of the temple of Minerva, rises 270 feet above the water. Sixteen white marble columns, from which the cape derives its name, are still standing. See FALCONER, WILLIAM, Vol. IX, p. 6.

COLONSAY AND ORONSAY, two islands of the Argyllshire Hebrides, 16 miles N.N.W. of Port Askaig, in Islay, separated from each other by a sound 100 yards wide, and dry at low-water. Colonsay, which rises to a height of 493 feet, is 16 square miles in area; Oronsay, only 3. On the latter are a sculptured cross and a fourteenth-century Augustinian priory, with some curious effigies; whilst in the former are standing stones, a bone cave, Colonsay House (1722), and an obelisk to the memory of the lawyer, Duncan McNeill, Lord Colonsay (1794–1874). Near the center of the island of Colonsay is the beautiful Loch Fad. See also HEBRIDES, Vol. XI, p. 542.

COLOPHONY, a gum. See ROSIN, Vol. XX, p. 875.

COLORADO, the thirty-eighth state admitted to the Union, lies nearly midway between the Mississippi River and the Pacific Slope, and at nearly an

equal distance between British Columbia and Mexico. It is popularly called the "Centennial State," from the date of its admission, 1876. The area is 104,500 square miles, or 66,880,000 acres, of which about 26,000,000 acres are mountain lands, the remaining 40,880,000 acres mesa and valley lands. The climate is equable, and from the high altitude of the greater part of the state, dry and very agreeable, and beneficial to invalids, especially to those suffering with lung diseases. The average temperature, covering a period of five years, as recorded by the United States Signal Service, was as follows: January, 26.8°; February, 34.8°; March, 39.4°; April, 49°; May, 57.6°; June, 66.8°; July, 72.2°; August, 69.2°; September, 62.4°; October, 50°; November, 35.8°; December, 35.8°. The average number of cloudy days in a year is not more than forty. Health-resorts are numerous in the mountain regions, and mineral and thermal springs abound.

For a number of years the state has led in the production of the precious metals; almost every

STATE SEAL OF COLORADO.

known mineral is found within its borders, and mining has always been the chief occupation of the people. There are thousands of producing mines scattered throughout the length and breadth of the state, lodes of silver and gold seaming almost every mountain. There are also immense deposits of argentiferous lead ores, and for more than a decade the state has produced from forty to fifty per cent of the entire lead output of the whole country. One mine located at Leadville has yielded over $158,000,000 since its discovery. Of gold and silver alone Colorado has produced since 1859, $407,588,028, the increase each year over the preceding one being very marked. In 1872 the amount taken from the mines was $3,740,000, which had increased in 1900 to $55,000,000. The output of some of the gold-mines of the state has been little short of marvelous, the Robert E. Lee producing $118,500 worth of ore in 17 hours. On the opening of the Minnie mine at Leadville it was estimated that there was in sight $10,000,000 gross. In the early days of gold-mining the main work was done in placers, the only equipments necessary being the shovel, gold-pan and sluice-box, and in this way over $10,000,000 were taken during the first ten years of work. Subsequently, mines were sunk in the ground to varying depths, some being worked with profit as deep as 1,900 feet. Notwithstanding the rapid advances being made in agriculture and manufacturing, mining bids fair to continue to be the chief source of wealth for many years. The discovery of gold in the Cripple Creek district opened up one of the richest gold-fields in the world, and gave a new impetus to the mining industry in Colorado. (See CRIPPLE CREEK, in these Supplements.) Iron exists in great masses in many parts of the state, and is of the best quality. Bessemer steel has been produced at Pueblo for the past ten years; and the mills of that city, which is termed the Pittsburg of the West, turn out large quantities of the best quality of all kinds of iron made. The supply of copper, zinc, silica, cement, gypsum, onyx, kaolin and all kinds of valuable clays is beyond computation, as is that of an innumerable variety of commercial and manufactural minerals. The coal-fields of the state cover an area of almost forty thousand square miles, and the best anthracite and bituminous coal has been found in veins of great thickness, easy of access. Every town and city of the state has coal within close reach, and the mining is attended with small expense. The first record of the amount of coal produced was in 1873, when 69,977 tons were mined. In 1900, this had increased to 5,495,734 tons.

The parks of the state are great natural gardens, composed of broad, level valleys, once the beds of inland lakes or seas. The four largest of these, with their approximate area and elevations, are given as follows:

	AREA. SQUARE MILES.	ELEVATION. FEET.
North Park	2,500	9,000
Middle Park	3,000	8,500
South Park	2,200	9,500
San Luis Park	9,400	7,500

The soil of Colorado is so fertile that the possibilities of production are limited only by the water-supply. About 34,560,000 acres are arable and accessible to water. Early recognizing the importance of irrigation, efforts were put forth to inaugurate a system of canals so that the arable lands might have the advantages of the moisture denied by summer rains. Reports made in 1893 show that there were then in operation 12,400 miles of irrigating-canals, reclaiming 4,800,000 acres of otherwise arid land, and of this amount one half was then under cultivation, the remainder awaiting settlement and tillage. The leading crops, in the order of their importance as cultivated, are wheat, oats, alfalfa and potatoes, while rye, barley, tobacco, corn, fruits and hay are produced in great quantities. Garden vegetables give an enormous yield, and the small fruits are prolific to a high degree. Sorghum, buckwheat, navy beans, broom-corn, hops, sugar-beets, hemp and flax are also grown. Maximum results attained at the State Agricultural College have been: Wheat, 91 bushels per acre; rye, 52 bushels; oats, 102 bushels; Irish potatoes, 400 bushels; barley, 72 bushels; and corn, 67 bushels, shelled. Alfalfa leads all of the agricultural products of the state in tonnage and value. It affords the best of forage for stock and can be cut during every month of summer. For hay it is unexcelled, and yields from four to six tons per acre. The great strides made in stock-raising and farming generally are in a great measure due to the advantages derived from this plant, which flourishes at all altitudes below seven thousand feet. The climate is well adapted to fruit-

growing, and vineyards give generous yields of unsurpassed quality. Among the leading fruits are peaches, apples, pears, plums, cherries, nectarines and apricots, while among the small fruits are the blackberry, gooseberry, currant, raspberry and strawberry. The average orchard in full bearing gives profits as high as $500 per acre, and strawberries return a revenue of from $200 to $300 per acre. Large vineyards have given an average of $400 per acre for several seasons in succession. The value of the agricultural products of the state for 1900 was estimated at $33,048,576, and the fruit output for the same year amounted to $380,000; the wool-clip reached 8,500,000 pounds, valued at $1,115,000; and the potato crop was 4,465,748 bushels, valued at $1,717,000. Cattle, horses, sheep and hogs are widely raised throughout the state. The total value of all kinds of live-stock in 1900 was given as $52,018,000. A profitable industry as yet in its infancy is that of dairy-farming. Bee-culture has also received much attention, the conditions for success being so advantageous as to invite the agriculturist to engage in it. The annual production of honey is now in excess of 500,000 pounds.

In 1900, the state had 3,570 manufacturing establishments, employing 24,725 hands, turning out products of the value of $102,830,137, and paying in wages $15,146,667. The city of Denver alone had 1,474 of these manufactories. A great part of the manufacturing is in connection with the mineral products of the state, the leading industries being brass-works, lead-works; foundries and machine-shops, making engines, boilers and mining machinery; iron-works, building materials, tin, sheet-iron and copper works, flouring-mills, furniture, etc.

Building-stone of the very best quality is found in abundance in many parts of the state, and, in addition to its use in Colorado structures, has been used in the construction of some of the principal buildings of Chicago, St. Louis, Omaha, Kansas City, Salt Lake City and various other places. Marble of the best quality and of all colors, in great quantities, has been found, and is extensively quarried. Petroleum has been discovered in several localities. In and near the town of Florence there are 27 producing wells, aggregating about 1,100 barrels per day, the entire product being refined at Florence.

The numerous railway systems in Colorado form a network of lines throughout the state, the total trackage in 1900 being 5,000 miles, assessed for taxation at $30,428,444. All of the different lines center in the city of Denver, making that place the greatest railway point west of Kansas City. The telegraph and telephone mileage in 1894 was 5,751, with an assessed valuation of $455,306.

In 1906 the school population of Colorado was 144,000, and the total value of school property, $5,790,770. From the general government the state received 3,500,000 acres of valuable land for school purposes, and from the sale of less than one third of this a permanent fund has arisen, now amounting to over $1,000,000. Since the admission of the state into the Union in 1876 there has been expended on the common schools alone an amount approximating $16,000,000. This does not include the State University, Agricultural College, School of Mines and the State Normal School, all of which are state institutions, and well sustained by legislative appropriation. The first-named of these is located at Boulder, the second at Fort Collins, the School of Mines at Golden and the State Normal School at Greeley. Other institutions of learning are the University of Denver, the Colorado College, at Colorado Springs; the Westminster University of Colorado, at Denver; the Presbyterian College of the Southwest, at Del Norte; the Longmont College, at Longmont; the Tillitson Academy, at Denver; St. John's College and Wolfe Hall, at Denver; and the Jesuit College of the Sacred Heart, at Highlands. There are numerous other institutions of learning and private schools of varied character, and in great numbers. The educational exhibits at the World's Fair received 29 prizes from the bureau of awards. There are 20 public libraries in the state, with about 64,000 volumes. The state institutions include the Industrial School for Boys, the Industrial School for Girls, the Insane Asylum, the Mute and Blind Institute, the Penitentiary, the Reformatory and the Soldiers and Sailors'

STATE CAPITOL, DENVER.

Home. The new capitol building, which was completed and occupied in 1894, cost more than $2,250,000, and is one of the finest structures of its kind in the West.

Woman suffrage prevails in Colorado, having been adopted in the election of 1893 by a majority of about 5,000 votes.

In 1894 the total assessed value of all property was $208,905,279. The total assessed valuation of property in the state, 1904, was $465,000,000.

The state stands thirty-first in population, the census of 1890 showing 404,468 whites, 7,730 colored, 1,083 Indians and 612 Chinese, a total of 412,198. The census of 1900 gave the population as 539,700; that of 1870 was only 39,864.

The principal cities of the state are Denver, the capital; Pueblo, Colorado Springs, Leadville, Highlands, Aspen, Boulder, Cañon City, Durango, Cripple Creek, Salida, Ouray, Central City, Grand Junction, Fort Collins, Georgetown, Colorado City, Longmont.

The state flower is the Colorado Columbine, sometimes called the purple columbine.

The following is a list of the governors, with their respective terms of office:

TERRITORIAL.

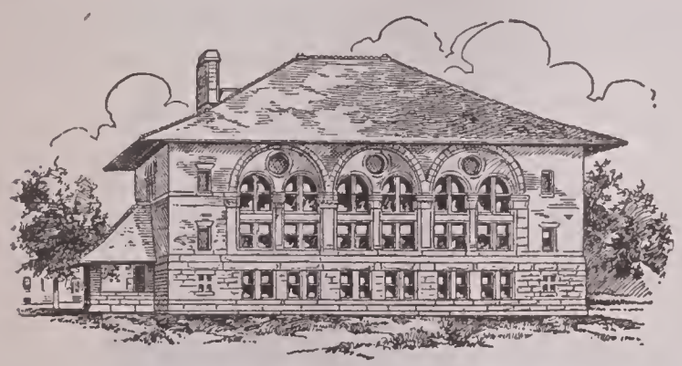
William Gilpin.....1861–62	Edward M. McCook.....1869–73
John Evans.....1862–65	Samuel H. Elbert.....1873–74
Alexander Cummings....1865–67	John L. Routt.....1874–76
A. Cameron Hunt.....1867–69	

STATE.

John L. Routt.....1876–79	Albert W. McIntire.....1895–97
Frederick W. Pitkin.....1879–83	Alva Adams.....1897–99
James B. Grant.....1883–85	Charles S. Thomas.....1899–1901
Benjamin H. Eaton.....1885–87	James B. Orman.....1901–03
Alva Adams.....1887–89	James H. Peabody.....1903–05
Job A. Cooper.....1889–91	Alva Adams.....1905
John L. Routt.....1891–93	James H. Peabody..Mch. 16, 1905
Davis H. Waite.....1893–95	Jesse F. McDonald..Mch. 17, 1905
Henry A. Buchtel.....1907	

For a historical episode (mine strike), see NOTABLE CHRONOLOGICAL EVENTS, Vol. XXII. *June 6, 1904; Gubernatorial Contest, March 16, 1905.*

COLORADO COLLEGE, situated at Colorado Springs, Colorado. It is a non-sectarian, co-educational institution, founded in 1874, and in 1896, under the presidency of W. F. Slocum, Jr., the principal educational institution of Colorado. Full collegiate courses are offered here, both in the classics and the sciences. The opportunity for scientific



COLORADO COLLEGE.

study is such, however, that it is expected that in time the school will be prominent in that direction. In 1906, there were 597 students of both sexes in attendance, with a faculty of 58 and a library of 25,000 volumes. The productive funds of the institution amounted to about 360,000 in 1900.

COLORADO DESERT, a very arid district in southern California, the whole length of which is traversed by the Southern Pacific railroad from San Bernardino on the north to Yuma on the south. The northern portion is known as Coahuila Valley and the southern as the Yuma Desert. The southern portion has the hottest climate of any point in the United States, the thermometer registering, during the summer months, as high as 134° F. The Coahuila Valley, it is thought, was formerly a part of the Gulf of California. A large portion of it lies below the level of the sea. The accepted theory is that the formation of the delta of the Colorado River cut off this valley from the Gulf of California, and the outlet of the river changing its position, the valley was left in its present unwatered condition.

COLORADO SPRINGS, the seat of El Paso County, 75 miles south of Denver, on the Chicago, Rock Island & Pacific railroad, and on divisions of the Atchison, Topeka & Santa Fé, Colorado & Southern, Colorado Midland, Colorado Springs & Cripple Creek District, and the Denver & Rio Grande systems. Situated at an altitude of 5,960 feet on the eastern slopes of the Rampan Range, with Pike's Peak 10 miles westward and the Garden of the Gods and Monument Park on the northwest, Colorado Springs, founded in 1871, has become a fashionable health resort, on account of its medicinal springs and baths and climatic and scenic attractions. It is also the center of the richest metalliferous and gold producing district of the state. Population, 1900, 21,085. C.L.S.

COLORADO, UNIVERSITY OF, a co-educational institution, the State University, situated at Boulder, Colorado, 28 miles N.W. of Denver. It was organized in 1876, and is supported by state taxes. In addition to the regular collegiate courses, instruction in law and medicine is given. The medical department is known as the Denver Medical College. The president in 1896 was James H. Baker. There were, in 1906, 123 in the faculty, 1,100 students and a library of 23,000 volumes. Since its organization, 791 have been graduated.

COLOR-BLINDNESS, a peculiar defect of sight, in which those who are affected are incapable of distinguishing different colors. To some, objects seem to be either light or dark, but gray is most usual. Others cannot distinguish either the primary colors from each other or from the secondary, confounding red with blue, blue with green, etc. The first class is rare, the second common. A distinguished chemist, Dalton (q.v., Vol. VI, p. 691), who himself suffered from color-blindness, was the first to draw attention to it, and hence the affection is frequently called Daltonism.

COLORED METHODIST CHURCHES. See METHODIST CHURCHES, in these Supplements.

COLOR PHOTOGRAPHY. See PHOTOGRAPHY, in these Supplements.

COLOR-PRINTING. Previous to May, 1895, printing in colors was a tedious and expensive process, involving an amount of patience and skill only appreciable by those familiar with the work. In that month there was marketed a commercially successful method of color-printing in three impressions, producing the effects previously obtainable only by a score or more of printings. The process can be used for all sorts of illustrations produced by photography and printing. The principle involved is, that if three photographs of a thing be taken respectively in red, blue and yellow light, and a plate be made from each photograph by some photomechanical process, the plates may then be printed in their appropriate color, one on top of the other, thus producing a print in the three primary colors of nature, and producing a combination involving all the colors of the original. The theory was understood as early as 1865, but the obstacles to successful execution were so numerous that many inventors gave up the problem after years of study. The results now obtained are not quite perfect, owing to the difficulty of securing exact shades of ink, and to the changes in color incident to printing one color on top of another, instead of blending them in, as nature does. Nevertheless the pictures made are vastly better than any previous three-color printings. The plates for the three negatives are color-sensitized by means of

three different dyes, each of which absorbs one third of the spectrum and reflects the other two thirds. In photographing, color-screens are used to assist in absorbing those rays which are not wanted for a particular plate. From the three photographs three half-tone electrotypes are taken—one for printing in each color. The plate from which the red and blue light was excluded in photographing is printed in yellow, the plate from which the yellow and red light was excluded is printed in blue, and the plate from which the blue and yellow light was excluded is printed in red. The result is a theoretically accurate reproduction of the scene in its natural colors.

C. H. COCHRANE.

COLOR-WHEEL. The Maxwell color-wheel is a device designed to aid in the exact definition and determination of colors. It consists of a set of colored cardboard disks, mounted so that they may be rotated rapidly. The disks are colored in vermilion, mineral-orange, light chrome-yellow, emerald-green, ultramarine-blue, black and white, and being made circular, they are mounted centrally upon the same axis. A straight slit is cut in each disk from the outer edge to the center, so that any other disk in the set can be pulled partially through the slit and made to overlap the top disk. In this way it is possible to exhibit a fraction of any or all of the color-disks at once. Then by rapidly rotating the disks by means of a belt-mechanism, the colors shown are blended into one. In use, if it is desired to determine the exact constituents of a shade of purple, the operator will overlap his red and blue and whirl the disks. If there is too much red, he will alter the disks and try again, and so on until he hits the same shade. He then stops the wheel and looks at a chart placed circumferentially in the rear of the disks, and is able to read off the percentages of his standard colors that go to make up the shade of purple he desires to match. He may telegraph this information to some distant place, with the certainty that the recipient, who understands the system, will be able to duplicate the color for him as accurately as he himself reproduced it on the color-wheel.

In connection with this color-wheel there has been prepared a table of typical colors, which are reproduced readily. For instance, cyan-blue is shown in the table to be composed of 21 parts white, 46 parts green and 33 parts blue; and mauve is produced with 47 parts white, 6 parts yellow, 9 parts green and 38 parts blue. These typical colors can all be reproduced exactly by any one having the table and the color-wheel, and thus it is now possible, in many kinds of business, to order special colors without sample, with a certainty of accuracy never before obtainable.

C. H. COCHRANE.

COLOSTRUM. See BEESTINGS, in these Supplements.

COLQUHOUN, ARCHIBALD ROSS, explorer and author; was born off the Cape of Good Hope in March, 1848, and was educated in Scotland (where his family belonged), and on the Continent. He served in the Indian Public Works Department, and as secretary to the government mission to Siam and the Shan States in 1879. He explored a railroad route from Bhamo to Canton in 1881–82, was correspondent of the London *Times* in China and Tonquin in 1883–84, revisited Burmah, was administrator in Mashonaland in 1890, explored American isthmian canal routes in 1895; China, in 1896; Siberia, in 1897, and the islands of the Pacific in 1900–01. During much of these travels he was a correspondent of the London *Times*. He has written *Across Chryse* (1883); *Amongst the Shans* (1885); *The Key of the Pacific* (1895, a masterly discussion of the Nicaragua and Panama Canal routes); *China in Transformation* (1898); *The Overland to China* (1900); *Russia against India* (1900); *The Renascence of South Africa* (1900); *The Mastery of the Pacific* (1902), and *Greater America* (1904). He has received medals from the Royal Geographical Society and the Society of Arts. W.F.J.

COLQUHOUN, PATRICK, publicist; was born at Dumbarton, Scotland, on March 14, 1745, became provost of Glasgow in 1782, and in 1792 became a police magistrate in London, in which place his great work was done. He promoted legislation for administrative reforms, and the improvement of commercial and educational methods, was the author of many pamphlets, and wrote two books of permanent value, on the police of London and on the population and resources of the British Empire. He died on April 25, 1820. W.F.J.

COLQUHOUN, PATRICK MACCHOMBAICH, SIR, was born on April 13, 1815, son of the Chevalier James Colquhoun, *chargé d'affaires* of the King of Saxony. He was educated at Cambridge, being graduated in 1837, and at Heidelberg, 1838, was called to the bar in 1838, and became queen's counsel in 1868. Through his father's influence in Germany he was in 1840 appointed envoy plenipotentiary of the Hanse Towns to make treaties with Turkey, Greece and Persia. From 1857 to 1866 he was councilor to the King of Saxony. In 1858 he was made a justice of the supreme court of the Ionian Islands, and in 1861 became chief justice of that court and was knighted. He died on May 18, 1891. He was a remarkable linguist, the champion oarsman of England and founder of the Colquhoun Sculls prize, and the author of a standard *Summary of the Roman Civil Law*. W.F.J.

COLQUITT, ALFRED HOLT, lawyer and Senator, was born in Georgia on April 20, 1824, and was educated at the College of New Jersey (Princeton), where he was graduated in 1844. He became a lawyer in Georgia, served in the Mexican War, and in 1852 was elected a representative in Congress, as a Democrat. Upon the outbreak of the Civil War he entered the Confederate army as a captain and rose to the rank of major-general. He was elected governor of Georgia in 1876, upon the resumption of power by the Democratic party in the South, and was elected to the United States Senate in 1882 and again in 1888. He died at Washington when nearing the

end of his second Senatorial term, on March 26, 1894. W.F.J.

COLTON, a city in a township of the same name, in San Bernardino County, California, in the southern part of the state. It lies at the western foot of the San Bernardino Mountains, in the heart of the richest fruit region of southern California, and in a country much frequented for health and pleasure. It is 50 miles east of Los Angeles on the Southern Pacific railroad, and had in 1900 a permanent population of 1,285. W.F.J.

COLTON, CALVIN, an American clergyman; born in Longmeadow, Mass., in 1789. He graduated at Yale in 1812; studied theology at Andover; and took charge of the Presbyterian Church in Batavia, N.Y., in 1815. He abandoned preaching in 1826 and took up the pen, going to England in 1831 as correspondent of the *New York Observer*. About 1835 he took orders in the Episcopal Church, but again turned to writing. In 1852 he was appointed professor of political economy at Trinity College, Hartford, Conn. Among his publications are: *Church and State in America* (1835); *Four Years in Great Britain* (1835); *Thoughts on the Religious State of the Country* (1835); *Junius Tracts* (1840–44); *Life and Speeches of Henry Clay* (1844), followed by the *Private Correspondence* (1855), *Last Seven Years of the Life* (1856), and the *Speeches* (1857) of the same statesman. He died in Savannah, Ga., March 13, 1857. E.E.T.

COLTON, WALTER, an American clergyman; born in Rutland, Vt., May 9, 1797. He graduated at Yale in 1822 and at Andover in 1825, and became professor of moral philosophy and belles lettres in an academy at Middletown, Conn. Resigning this position in 1830, he took up the editorship of *The American Spectator and Washington City Chronicle*. President Jackson appointed him chaplain in the navy, Jan. 29, 1831. In 1832 he was ordered to the Mediterranean, and in 1835 to the Charlestown navy yard. In 1827 he was for a short while editor of the *Colonization Herald*, and in 1838 was assigned to the navy yard at Philadelphia, where he became one of the editors of the *Independent North American*. In 1845 he was ordered to the Pacific station, and on July 28, 1846, was appointed alcalde of Monterey, a position he held for about three years. He established the first newspaper in California, now published in San Francisco as the *Alta California*. He also built the first schoolhouse in California, and announced the discovery of gold in the Sacramento Valley in the Philadelphia *North American* in May, 1848. In 1849 he returned to Philadelphia with impaired health. He wrote *Ship and Shore in Madeira, Lisbon, and the Mediterranean* (1835); *Visit to Athens and Constantinople* (1836); *Deck and Port* (1849); *Three Years in California* (1850); *Land and Lee in the Bosporus and Ægean* (1851); *Notes on France and Italy* (1851). His works were later edited by Rev. H. T. Cheever. He died in Philadelphia, Jan. 22, 1851. E.E.T.

COLUBER, a genus of non-poisonous snakes. See SNAKES, Vol. XXII, pp. 203, 204.

COLUMBÆ. See ORNITHOLOGY, Vol. XVIII, p. 50.

COLUMBIA, a city in a township of the same name, the county seat of Boone County, Missouri, in the central part of the state. It lies on Hinkson Creek, a tributary of the Missouri River, and on the Wabash railroad, 26 miles north by west of Jefferson City, and is the site of the University of Missouri. Its population in 1890 was 4,000, and in 1900, 5,651. W.F.J.

COLUMBIA, a borough of Lancaster County, southeastern Pennsylvania, on the east bank of the Susquehanna River, and on the Columbia branch of the Pennsylvania railroad, 81 miles W. of Philadelphia. It was founded by English Quakers in 1726. A railroad bridge over a mile in length connects Columbia with Wrightsville, on the opposite bank of the Susquehanna. It is a large manufacturing center, having extensive rolling-mills, foundries, oil-refineries, saw-mills, flour-mills, tanneries, gas and water works, and manufactories of steam-engines and railroad iron. Population 1890, 10,599; 1900, 12,316.

COLUMBIA, a city and the capital of the state of South Carolina and Richland County (see COLUMBIA, Vol. VI, p. 150). The city, which has long been famed for its beauty, is built on a plateau about two hundred feet above the Congaree River, affording a magnificent view of the surrounding country. It is about two miles square, regularly laid out, with broad streets, several of them one hundred feet wide, handsomely shaded, with macadamized roadways and paved sidewalks. The state house is built of granite, three stories high, and cost three million dollars. The United States courthouse and post-office, also of granite, and the new city hall are handsome buildings. The South Carolina University, which was organized as a college in 1806, was, in 1880, reorganized, with two branches, the South Carolina Agricultural and Mechanical College at Columbia, for whites, and Claflin University at Orangeburg, for blacks. Other educational institutions are a Presbyterian theological seminary, the Winthrop Normal College, several academies for the education of both sexes, and excellent public schools. The Roman Catholics also have a school, the Ursuline Convent. There is a library containing thirty thousand volumes belonging to the university. There are a number of factories, including a very large cotton factory recently erected, run by water-power. Population 1900, 21,108.

COLUMBIA, the county seat of Maury County, western central Tennessee, on Duck River, on the Louisville and Nashville and Nashville, Chattanooga and St. Louis railroads; by the former, 47 miles S.S.W. of Nashville. The city is the seat of Jackson College, and has two seminaries for young ladies. It has a stock-yard, a grain-elevator and flour and cotton mills. It is the location of a large United States arsenal. Population 1900, 6,052.

COLUMBIA CITY, a city and the capital of

Whitley County, northeastern Indiana, situated on Blue Creek, on the Pittsburg, Fort Wayne and Chicago and the Wabash railroads, 20 miles W. of Fort Wayne. It contains manufactories of flour, lumber and woolen goods. Population 1900, 2,975.

COLUMBIA COLLEGE, a non-sectarian educational institution, located in New York City. It was chartered in 1754 as King's College. As early as 1746, funds had been raised for the establishment of an institution for collegiate instruction. The method employed for procuring this first endowment was the lottery system legalized by act of the legislature. The original sum was added to until in 1851 a nucleus of about $17,000 had been raised. The institution was chartered by George II in October, 1754. The first building was begun on ground donated by Trinity Church in 1756. During the American Revolution the building was used as a hospital, and all work of the college stopped. Classes were resumed in 1784, under the present name, Columbia College. The first location of the college was in what is now the heart of New York City, at

COLUMBIA UNIVERSITY.

the corner of Barclay and Murray streets. In 1857 the institution was removed to Forty-ninth Street and Fourth Avenue, its location to 1897. The demand for better facilities caused the college authorities to take steps toward securing possession of a tract of 17½ acres lying between One Hundred and Sixteenth and One Hundred and Twentieth streets. The purchase was made in 1892, but the erection of new buildings was not begun until 1895. In 1897 it moved to its new location known as Morningside Heights. In 1903 the endowment was estimated at over $12,362,000 and the total income, including tuition receipts, $1,630,768. In 1904 the library consisted of 362,000 volumes, which included all departmental libraries. There are, in addition to the regular collegiate course of instruction, six special schools, all of which go to make up the college. The oldest of these special schools is the School of Medicine, first organized in 1767. From 1813 until 1860 the medical department was permitted to merge with the independent school called the New York College of Physicians and Surgeons. In 1860 this school was reorganized as the Medical Department of Columbia College. The second of the special schools is the Law Department, established in 1858; the third, the School of Mines, was organized in 1863; the fourth, the School of Political Science, in 1880; the fifth, the School of Philosophy, in 1890; and the School of Pure Science in 1892. Under these seven heads courses are given in every branch of collegiate instruction. In 1904 there were 551 in the combined faculties, and 4,833 students were in attendance. From the organization of the institution until 1901, 17,710 had been graduated. The presidents of the college and their terms of office are as follows: Samuel Johnson, 1753–63; Myles Cooper, 1763–75; Benjamin Moore, 1776; no organization, 1776–84; William Moore, 1784–87; W. S. Johnson, son of the first president, 1787–1800; C. H. Wharton, 1800; Benjamin Moore, 1800–11; William Harris, 1811; W. A. Duer, 1829; N. F. Moore, 1842; Charles King, 1849; F. A. P. Barnard, 1864; Seth Low, 1888; N. M. Butler, 1902.

COLUMBIAN EXPOSITION (1893). See WORLD'S FAIR, in these Supplements.

COLUMBIAN UNIVERSITY, THE, OR GEORGE WASHINGTON UNIVERSITY, an educational institution at Washington, District of Columbia, organized by an Act of Congress in 1821 under the auspices of the Baptist Church. The name was originally Columbian College, but in 1873 was changed to Columbian University,

COLUMBIAN UNIVERSITY.

and in 1904 to the George Washington University. The institution has medical, law and dental departments, a scientific school and the Corcoran school founded by W. W. Corcoran in 1884. In 1906 the university had 200 instructors and 1,580 students. The library contains 7,850 volumes. The grounds and buildings are valued at $1,000,000. W.M.C.

COLUMBIA OR OREGON RIVER, the largest American river that enters the Pacific. See OREGON, Vol. XVII, p. 846.

COLUMBINE, the common name of plants of the genus *Aquilegia*, natural order *Ranunculaceæ*, natives of the temperate and colder regions. *A. Canadensis* is a beautiful plant which grows wild in many parts of the United States, but is cultivated with the greatest ease. It has terminal flowers, scarlet without and yellow within, pendulous, and much embellished by the numerous descending yellow stamens and styles. See also HORTICULTURE, Vol. XII, p. 256.

COLUMBIUM. See NIOBIUM, Vol. XVII, p. 527; also CHEMISTRY, Vol. V, pp. 467, 468.

COLUMBUS, a city and the capital of Muscogee County, central western Georgia, on the Chattahoochee River, on the Central railroad of Georgia, the Georgia Midland and Gulf and the Columbus Southern railroads. Columbus is at the head of steam-navigation from the Gulf of Mexico, a distance of three hundred miles. It is connected with Macon, Georgia, by the Southwestern railroad, and is the terminus of the North and South railroad. It is also on the Western and the Mobile and Girard railroads. A change in the level of the Chattahoochee River at this point affords unlimited water-power, which has fostered extensive manufacturing interests. The largest cotton and woolen mills in the South are located at Columbus, producing a great variety of colored goods, ginghams, etc. The city contains an opera-house, superior county buildings, churches, a high school, several graded schools, a female seminary, male academy and several excellent hotels. The streets are broad, handsomely shaded and well-lighted. Population, 1890, 17,303; 1900, 17,614. See COLUMBUS, Vol. VI, p. 153.

COLUMBUS, Indiana, a city in a township of the same name, the county seat of Bartholomew County, in the south-central part of the state. It is on White River, and is reached by the Cleveland, Cincinnati, Chicago and St. Louis, and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. Its population was 6,719 in 1890, and 8,130 in 1900. W.F.J.

COLUMBUS, Kansas, a city and the county seat of Cherokee County, in the southeastern corner of the state. It is reached by the Kansas City, Fort Scott and Memphis, and St. Louis and San Francisco railroads. Its population in 1900 was 2,310. W.F.J.

COLUMBUS, a town in Hickman County, southwestern Kentucky; situated on the Mississippi River, 12 miles below Cairo; on the Mobile and Ohio railroad. It is an important center of trade and transportation, and contains manufactories of furniture and crockery. Population, 1900, 1,235.

COLUMBUS, Mississippi, a city and the county seat of Lowndes County, on the eastern border of the state. It lies in an agricultural region, and is reached by the Mobile and Ohio, and the Richmond and Danville railroads. Its population was 4,559 in 1890, and 6,484 in 1900. W.F.J.

COLUMBUS, Nebraska, a township and coextensive city, the seat of Platte County, in the central part of the state. It lies just north of the Loup and Platte rivers, 75 miles west of Omaha, and is reached by the Union Pacific railroad, and by the Burlington and Missouri River railroad in Nebraska. Its population was 3,134 in 1890, and 3,522 in 1900. W.F.J.

COLUMBUS, a city and the capital of the state of Ohio, is reached by no less than 15 different lines of railway, and has 30 miles of street-railways, operated by both horse and electric power. There is an abundant supply of natural gas, which is used largely by manufacturers, as well as by private families, for fuel. Carriage-manufacturing is the leading industry, one company manufacturing two million dollars' worth of goods annually. The area of the city is twelve square miles. Public parks cover 195 acres. The State University, United States Garrison, State Fair, Capitol and other grounds — all fine parks — have a total area of 600 acres. A United States custom-house was established in Columbus in 1889, which transacted about one million dollars' worth of business in 1890. Pop., 1890, 90,398; 1900, 125,560. See COLUMBUS, Vol. VI, p. 153.

COLUMBUS, Texas, a city and the seat of Colorado County, in the southeastern part of the state. It lies on the Colorado River, 80 miles from Austin, on the Southern Pacific railroad. Its population was 1,824 in 1900. W.F.J.

COLUMBUS, DON BARTOLOMEO COLON, an older brother of Christopher (who had two brothers and one sister), also a navigator, whose date of birth is not known; followed his brother to Lisbon, where he became famous as a cartographer. From Lisbon he went to England, and from there, in 1493, to London. In 1494 he was placed in command of three ships on an expedition to Hispaniola, where he arrived in the same year and was raised to the dignity of an adelantado, or vice-governor of the island. He took part in the last expedition of his brother in 1502. With his nephew, Diego, he returned to America in 1509, and was again in Spain in 1511. Having sailed once more to Hispaniola, he died there in the latter part of 1514. Christopher Columbus' younger brother, GIACAMO COLUMBO, called in Spain *Don Diego Colon*, was in the New World in October, 1493, returning in April, 1495. After his second visit in 1498, he was thrown in chains and brought with his brother to Europe. He remained in Spain, where he died at Seville, Feb. 21, 1515. G.A.S.

COLUMELLA, the axis to which the carpels of a compound pistil often are attached (see BOTANY, Vol. IV, p. 135), and the central axis of spiral univalve shells. See CORALS, Vol. VI, p. 332.

COLUSA, a town and the capital of Colusa County, northern California, on the Sacramento River, 65 miles N.N.W. of Sacramento, on the Colusa and Lake railroad. It has flouring-mills and manufactories of carriages and farming tools. Population, 1900, 1,441.

SIDNEY COLVIN.

COLVIN, SIDNEY, author and art critic; was born in England on June 18, 1845, and was educated at Cambridge. He became Slade professor of fine arts at Cambridge in 1873–85, and director of the Fitzwilliam Museum in 1876–84, and since 1884 has been keeper of prints and drawings at the British Museum. He has written much upon art topics and is the author of a *Life of Walter Savage Landor* (1881); *Life of Keats* (1887); *A Florentine Picture and*

Chronicle (1898); *Early History of Engraving in England* (1901), and other works. He has also edited *Selections from Landor* in *The Golden Treasury Series* (1882); *Letters of Keats* (1887); the Edinburgh edition of Robert Louis Stevenson's works (1894–97), and *Letters of Robert Louis Stevenson* (1899). W.F.J.

COLWELL, STEPHEN, merchant and economist, was born in Virginia, now West Virginia, on March 25, 1800, was educated at Jefferson College, at Canonsburg, Penn., studied law, and was admitted to the bar. In 1836 he became an iron manufacturer, and was thus led to study political economy and to advocate the maintenance of the protective system as founded by Hamilton. He wrote a number of important works on political economy, the chief of them being *The Ways and Means of Payment*, in 1859. He also contributed many articles to *The Princeton Review*, on political economy and on theological topics. On 1865 he was appointed a member of the Internal Revenue Commission. He died in 1871. W.F.J.

COLYMBIDÆ, a family of web-footed birds. See DIVER, Vol. VII, p. 254.

COMA BERENICES, a small and close cluster of stars near the equinoctial colure, south of the tail of the Great Bear, visible in April and May, near the zenith. It is one of the nine constellations introduced by Hevelius. According to Egyptian legends, Coma Berenices, the English rendering of which is Berenice's Hair, was the name given to this constellation, owing to the belief that the hair of Berenice, a wife of Ptolemy Euergetes, king of Egypt in 248 B.C., which had been given into the care of the priests of the temple of Venus at Samos and disappeared, had been placed by the gods in the tail of Leo in the form of this constellation.

COMAN, KATHERINE, an American educator; born in Newark, Ohio, in 1857. She was graduated from the University of Michigan in 1886 and was appointed professor of history and political economy at Wellesley College. She has written the *Growth of the English Nation* and other works. W.M.C.

COMANCHE, Texas, the seat of Comanche County, 120 miles N.W. of Austin, on the Fort Worth and Rio Grande railroad, with cotton and grain growing, cattle raising, milling, and quarrying industries. Population, 1900, 2,070. C.L.S.

COMETS. See ASTRONOMY, Vol. II, pp. 712–714; and ASTRONOMY, in these Supplements.

COMET-SEEKER or COMET-FINDER, a telescope with a low magnifying power, and a short focus as compared with the size of its object-glass. It has a wide field, and is employed to find comets.

COMFORT, GEORGE FISK, educator and author, was born at Berkshire, N. Y., on September 20, 1833, and was educated at Wesleyan University, Middletown, Conn. He also studied educational systems and fine arts in Europe. He was professor of modern languages and æsthetics at Allegheny College, and afterward at Syracuse University, where he was founder and is now dean of the College of Fine Arts. He was one of the organizers of the Metropolitan Museum of Art in New York, and has written much on art and other topics. W.F.J.

COMFREY, the common name of species of *Symphytum*, a genus of *Boraginaceæ* (or *Asperifoliaceæ*), and natives of the Old World. They are coarse, branching and leafy herbs, with tubular-funnel-form flowers, nodding in raceme-like or forked clusters. *S. officinale*, the common comfrey, with yellowish-white flowers, is naturalized in the United States. *S. asperrimum*, with reddish-purple flowers changing to blue, is cultivated somewhat. The root of various species, notably *S. officinale*, is used in a medicinal way, and formerly was cultivated widely in Europe for this purpose.

COMISO, Sicily, a southern hill town, 8 miles west of Ragusa, with railway connection. It manufactures paper and other articles for export. Population, 21,873. C.L.S.

COMMANDER OR KOMMANDORSKII ISLANDS, named after the title of their discoverer Commander Bering, belong to Russia, and are situated in the Bering Sea, from 150 to 250 miles east of Nijni Kamchatka, on the east coast of the Kamchatka Peninsula. They comprise two islands, Bering Island the largest and nearest to the mainland, about 48 miles long, with a maximum width of 18 miles, and Miedni or Copper Island, about 30 miles long and 5 miles wide, at its broadest part. They are of volcanic origin and barren; the climate is temperate. C.L.S.

COMMANDITE, SOCIÉTÉ EN, or partnership in, an expression used in France to express a partnership in which one may advance capital without taking charge of the business. In other words, it is similar in nature to the "special partnership" recognized by the statutes of several states in the Union.

COMMENTRY, France, a manufacturing town in the department of Allier, 10 miles by rail S.E. of Montluçon. Valuable coal deposits in the neighborhood promote mining, iron-founding, and other industries. Pop., 8,084. C.L.S.

COMMERCE AND LABOR, DEPARTMENT OF. The Department of Commerce and Labor was established by the Fifty-seventh Congress and approved February 14, 1903, being the ninth cabinet position provided for by the U. S. government. The duty of this department, as defined by the act, is to promote and develop the foreign and domestic commerce, the mining, manufacturing, and shipping and fishing industries, the labor interests and the transportation facilities of the United States. The Secretaries of Commerce and Labor have been George B. Cortelyou (1903), Victor B. Metcalf (1904). A.R.R.

COMMERCIAL AGENCIES. See MERCANTILE AGENCIES, in these Supplements.

COMMERCIAL LAW is a term denoting those branches of law which prescribe the rights of property, and the rules governing the business relations of persons engaged in commerce or trade. The rules of commercial law are more nearly the same throughout the world than any other branch of municipal law, for the reason that the commercial

relations between the various countries of the world tend to bring about a similarity in the rules of law governing trade and commerce.

COMMERCIAL MUSEUM OF PHILADELPHIA, a department of the Philadelphia, Pennsylvania, museums, established by special ordinance of the city councils, June 15, 1894. The project had its inception at the World's Columbian Exposition, when, at the instance of public-spirited citizens of the Quaker City, the most important parts of the exhibits at Chicago, from Mexico, Central and South America, Australia, South Africa and many Asiatic countries, were, at the close of the Exposition, removed to Philadelphia to form the nucleus of the museum. The products of other countries were obtained and added to the collection. Consisting, as the museum does, of collections of natural products from all the countries of the world which have entered the American markets, or which may be made available for them, its objects are: To bring before the American manufacturers, dealers and consumers all the varied products of the world, so that the American consumer, dealer or manufacturer can make the best selection for his special interest; to publish scientific and useful information concerning such products, and periodically to exhibit fresh manufactures and samples of goods likely to be of service in American markets. The museum is under the control of a board of trustees elected by the councils and approved by the mayor. The exhibit of raw products numbered over sixty thousand specimens in 1896, and collectors for the museum have been sent abroad to secure further and more recent material. A bureau of information affords specific information to manufacturers on any desired subject within the scope of the museum's work.

COMMERSON, Philibert, French botanist; born Nov. 18, 1727, at Châtillon-les-Dombes; studied medicine at Montpellier. In 1756 he founded the botanical gardens of Châtillon, and accompanied Bougainville in a voyage around the world completed from 1766–69, collecting 160 new species and varieties of plants. He died, March 13, 1773, on Isle-de-France. G.A.S.

COMMINATION, a penitential office used in the Church of England after the Litany on Ash Wednesday, consisting of sentences taken from Deuteronomy xxvii and other passages of Scripture. To each sentence that is read the congregation responds "Amen." This office has never been incorporated in the American prayer-book.

COMMISSION, a writing, generally in the form of a warrant, authorizing one or more persons to perform duties or exercise powers belonging to another or to others. Instruments of delegation bearing this title are issued by the government to officers in the army and navy, judges, justices of the peace, postmasters and others. Another class of commissions are those granted to a body of persons intrusted with the performance of certain special duties of a public or legal character.

COMMISSIONAIRES, a name applied in France and elsewhere to a class of guides, agents, couriers, etc., who wait upon travelers at railway stations, etc., to look after their baggage, direct them upon their way, and perform other services. Often they act as interpreters. In England the name belongs to an enrolled body, the Society of Commissionaires, founded in 1859, composed of partly disabled veteran soldiers, who serve as messengers, agents, and doorkeepers. W.F.J.

COMMODORE. See Navy, in these Supplements.

COMMON CARRIER. See Carrier. Vol. V, p. 122.

COMMON SCHOOLS OF THE UNITED STATES. See School, Common, in these Supplements.

COMMUNICATION, Privileged, a communication between such persons or under such circumstances that it does not involve an action for damages, or a communication between such persons and under such circumstances that the receiver cannot be called upon to produce it as an admission in a suit. The most common instance of such privilege is in the case of a client and his legal adviser. In the United States members of the legal profession are privileged, and, as a rule, what a client communicates to them cannot be disclosed except the right of confidentiality be waived. The privilege is extended to the communications of several parties, or of their counsel and agents engaged on the same side of a cause, and made with a view to their joint prosecution or defense. Interpreters stand in the same relation as attorneys.

Confessions made to a clergyman or priest in some states are privileged by statute, but generally it is otherwise. By a statute of the state of New York, ministers of the Gospel and priests of every denomination are forbidden to disclose confessions made to them in their professional character, and in the course of discipline enjoined by the church. Similar statutes exist in Missouri, Wisconsin, Michigan and Iowa. Communications made to a physician are in some states privileged, and in others not. Communications between husband and wife are privileged from disclosure.

In England no special privilege is extended to the Roman Catholic confessional, and the question as to how far a confession made to a clergyman for the purpose of obtaining spiritual comfort and consolation is protected, was long considered doubtful. The rule has, however, been established for some time that clergymen are not entitled to the same privilege as legal advisers; in Scotland the point has never been decided. In England communications to a medical man, even in the strictest professional confidence, are not protected from disclosure; and the same is the case in Scotland. For communications involving no liability for defamation, see Libel, Vol. XIV, p. 505.

COMMUTATOR, a recent improved form of commutator is found in the Western electric iron-clad arc dynamo. It is built up on a substantial disk of hardwood veneering mounted on a brass flange. The wooden disk is faced with mica, and each segment screwed in independently. These segments are tapered slightly toward the inner side, to allow slate wedges to protect the mica and veneer-

ing. Air-insulation is provided for between the segments, thus confining any flashing almost wholly to the brushes. All the screws are accessible from the front, for convenience in making repairs. The segments are increased in size at the working part so as to provide for long life, and also to hold the flashing as much as possible in the working parts of the segments. In some dynamos the commutators are now made of greatly increased diameter, so as to allow of more commutator-bars, and a consequent increase in the number of alternations in the current.

C. H. Cochrane.

COMNENUS, the name of a family, originally Italian, of which many members occupied the throne of the Byzantine empire from 1057 to 1204, and that of Trebizond from 1204 to 1461. For biographical particulars as to them, see Alexius I, Vol. I, p. 442; Andronicus I, Vol. II, p. 22; Anna Comnena, Vol. II, p. 53; Isaac I, Vol. XIII, p. 384; John II, Vol. XIII, p. 727; and Manuel I, Vol. XV, p. 512.

COMO, a town of Park County, central Colorado, and an important junction of the Denver, Leadville and Gunnison railroad; situated at the head of Kenosha Pass. It is surrounded by extensive coal-mines. Population 1900, 407.

COMODO, an island of the Malayan Archipelago, in lat. 8° 30′ S., long. 120° E. It is 35 miles in length and 16 miles in width, and occupies nearly the entire width of the strait which separates the islands of Sambawa on the west and Flores on the east.

COMORIN, Cape, the most southerly extremity of India, in lat. 8° 4′ 20″ N., and long. 77° 35′ 35″ E.

COMPARETTI, Domenico, philologist; born June 27, 1835, in Rome; became in 1859 professor of Greek language and literature at Pisa, and a few years later at Florence. Among his writings are *Saggi dei Dialetti Greci dell' Italia Meridionale* (1866); *Virgilio nel Medio Evo* (1896); *La Cómissione Omerico di Pisistrato e il Ciclo Epico* (1881); *Monumenti Antichi* (1893). With D'Ancona he published *Canti e Racconti del Popolo Italiano.*

G. A. S.

COMPASS PLANTS, a name that has been applied to those plants, the "fixed light position" of whose leaves is vertical and directed north and south. As a consequence, the leaves stand edgewise and twist into the meridian plane. The purpose is to expose the broad leaf-surfaces to the incident rays of light during the morning and evening, and to protect them from the too intense light and heat of the mid-day rays. The best-known "compass plants" are *Silphium laciniatum*, a "rosin-weed" of the prairies of the United States, and *Lactuca Scariola* of Europe, but extensively naturalized in the United States. Both of these plants belong to the great family of *Compositæ*, and both strikingly exhibit the phenomenon referred to. When grown in shaded or otherwise protected places the phenomenon does not appear, and the use of these plants as "compasses" in very cloudy weather is a doubtful story.

COMPETITION. See Political Economy, Vol. XIX, p. 394; Wages, Vol. XXIV, p. 330.

COMPLAINT, in criminal law, is the formal charge, made in writing, and usually under oath, before some magistrate or other proper tribunal, alleging that some person has been guilty of a designated offense, which the party making the charge offers to prove. The person making the charge is called the complainant. Complaint is also a term used in connection with civil actions, especially in states which have adopted a code of procedure, and when so used refers to the first pleading filed by the plaintiff, setting forth his cause of action in detail. In this sense it has the same meaning as declaration.

COMPLEMENTARY COLORS. A term used in art to describe colors, the combination of which produces white light. According to the laws of physics, the complementary color to green is red, that to blue is orange, that to purple is yellow, and *vice versa*. In practice, the combination of complementary colors does not produce pure white at all, but gray.

COMPLINE, the last service of the day in a Roman Catholic Church, celebrated after sunset, and generally just before bedtime. See Canonical, Vol. V, p. 21.

W. F. J.

COMPLUTENSIAN POLYGLOTT. See Jimenes, Vol. XIII, p. 705; Polyglott, Vol. XIX, p. 431.

COMPOSITÆ, by far the largest family of flowering plants, containing ten to twelve thousand species distributed throughout the world. Those of temperate regions are chiefly herbs, although many of them are shrubby in the arid regions of the western United States, notably the "sage brushes," while many tree-forms occur in the tropics. It is regarded not only as the most numerous, but also the most highly organized family of flowering plants. It is characterized by its small flowers being collected in dense heads surrounded by involucral bracts, thus giving the appearance of a single flower, which was formerly called a "compound flower." The calyx is modified into the characteristic "pappus" of the group, which appears as a tuft of hairs, or bristles, or scales of various kinds. The corolla is gamopetalous, either tubular throughout or becoming flat (like a strap) above. The strap-shaped corollas, in many cases, are found only at the margin of the head, and as they are usually relatively large and brightly colored, they still further increase the resemblance to a single flower by simulating a set of separate petals. In such cases as the dandelion all the flowers are strap-shaped. Notable members of the family are asters, goldenrods, sunflowers, thistles, arnicas, etc. Many species are cultivated for their beauty; many yield valuable products useful in the arts, in medicine, etc. Among the common food-producing species are lettuce, artichoke, salsify, chicory, etc.

COMPOSITION, in bankruptcy, is an agreement between a debtor and creditor, whereby the creditor accepts a part of his demand in discharge of the entire debt, upon terms or by means different than are provided in the original contract or required by

law. Such agreements are frequently made in other forms of insolvency proceedings; also, especially where the debtor, in consideration of the discharge, is able to borrow sufficient money from friends to pay a larger portion of his debts than could be realized by the sale of his assets through the usual course of administration. A composition agreement is generally in writing, and if made in good faith, will be valid.

COMPOSITION OF FORCES. See MECHANICS, Vol. XV, p. 708.

COMPOSTS. See HORTICULTURE, Vol. XII, p. 238; and MANURE, Vol. XV, p. 513.

COMPOUND ANIMALS. See COLONIAL ANIMALS, in these Supplements.

COMPOUNDING A FELONY, the act of the party against whom an offense has been committed, who agrees with the felon that he will not prosecute him, upon condition that the thief returns the stolen goods, or who in any manner accepts reward or other consideration for not prosecuting the offender. This offense was, at common law, punishable in the same manner as the felony compounded. Throughout the United States the offense is indictable, and the punishment fixed by statute, but is now usually punishable only as a misdemeanor. Any note, receipt or other contract given upon such consideration, in whole or in part, is void in law. The failure to prosecute does not constitute the offense, unless accompanied with the acceptance of some consideration, therefor. Compounding a misdemeanor is also indictable, but if the offense be such that an action for damages will lie against the offender at the suit of the party injured, the law will generally permit a compromise, even though a criminal prosecution could have been maintained. Advertising a reward for the return of stolen property, with an offer not to prosecute, is a similar offense to compounding the theft.

COMPRESSED AIR. See AIR-COMPRESSORS AND USES OF, in these Supplements.

COMPRESSED-AIR MOTORS. See MOTORS, in these Supplements.

COMPTON, BARNES, an American public man; born in Port Tobasco, Maryland, Nov. 16, 1830. He graduated at Princeton in 1851. He was elected a member of the state house of delegates from Charles County in 1860 and 1861, and of the state senate in 1867, 1868, 1870 and 1872, serving as its president in 1868 and 1870. Was elected state treasurer of Maryland six times, holding the office eleven years and two months, when he resigned. In politics he was a Democrat, and was elected a representative from the fifth Congressional district of Maryland to the Forty-ninth and Fiftieth Congresses. He was declared re-elected to the Fifty-first Congress, but was unseated by the House of Representatives. He was elected to the Fifty-second and Fifty-third Congresses from the same district. Died in Laurel, Md., Dec. 2, 1898.

COMPTROLLER OR CONTROLLER, literally, one who controls. The name is applied to various functionaries. In the United States government there is a comptroller of the currency, who has supervision of the national currency. Many of the states have comptrollers in charge of the state finances. In New York city the comptroller is the most important and powerful of the financial officers of the municipality. In nautical parlance a controller is a cast-iron block over which the anchor chain passes between the locker and the hawse hole. In electric engineering it is a device for regulating or controlling the current or the speed of a motor. W.F.J.

COMPULSORY EDUCATION. See SCHOOLS, PRIVATE, in these Supplements.

COMPURGATORS, twelve persons whom Anglo-Saxon law permitted the accused to call in proof of his innocence, and who joined their oaths to his. They were persons taken from the neighborhood, or otherwise known to the accused. It was rather in the capacity of witnesses to good character, than of jurymen, that they acted, though the institution has been spoken of as the Anglo-Saxon jury; what they swore to was not so much their knowledge as their belief. See JURY, Vol. XIII, p. 793.

COMSTOCK, ANTHONY, an American reformer; born in New Canaan, Connecticut, March 7, 1844. He received a common school education and enlisted as a private in the Union army at the outbreak of the Civil War. In 1873 he was appointed a post-office inspector in New York and became special agent and secretary for the Society for the Suppression of Vice. His work was especially directed toward the seizure of obscene literature. He has published *Frauds Exposed* (1881); *Traps for the Young* (1883) and *Morals vs. Art* (1887). W.M.C.

COMSTOCK, CYRUS BALLOU, an American military engineer; born in West Wrentham, Mass., February 3, 1831. He was graduated from West Point Military Academy in 1855, and after several years as an instructor in engineering was called to Washington to erect defenses for the National Capitol. In 1862 he was chief engineer with the army of the Potomac and was senior engineer at the siege of Vicksburg. He was chief engineer in the assault and capture of Fort Fisher, and in 1865 was aide-de-camp to General Grant. At the close of the war he held the rank of brevet brigadier-general of regulars and brevet major-general of volunteers. He was president of the Lake Geodetic Survey, president of the Mississippi River commission and member of the Permanent Board of Engineers for Fortifications. In 1884 he was made a member of the National Academy of Sciences. He was placed on the retired list of the army in 1895. W.M.C.

COMSTOCK, JOHN HENRY, an American entomologist; born in Janesville, Wisconsin, February 24, 1849. He was graduated from Cornell University in 1874. In 1879 he was United States Entomologist, and in 1881 became professor of entomology and zoölogy at Cornell. His books include *Report on Cotton Insects* (1879); *Introduction to Entomology* (1888); *Manual for the Study of Insects; Insect Life* (1901) and *Elements of Insect Anatomy* (1903). W.M.C.

COMSTOCK, JOHN LEE, an American author; born in Lyme, Connecticut, in 1789. He studied medicine and during the War of 1812 was assistant surgeon on the northern frontier.

He wrote *System of Natural Philosophy* (1831); *History of the Greek Revolution* (1828); *History of the Precious Metals* (1849); *Natural History of Quadrupeds* (1829); *Grammar of Chemistry* (1825); *Introduction to Botany* (1835). He died in Hartford, Connecticut, Nov. 21, 1858. W.M.C.

COMSTOCK LODE. See NEVADA, Vol. XVII, p. 377; MINING, Vol. XVI, p. 492; and also SILVER AND SILVER-MINING, in these Supplements.

COMZA RIVER. See AFRICA, in these Supplements.

CONANT, THOMAS JEFFERSON, an American Biblical scholar; born in Brandon, Vermont, December 13, 1802. He was graduated from Middlebury College in 1823 and became a tutor at Waterville College and the Rochester Theological Seminary. In 1857 he was appointed by the American Bible Union one of a committee to prepare a revision of the English version of the New Testament. He was also a member of the American committee on the English revision of the Old Testament. His publications include *Hebrew Grammar* (1856); *Matthew, Revised Version* (1860); *Genesis, Revised Version* (1868); *The New Testament; Common Version Revised* (1871); *Proverbs, Revised* (1872); *Prophecies of Isaiah* (1874), and *Historical Books of the Old Testament, Joshua to II. Kings* (1884). He died in Brooklyn, N. Y., April 30, 1891. W.M.C.

CONCENTAYNA, a town of Valencia, southeastern Spain, situated on the southern slope of the Sierra Mariola. It has manufactories of linen, woolen, paper, soap, etc. Population, 7,756.

CONCENTRATION OF ORE. See SILVER AND SILVER-MINING, in these Supplements.

CONCEPCION DEL URUGUAY, distinguished from several other places called simply CONCEPCION, is an important city in the province of Entre Rios, in the eastern part of the Argentine Republic. It lies on the Uruguay River, which forms the eastern boundary of the Republic, 157 miles north of Buenos Ayres, has much commerce, and had in 1900 a population of 13,654. W.F.J.

CONCEPTION, NATURE OF MENTAL. See PSYCHOLOGY, Vol. XX, pp. 62, 83.

CONCEPTUALISM. See SCHOLASTICISM, Vol. XXI, p. 442.

CONCERTINA, a portable musical instrument invented by Sir Charles Wheatstone in 1829, consisting of a pair of bellows, usually polygonal in form, with a set of keys at each end, which, on being pressed, admit wind to fill metallic reeds. The name is often improperly applied to inferior instruments of similar nature, as the *accordion*, which has a single keyboard, sounds notes in one key only and produces different notes on expanding and compressing the bellows. In the English concertina the compass is very extensive, beginning with the lowest note of the violin, G, and ascending chromatically for three-and-a-half octaves to C. Violin, flute, and oboe music can be performed on the concertina with good effect. Either sound on the scale is double and can be produced by pulling the bellows open, or by pressing them together. Much variety of tone can be produced by a good performer, and it has the power of being played with great expression. There are tenor, bass, and double bass concertinas with great variations of size and shape. W.R.B.

CONCERTO, the name given to an instrumental composition designed to show the skill of an executant and usually accompanied by an orchestra. Ludovico Viadana, in 1602–03, published a series of motets for voices and organ which he called "Concerti Ecclesiastici," but the real inventor of the modern concerto as a concert piece was Giuseppe Torelli, who in 1686 published a "Concerto da Camera" for two violins and bass. From the beginning of the last century to the present time the piano and violin were the sole instruments mostly used in concertos. The modern form of the concerto was finally settled by Mozart. W.R.B.

CONCH, originally a shell-fish, but now more particularly the shell of a large gasteropod. It is often used as an instrument of call in Hindoo temples and West India plantations. W.R.B.

CONCHIFERA, a term used by Lamarck to designate the bivalve molluscs, such as the oyster, and the brachiopods. See MOLLUSCA, Vol. XVI, p. 710. R.W.C.

CONCHOID OF NICOMEDES, in geometry, a plane curve of the fourth order invented by Nicomedes. If from a fixed point (the pole) straight lines be drawn intersecting a fixed straight line (the asymptote), and on these lines points be taken at a constant distance from their intersections with the asymptote, this succession of points will form a *conchoid of Nicomedes* consisting of two branches, one on each side of the asymptote. W.R.B.

CONCHOLOGY, that branch of natural history which deals with the shells of mollusks. From the time of Aristotle the beauty and variety of these structures have made them favorite objects of study, and few zoölogical subjects have excited so much popular enthusiasm. The study often became unscientific, and sometimes a craze. Since the shells are only external coverings, and seldom were considered in relation to their tenants, or in connection with the internal and external influences to which they owe their shapes, conchology has been somewhat barren of scientific results.

CONCINI, CONCINO, MARQUIS D'ANCRE, BARON DE LUSIGNY, a Florentine adventurer; born in Florence, and accompanied Maria de Medici (queen of Henry IV of France) when she went to Paris in 1600. He married Eleonora Galigai, a favorite attendant of the queen. Concini made his mark by his talents for intrigue, and on Maria becoming regent in 1610, his fortune was assured. In 1613 he was appointed a marshal of France and prime minister. His rapacity having provoked general and widespread hatred, he was assassinated near Paris, April 24, 1617.

CONCLAVE, the secret meeting of the college

of cardinals for the purpose of electing a pope. (See also CONCLAVE, Vol. VI. p. 213.) The Saviour himself, according to Catholics, selected the first pope, St. Peter, but nowhere in Scripture or tradition can any law be found by which he determines by whom, or in what manner, the succeeding pontiffs are to be chosen. Hence, from time to time, the church has enacted laws on this matter, which, also, have been changed whenever necessity required it. Whether the pope can choose his own successor is a controverted and difficult question among canonists. While all admit that the pope has the power of determining by whom and in what way his successors shall be chosen, nevertheless they hold diametrically opposite views as to whether he can select his own successor. Pope Boniface II, in 529, actually appointed his successor, but the next year he annulled his decree. On the other hand, Pope Celestine III wished to resign the papacy in favor of Cardinal John de St. Paul, but because such an action was unknown in the church he determined not to do it. Under Pope Paul IV the question was discussed in consistory, and he, with a majority of the cardinals, thought the affirmative opinion should be rejected as false, but no decree was issued on the subject.

The method of selecting the pope has been different in different ages. In the beginning of the church the election pertained to the priests and deacons of the city of Rome. But from the time of St. Sylvester, when the Christian religion began to be professed publicly, the whole Roman people had a certain part in his election, by bearing testimony to his life and character. Throughout the first four centuries, while the pope was selected in this way, the greatest liberty prevailed. But from the fifth to the eleventh century, emperors and kings usurped great authority in the matter, so much so that at times the election ruled by them was clearly injurious and invalid, and was declared so by those who had the right of suffrage. To preclude such injurious interference on the part of temporal authority, in the year 1059 Pope Nicholas II prescribed a certain form and method for filling the Roman see, which was published in the Lateran Council, and by which the cardinal bishops (see CARDINAL, in these Supplements) were declared the electors of the sovereign pontiff, while to the other cardinals, the clergy and the Roman people it was left only to consent to the election made by these cardinals. In the year 1178, in another Lateran Council, Pope Alexander III decreed that the election of the sovereign pontiff should pertain to all the cardinals, but to them alone, and that he who received two thirds of the votes of all the cardinals participating in the election should be the pope.

A vacancy occurs in the Apostolic See when the pope resigns or dies. Notice of the vacancy is sent to all cardinals, and without being summoned, but guided only by the law, after the funeral services of the deceased pope, on the morning of the eleventh day after his death, they enter the conclave under the presidency of the cardinal dean. The conclave must be held in the city where the pope dies, unless by special decree to the contrary. The windows in that section of the palace or building devoted to the conclave are walled up, and also all doors except one, which is doubly locked, one key being kept by the cardinal camerlengo, the other by the governor of the conclave. Food is introduced through a turning box, which is also doubly locked. There is, however, a small opening or window through which audience may be given to the ambassadors of those nations which claim the privilege of each excluding one objectionable candidate. A strict watch is kept by prelates assigned for that purpose, so that no letter or message may be transmitted to or from the conclave, and severe punishment follows an offense in this matter. Inside the conclave, and subject to its restrictions, each cardinal is allowed to bring two servants, who must have been in his employ for at least a year, and must be real servants, not brothers or nephews, of the cardinal. Besides these, there are several officials, such as the sacristan, masters of ceremonies, physicians, barbers, a carpenter, a mason, and some servants for general work. During the balloting every one is excluded from the chapel, except the cardinals.

The election of a pope may be accomplished in three ways: By quasi inspiration, when all the cardinals unanimously and at once agree on the same person, without there having been any previous deliberation on the subject; by compromise, when the cardinals commit the right of choosing the pope to a few specified persons; or by ballot.

The governments of Austria, France and Spain claim the privilege of each excluding one candidate who is objectionable. Whence this privilege originated, or at what time, is unknown, but a diligent examination fails to reveal any trace of it in canon law or in any concordat granted by the Holy See. Many writers claim it is wholly a usurpation. However, it has been exercised even in the present century, and though Pius IX, in three bulls, published in 1871, 1872 and 1873, entirely abolished all rights or privileges of exclusion, still, in the conclave which elected his successor, Cardinal Bonnechose, in the name of France, opposed Cardinal Bilio after the first ballot. Cardinal Pecci, who took the name of Leo XIII, was elected then. Because of the loss of the Papal States, and the possible interference of secular governments, Pope Leo XIII issued several regulations for future conclaves, specifically denying all privileges assumed by these governments in the past in regard to conclaves.

If no choice is made the first day, two sessions are held each day until a pope has been elected canonically. Meanwhile, in all the churches of Rome and the world, special prayers are offered. As soon as the tellers find that some candidate has received two thirds of the votes, his name is declared. If the newly elected pope is present, the cardinal dean asks him whether he consents, and if so, what name he intends to take. Then

he is placed before the altar, where he receives the salutation of all the cardinals. The camerlengo then places the fisherman's ring on his finger. In the mean time the senior cardinal deacon goes to the balcony over the entrance to the palace, and announces to the people the election of the new pontiff. The castle of San Angelo then fires its guns, and the bells of the city churches are rung, in salute. Ordinarily, the pope immediately goes to St. Peter's Church, where the *Te Deum* is sung in thanksgiving.

P. A. Baart.

CONCOMITANCE, Sacramental, is the doctrine of the Roman Catholic Church, as established by the Council of Trent, that the body and blood of Christ are given both under the form of bread and under that of wine; hence that he is received whole and entire when taken under the form of bread alone or wine alone. Since the Council of Constance, the principle has been fixed in that church that Christ was given whole and entire under either species. The Protestant Church maintains that the officiating priest receives both body and blood twice, and that it holds equally good for one kind in the sacrifice of the mass.

CONCONULLY, a village and the capital of Okanogan County, central northern Washington, on the Conconully Creek, 18 miles above the Okanogan River. It is in a rich mining district, where gold, silver and lead are found. Population about 300.

CONCORD, Massachusetts, one of America's most historic towns, is in Middlesex County, 17 miles east of Boston. It was the scene of one of the first engagements of the Revolutionary War, and has since been known as the home of a number of eminent men, including Emerson, Thoreau, Hawthorne, Alcott, and others. It is reached by the Fitchburg and the Boston and Maine railroads. Its population was 5,652 in 1900. W.F.J.

CONCORD, a city and the capital of Merrimack County, central southern New Hampshire, and capital of the state, on the Boston and Maine railroad. The Merrimack River divides the city into two portions, which are connected by seven bridges, three of them railroad bridges. The streets are wide, well paved and lighted. The chief educational institutions are St. Paul's (Episcopal) School, a public high school, and several graded schools. It has also a public library, and a state library containing 11,000 volumes. Its principal public buildings are the state house, built of granite, city hall, state prison, two orphanages, a home for the aged, and a state insane asylum. Concord has many fine hotels and extensive manufacturing interests, but chiefly is noted for its valuable granite-quarries. Population 1890, 17,004; 1900, 19,632. See Concord, Vol. VI, p. 214.

CONCORD, North Carolina, a city and the county seat of Cabarrus County, in the south central part of the state. It is in the valley of the Yadkin River, and is reached by the Richmond and Danville Railroad. Its population was 4,339 in 1890 and 7,910 in 1900. W.F.J.

CONCORDIA, a town of the Argentine state of Entre Rios, on the Uruguay, 302 miles N. of Buenos Ayres by river, on the Argentine Republic railroad. It has a custom-house, and a river trade exceeded only by that of Buenos Ayres and Rosario. Population, 14,800.

CONCORDIA, a city and the county seat of Cloud County, Kansas, in the northeast central part of the state. It lies on the Republican River, in an agricultural and stock raising country, and is an important railroad center, and shipping point for produce, being reached by the Atchison, Topeka and Santa Fé, the Missouri Pacific, the Union Pacific, and the Burlington and Missouri River railroad in Nebraska. Its population was 3,184 in 1890 and 3,401 in 1900. W.F.J.

CONCUSSION of the Brain. See Insanity, Vol. XIII, pp. 107–114.

CONDENSED MILK consists of cow's or goat's milk which has been evaporated in vacuum pans to about one fourth of its volume, and sugar added to the amount of about one and one quarter pounds to the quart of condensed milk produced. It is also prepared without sugar, but the unsweetened article requires refrigeration, to be kept for any considerable length of time. But little change has been made in the methods of condensing milk since the process was first patented and perfected, but the consumption of the article has increased to such an extent that it is estimated that in 1896 fully 500,000,000 gallons of milk were used by the condensing companies now doing business in the United States. The best condensed milk will keep for an indefinite time, stand changes of temperature and climate, and, being ready for instant use by the addition of amounts of water varying with the purposes for which it is intended, it has become one of the staple articles of commerce. See Milk, Vol. XVI, p. 317.

CONDENSERS. See Electricity, Vol. VIII, p. 32; also Electricity, §§ 34, 35, in these Supplements.

CONDITION, in law, a declaration or provision that upon the occurrence of an uncertain event an obligation shall come into force or shall cease, or that the obligation shall not come into force until a certain event. Such conditions are known, respectively, as precedent or subsequent, resolutive and suspensive.

CONDITION, in logic, that which must precede the operation of a cause. It is not regarded as that which produces an effect, but as that which renders the production of one possible. For instance, when an impression is made on wax by a seal, the seal is said to be the cause; the softness or fluidity of the wax, a condition.

CONDITIONED, Doctrine of the, relates to the philosophical system of Sir William Hamilton. See Vol. XI, p. 373. R.C.A.

CONDONATION, a legal term used to express the act or course of conduct by which a

husband or wife is held to have pardoned a matrimonial offense of which the other has been guilty, conditionally on a promise of future behavior. Thus if a wife voluntarily cohabits with her husband after she has discovered that he has been guilty of adultery, she is held to have condoned the offense, and such condonation is a bar to an action for divorce unless the original offense has been revived by subsequent matrimonial offenses.

CONDUCTIVITY. See ELECTRICITY, Vol. VIII, p. 49; also ELECTRICITY, §44, in these Supplements.

CONDUCTORS AND INSULATORS. See ELECTRICITY, § 6, in these Supplements.

CONDUCTORS AND NON-CONDUCTORS. See ELECTRICITY, §§ 10, 11, in these Supplements.

CONDURANGO (*Marsdenia condurango*), a Peruvian climbing shrub, the bark of which was introduced into therapeutic use in 1871. Known also as cundurango, or "condor vine" because the condor eats its leaves as an antidote to the venom of serpents. W.R.B.

CONE, in botany, a flower whose sporophylls (stamens and carpels in flowering plants) are inserted close together upon an elongated axis, forming an approximately cone-shaped body. The most notable illustration is the characteristic carpellary cone of the pines, spruces, etc., which gives the name *Coniferæ* to one of the three great divisions of Gymnosperms. It should be said that the morphology of the cone of *Coniferæ* is in dispute, some regarding it as a cluster of flowers, rather than a single flower. Cones are also common in *Equisetum*, *Lycopodium* and *Selaginella*, genera of Pteridophytes, although they are included among what commonly are called "flowerless plants."

CONEMAUGH FLOOD, a name given to the most disastrous flood known in American history. It occurred in Johnstown, Pennsylvania, in the afternoon of May 31, 1889. About ten miles above Johnstown, on the South Fork Creek, a little above its junction with the Conemaugh River, was a dam owned by the "South Fork Fishing and Hunting Club," an organization of wealthy men, most of them residents of Pittsburg. By means of that dam the water of the creek and upper watershed had been accumulated, forming an immense reservoir, bearing the name of Conemaugh Lake, stocked with fish. Weakened by heavy rains, the dam gave way and the freed waters rushed down the valley with the speed of a race-horse, sweeping away most of the hamlets and villages of Woodvale, Conemaugh, South Fork, Mineral Point, Morrellville, and the large villages of Cambria City and Johnstown—the whole borough familiarly called Johnstown City—embracing, with the hamlets and villages, an estimated total population of 45,000 living on the direct line of the flood. The wreckage was complete, and was rendered more appalling by the obstruction of floating wreckage at the stone bridge of the Pennsylvania railway. Whole houses, in which families were imprisoned, at this point were hurled bodily upon each other, or submerged beneath the rushing waters. Then the obstructed timbers caught fire from an overturned stove. Pinned in the wreck, hundreds of men, women and children were burnt to death.

The loss of life in the valley reached a total of 2,500; 99 entire families were lost.

An appeal for aid met with generous response, both in the United States and abroad. A Flood Relief Commission was appointed to receive the donations, which reported the total cash contributions as $4,116,801.58. Of this amount, $2,912,346.30 passed through the hands of the relief commission, divided as follows: Contributions sent to Governor Beaver, $1,236,146.45; contributions disbursed by Philadelphia Permanent Relief Committee, $600,000; by Pittsburg Relief Committee, $560,000; by New York Relief Committee, $516,199.48. The expenditures by the commission were $2,845,140.83, of which $2,592,936.68 went to the relief of the Conemaugh valley, $246,475.26 to the relief of other portions of the state, and $5,728.89 for general and office expenses.

CONEY ISLAND, one of the chief popular resorts of New York city, lies at the southwestern end of Long Island, from which it is separated by Sheepshead Bay and a narrow tidal creek, and forms part of the borough of Brooklyn, City of New York. Its name is derived from that of its former owner, a man named Coney or Cooney. It is about six miles long, from east to west, and at no point as much as a mile wide; and it consists almost entirely of beach sand. The western extremity, formerly known as Norton's Point and then a resort of prize fighters, but now called Sea Gate and occupied by wealthy and exclusive residences, forms the eastern side of the entrance to New York Bay, and is famed as the scene of Henry Hudson's landing in 1609. East of it is a large tract devoted to summer homes for the sick children of the poor. Then comes Coney Island proper, a community with a permanent population of several thousand, and with a transient population in summer often exceeding 250,000. It consists largely of cheap hotels, music halls, theaters, drinking places, restaurants, and all imaginable places of amusement and entertainment, together with vast bathing establishments along the beach. In recent years its character has been much improved by the creation of large amusement parks and buildings providing entertainment of a really high class. East of it lies a city park, and beyond this the Ocean Parkway, a great boulevard, reaches the beach from Prospect Park, in Brooklyn, five miles away. Here are several fine hotels. East of the Parkway is Brighton Beach, with a large hotel and a race track, and beyond it, occupying the eastern half of the island, is Manhattan Beach, with two of the largest and finest seaside hotels in the world, a summer theater, and a vast enclosure in which elaborate firework spectacles are given. All parts of the island are reached by electric railroads and driveways from New York and Brooklyn, and two or

three lines of excursion steamers run thither during the summer season. W.F.J.

*CONFEDERATE STATES OF AMERICA OR SOUTHERN CONFEDERACY. From its inception compelled to defend its claim of independence by force of arms, the external history of the Confederacy of America is the history of the Civil War; and that will be found recorded under UNITED STATES, Vol. XXIII, pp. 814 et sq.

It remains only to give a brief account of the interior political history of this government. From the days when South Carolina attempted to nullify the tariff of 1828 up to the admission of California in 1850, national politics had turned upon the effort to maintain an equilibrium between Northern and Southern states. Until the latter part of this period the predominance of the South in public matters practically went unchallenged. As stated by Alexander H. Stephens, for sixty years Southern Presidents had ruled the United States, as compared with 24 years' tenure of office by statesmen chosen from Northern states; 18 judges of the supreme court had hailed from the southern side of Mason and Dixon's line, as against 11 from the northern side. In the matter of the presidents of the Senate (*pro tem.*), 24 Southerners had filled the office, as compared with 11 Northerners; of 35 speakers of the House of Representatives, no less than 23 were from the South; of Attorney-Generals, 14 were Southerners to 5 of the colder climate; 86 foreign ministers out of 140 had been furnished by the land where cotton was king; while, to complete the picture, a vast majority of the army and navy officers, and fully two thirds of the Federal office-holders, were natives of that section of the country, which contained one third of the white population of the republic, and seemed to rule the remaining two thirds.

The causes which brought about the clash between the North and South in feats of arms were as follows: The War of 1812 merged all partisan differences into one policy, represented by Monroe. His administration was Democratic (then called Republican) in name, but Federalist in measures, and its exemption from political factions led men to style the times "the era of good will." New political alignments were to grow out of the ambition of members of his Cabinet, which contained Crawford of Georgia, John C. Calhoun, John Quincy Adams and William Wirt. Calhoun, a man of great insight and force of character, and not destitute of ambition, sought to make his section a unit in national affairs and thus preserve its ascendency, as a united South could have a predominance denied a divided North. If he could establish such a political equilibrium, there would be the reward of Southern gratitude, and the probable possession of the White House at Washington for a Presidential term or two. His own state of South Carolina, in its attempted nullification, was left without general support, and it was seen that neither questions of trade nor any abstract notion of states' rights would unite the South. At this time slavery had virtually disappeared north of Mason and Dixon's line, and that institution had become localized. It furnished an adequate ground upon which to build Southern unity, and it was the labor of Calhoun's life to bring that about. Long after his death the preservation of the equilibrium between the Northern and Southern states lay at the core of national politics. The issue was the more unfortunate, as it was not one of simple expediency, but touched the moral sentiment of the nation, making sensitive those who defended slavery, and aggressive those who opposed it. It left no secure basis for compromises; and these, when made, were short-lived.

From 1833 until the firing upon the *Star of the West*, slavery, its extension or restriction, was the dominant issue between the great parties, and the South, with honest logic, believed that those who would restrict would ultimately extinguish.

When the question arose of law for the organization of Kansas, the administrations of both Pierce and Buchanan threw their weight on the side of the slave power in that territory. The turmoil and violence attending the organization of Kansas constituted the first physical strife between the slave and free states for predominance on any given territory, and the free states party won. It then became evident that the South had lost control forever of the long-maintained balance between slave and free states in the United States Senate, in so far as that balance rested upon an equal number of both kind of states in the Union. A feeble defense for the Southern institution was found in the Supreme Court, which, in the Dred Scott case, ruled that slavery was an institution of domestic concern, intrenched as such in the Federal constitution, and that any legislation concerning it was beyond the power of Congress. Owing to the feebleness inherent in the judiciary, especially in times of high political passion, it was seen that the Supreme Court was but a broken reed for Southern hopes, and in Mr. Buchanan's Cabinet there were men who began at once to plan for the success of a secession movement, which was foreseen to be imminent. Vessels of the navy, by a Northern Secretary of War, were sent far away; arms and munitions of war were removed from Northern to Southern arsenals; the credit of the government was impaired. At this time it was given out that the Republican party, which had evinced surprising strength in the elections of 1856, would, if it elected a President, justify the South in retiring from the hated compact of Union.

In order to bring about this pretext for disunion, fire-eating leaders contrived to disrupt the Democratic convention which met in Charleston in 1860. Had the Democratic party then been united it would still have controlled all departments of the government. Instead thereof, two Democratic tickets, one headed by Breckenridge of the states' rights party, and the other by Douglas as the regular nominee, were put in the field, and Mr. Lincoln, in consequence, obtained a

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majority of the electoral votes and was made President. Mr. Lincoln's popular vote was nearly four hundred thousand less than the ballots cast for the two Democratic nominees.

The day after the election, and on mere report that Mr. Lincoln had been constitutionally chosen President, the legislature of South Carolina summoned a convention to meet at Columbia to take that state out of the Union and pass bills for enrolling and arming the militia. On the 20th of December the convention of that state seceded in a manner subsequently followed by all other states that joined the Southern Confederacy, namely, by simply repealing all former acts ratifying the Federal constitution. At once the governor confiscated all United States property in the state except Fort Sumter, in Charleston harbor, to which Major Anderson, in anticipation of this action, had transferred from Fort Moultrie a little garrison of eighty men.

The course of South Carolina was followed by Mississippi on the 9th of January, 1861; on the 10th by Florida; on the 11th by Alabama; on the 19th by Georgia; on the 26th by Louisiana; and on the 1st of February by Texas. The Federal government was able to hold Fort Pickens, in Pensacola harbor. Thus there were seven states avowedly out of the Union, and they were resolute to draw to their support the remaining eight slave states.

In Washington the winter passed with dissension and strife in the Cabinet, and in futile efforts to find some method of compromise. Cass left the Department of State in December because President Buchanan would not reinforce the troops in Charleston Harbor; Cobb abandoned the Treasury in January, and went home to Georgia to forward the secession of that state. In December, Floyd forsook the War Department because Fort Sumter and Pensacola were not given up to the states in which they were located. Thompson of the Interior Department was engaged in efforts to instigate the secession of North Carolina, acting as the agent of Mississippi for this purpose, while still holding office under the government he was trying to disrupt. By the middle of January, Mr. Buchanan's Cabinet was reconstructed, but no aggressive movements could be expected from it during that President's term. In February, General Twiggs, having the largest collection of troops of the army under his command, surrendered it in Texas to an officer of the provisional Confederate government. Many of the officers and privates came North and did good service for the Union cause.

On the 4th of February, 1861, a congress of delegates from the seven seceded states met in Montgomery, Alabama, prepared a provisional constitution, and elected Jefferson Davis President and Alexander H. Stephens Vice-President. It then proceeded to draw up a permanent constitution, which was adopted unanimously on the 11th of March. But the President and Vice-President remained in provisional office until the 22d of February, 1862, when they were inaugurated for a term of six years by virtue of an election held in the Confederacy in the preceding October. On the 21st of May, 1861, the government and Mr. Davis removed to Richmond, Virginia, and on the 18th of February, 1862, the first Congress under the permanent constitution assembled in that city.

The Confederate constitution was framed upon the lines of that of the United States; it differed from that in the recognition of the sovereign and independent character of each state in the Confederacy; in the declaration that slavery was to be protected in all new territories; in the prohibition of protective tariffs and of the expenditure of Confederate money for internal improvements; in the lengthening of the executive term to six years, and making the President ineligible for re-election; in conferring upon the heads of departments the right to debate in Congress. New states were to be admitted on a vote taken by a poll of the states; state legislatures could impeach Confederate officers each within its own jurisdiction. The declaration of free trade was virtually a device to secure the support of Great Britain, whose textile industries were dependent upon the export of cotton, and whose traditional policy was always for securing and retaining new markets. The constitution further provided for the rendition of fugitive slaves to their owners, and that five slaves should count as three persons in the basis of representation or taxation. The new Congress immediately began to emit bills of credit payable ninety days after the Confederate States had secured their independence. The new government passed almost immediately to a paper currency, which from time to time was emitted freely, until before the close of the war it was practically valueless, and financially the Confederacy was virtually in the same condition as France in 1792. A small loan of ten million dollars was taken in France and England. It was proposed at that time that a loan of fifty times as much should be offered abroad in order to secure in foreign countries financial interest in the success of the Confederate arms, and also to give ground for interference in the American strife by the governments of France and England. Mr. Davis's government had not the courage to make this attempt, and those who had invested in his foreign securities eventually lost their money.

When Mr. Lincoln was inaugurated he found an enemy in possession of seven states, occupying over 560,000 square miles, and inhabited by nearly five million persons, of whom about half were black. In the eight border states was a population of seven and a quarter millions and an area of about 320,000 square miles, in which the ratio of the blacks to the whites was less.

Much depended upon the course that should be taken by the border states, in which there existed a strong sentiment of Union. In fact, this sentiment was so strong that the friends of secession were fearful of risking their case in conventions and popular elections. It was felt that some bold and bloody means should be

taken to break up the passive attitude of the border states. The occasion for firing the Southern heart was found at Fort Sumter, then besieged by an army of seven thousand men under Beauregard. The attempt to provision that fort in January had been frustrated by arms, and the steamer *Star of the West* fired upon. On the 11th of April, 1861, the Confederate general, Beauregard, demanded the surrender of the fort, and on the refusal of his terms, ordered its bombardment. On the following morning, fire was opened, and on the 13th Major Anderson surrendered his feeble garrison with the honors of war. The effect was electric, and the response of the North was the rapid gathering of militia to the defense of Washington.

On the other hand, the border states were quivering with excitement, and contemptuously refused to place their militia under the command of President Lincoln. Virginia, which, on the 4th of April, had defeated the secession ordinance by a two-thirds vote, in convention on the 17th voted it in secret session, and her executive authorities proceeded at once to seize the Norfolk navy-yard and Harper's Ferry arsenal, with their immense stores of ordnance and ammunition.

These summary proceedings were not acquiesced in by the western part of the state, where forty counties refused to recognize the secession ordinance of the convention. On the 11th of June these counties organized a convention which declared them a separate state, and established a local provisional government to act until such time as the state was organized more regularly and admitted into the Union. Arkansas and Tennessee joined the Confederacy on the 6th of May, but eastern Tennessee admitted no allegiance to the confederated states, and was only held in subjection to them by military occupation. North Carolina seceded on the 20th of May, and there the process of disruption practically ceased.

Fresh governments were set up in Kentucky, Missouri, and even in Maryland, but their officials had neither resources nor effectual authority. Recruits for the Confederate army were obtained in the border states with considerable freedom, but Delaware, from its position, was helpless.

The government established by Mr. Davis under the permanent constitution consisted of Judah P. Benjamin as Secretary of State; Charles G. Memminger as Secretary of the Treasury; James A. Seddon as Secretary of War; Stephen R. Mallory as Secretary of the Navy; and John H. Reagan as Postmaster-General. The Confederate Congress finally lost all semblance of independence, and became absorbed in the military situation and in criticisms of Mr. Davis. The government degenerated into a military despotism, the act of *habeas corpus* was suspended, conscriptions grew severer, until all the white male population between 17 and 55 years of age was enrolled in subjection to military orders. Congress usually sat in secret session, but in November, 1864, it fell into useless criminations and complaints of Mr. Davis, and into an impotency which left all the vitality of the Confederacy to the President and General Lee.

The overthrow of the Confederate troops in the field put an end to the existence of the Confederate States of America. On the surrender of Lee, Mr. Davis and his cabinet fled from Richmond, some of them abandoning the country. Mr. Davis was taken prisoner in Georgia while on his way to the sea-coast of Florida. The last of the Confederate armies to surrender was that of General Kirby Smith, in the country west of the Mississippi, on the 26th of May, 1865.

It still remains for some competent and unprejudiced historian to weave into a just narrative the vast material which the Civil War produced. Until this shall be accomplished perhaps the best extant authorities upon the subject are *The War Between the States* (1870), by A. H. Stephens; *The American Conflict* (1866), by Horace Greeley; and *A History of the American Civil War* (1870), by John W. Draper.

D. O. KELLOGG.

CONFEDERATION OF THE RHINE. See NAPOLEON, Vol. XVII, p. 217; GERMANY, Vol. X, p. 451; and AUSTRIA, Vol. III, p. 116.

CONFERENCES, in diplomacy, see CONGRESS, Vol. VI, p. 239; in religious bodies, see METHODISM, Vol. XVI, pp. 195 et seq. and METHODIST CHURCHES, in these Supplements.

CONFERVA, a genus of green, filamentous, unbranched algæ, belonging to the family *Ulothricaceæ*. The family reproduces by the formation of motile spores (*zoöspores*) formed in any cell. In some cases smaller zoöspores are formed which fuse in pairs and form a heavy walled spore (*zygospore*), such a process being sexual. The name *conferva* was formerly applied to all green filamentous algæ, but has now been much restricted.

CONFESSION is a technical term widely used in law and theology. In law it is the acknowledgment of a debt made by the debtor to the creditor, or an acknowledgment of guilt made by a criminal to the court. In ecclesiastical affairs confession is one of the sacraments of the Roman Catholic and some other churches, and consists in the personal confession of sins to a priest, usually followed by the giving of absolution or the imposition of penance. Theologically it is applied to various statements of faith or creed, as the Augsburg Confession, the Westminster Confession, etc. W.F.J.

CONFISCATION, the act of appropriating, without compensation, private property to the public use; also, the act of seizing, by authority, property improperly obtained or held; as, to confiscate a set of burglar's tools or a set of gambling implements. When the goods of a criminal are declared forfeited, and adjudged to the public treasury, they are said to be confiscated. By the terms of an act of Congress passed in 1861, all property used for insurrectionary purposes was declared confiscated. In some European countries confiscation of the estates of an offender has been

imposed as a punishment for certain political offenses.

In international law it is a general rule that the goods of an alien enemy may be confiscated when found within the state, unless there be treaty to the contrary. In the United States it is the rule that the strict right of confiscation exists only in Congress, and without an act of Congress the goods of an enemy found in this country cannot be forfeited. The custom in modern times is usually to provide by treaty, in case of war, that the subjects of each state residing in the territory of the other shall be permitted to remain and continue their business without interference, thus recognizing the right of confiscation under such circumstances, but waiving the right for the purpose of protecting the interests of the citizens of each country who may reside or transact business within the territory of the enemy. Debts due from citizens of one state to citizens of an enemy may be confiscated in the same manner as other property, even though they were contracted during times of peace. Goods which are contraband of war, or have been captured while under the protection of the enemy, are always confiscated.

CONGER, Edwin H., U. S. Envoy Extraordinary and Minister Plenipotentiary at Pekin, was born in Knox County, Ill., March 7, 1843, and graduated in 1862 from Lombard University, Galesburg, Ill. On leaving college, he entered the Union army as lieutenant, and later reached the rank of captain. He was subsequently brevetted major for gallant conduct on the battlefield. After the Civil War he studied law, graduating from the Albany Law School in 1866, and after being admitted to the bar practiced law in Galesburg. In 1868 he removed to Iowa and engaged in stock-raising and banking. From 1882 to 1885 he was State Treasurer of Iowa, and in 1884 was elected to Congress from Iowa. He served three terms in Congress and was appointed U. S. Minister to Brazil by President Harrison. In 1897, he was transferred to Pekin, where he has since served the United States as Minister to China. Throughout the anxious months of midsummer 1900, he was besieged by the Boxers, along with the representatives of the European governments, at the Chinese capital.

CONGREGATIONALISM IN THE UNITED STATES. For an account of the rise of Congregationalism and its gradual development into an ecclesiastical polity of individual church autonomy, see Independents, Vol. XII, pp. 761–767; Congregationalism, Vol. VI, pp. 238, 239. The early settlers in New England, the Puritans, who followed the Pilgrims and landed in the wilderness "for conscience' sake," were not Separatists or Congregationalists. They were dissenters, who still held it an honor to call the "Church of England, from whence wee rise, our deare mother," and who separated only from the sinful corruptions in the worship of God in the mother church. The Presbyterianism of England was likewise transplanted to Massachusetts, and Thomas Parker and James Noyes, who came over in 1634, did not hesitate to teach and preach the essential polity afterward held by a majority of the Westminster Assembly. Indeed, the New England churches early resolved themselves into more or less antagonistic bodies, some holding to "Brownism," some to the "Presbyteriall-government," and some to a middle way between these two, which was ably set forth by John Cotton in his famous book, *The Keys to the Kingdom of Heaven.* The Cambridge Platform, in the drafting of which nearly all the churches of New England took part, and which presented a Presbyterian polity, was at least tacitly accepted by the churches, the divergence being rather upon its interpretation than upon the essence of its rules, and more than two generations passed before any important modifications were made.

Difficulties arose out of the union of church and state. In Massachusetts and New Haven, by the king's letter in 1662, the franchise was limited to those who had a "certificate from the minister of the place where they dwell, showing that they be orthodox in religion," etc. Differences as to what constituted orthodoxy led to endless disputes. Furthermore, the churches were divided into synodists and antisynodists. The synodists maintained that the synod should have power of deciding certain controversies regarding church discipline, while the antisynodists held that only advisory authority was vested in the synod of elders. In Boston this led to the division of the First Church, and the establishment, by the seceders, of the "Old South" Church. The same struggle led to the call for a meeting of the associated ministers in 1705, to consult as to what steps should be taken, "that the councils may have due constitution in preserving the interests of the churches in the country." The essential steps taken related to the formation of a council, whose determinations "are to be looked upon as final and decisive," with the proviso, in certain cases, of an appeal to a larger council, which should have power to declare any church failing to accept its decisions as "no longer fit for communion with the faithful." But this was Presbyterian polity pure and simple, and the strife it engendered led ultimately to a restoration of the original Brownism, purged of its inconsistencies, and molded into the modern Congregationalism. But this result was still distant. When John Wise, an Ipswich clergyman, in 1710, in attempting to lead back the churches to the Cambridge Platform, really presented the fallacies of that platform in such a light as to leaven the whole of New England with views opposed to its direct Presbyterianism, the strife was continued by those advocating "consociation of churches"—a new form of council with definite powers—and by the "Associationists," who wished to create a commonwealth of churches. Both these were supported by some, attacked by others, and finally overthrown by the powerful attack of that "second father of Congregationalism," Nathanael Emmons, one of the most convincing preachers of his age, a consistent theologian, and one of the

most pious and noble men in America. His famous axiom,

"Associationism leads to Consociationism; Consociationism leads to Presbyterianism; Presbyterianism leads to Episcopacy; Episcopacy leads to Roman Catholicism; and Roman Catholicism is an ultimate fact."

became a rallying-point for those who believed with him that the platform of church discipline given in Matthew xviii is right and sufficient, and "if we depart from this, there is nothing in Scripture to prevent our being Presbyterians, or Episcopalians, or Papists."

As late as May, 1844, a meeting of Congregational ministers at Boston reaffirmed almost the same principles of polity as those presented by their fathers in 1805. But the work of Wise and Emmons was bearing fruit, and in June, 1865, 502 elders, representing 25 states, met at the "Old South" Church, in Boston, and set forth the following simple declaration of faith and polity, which has since remained the rule of the Congregational Church:

"*Resolved*, That this Council recognizes as distinctive of the Congregational polity,—

"*First.* The principle that the local or congregational church derives its power and authority directly from Christ, and is not subjected to any ecclesiastical government exterior or superior to itself;

"*Second.* That every local or congregational church is bound to observe the duties of mutual respect and charity which are included in the communion of churches one with another; and that every church which refuses to give an account of its proceedings, when kindly and orderly desired to do so by neighboring churches, violates the law of Christ;

"*Third.* That the ministry of the gospel by members of the churches who have been duly called and set apart to that work implies in itself no power of government, and that ministers of the gospel not elected to office in any church are not a hierarchy, nor are they invested with any official power in or over the churches."

To this declaration was added another provision by the assembly of 275 delegates which met at Oberlin, Ohio, Nov. 15, 1871, and organized there the National Council of Congregational Churches of the United States, viz.:

"The churches, therefore, while establishing this National Council for the furtherance of the interests and work of all the churches, do maintain the scriptural and inalienable right of each church to self-government and administration; and this National Council shall never exercise legislative or judicial authority, nor consent to act as a council of reference."

Congregationalism, while it emphasizes church autonomy, also adds the principle that, all churches being of one divine family, owe to each other fraternal affection and communion which is manifested by reciprocal recognition, exchange of membership and working together in harmony for the good of all. Inasmuch as distant churches cannot meet as a body for fellowship and advice, they meet by delegation, and the assemblies of these delegates are termed councils.

Any competent number of believers desiring to be organized or received into fellowship may call a council, or any church needing advice, or any aggrieved member in a church that unreasonably refuses to issue a call, may himself call a council. These calls are usually made through written requests, termed letters missive. Councils called by individuals or churches seeking fellowship, or who desire light, are termed "advisory councils"; those called by two parties who stand in any way antagonistic to one another are termed "mutual councils"; and those called by an aggrieved party whom his fellows have refused to join in the call are termed "*ex parte* councils."

The tendency of the later Congregationalism is toward the extension of the principle of mutual sympathy and advice, to include, also, sister churches of other denominations, recognizing only the common faith in an adherence to the teachings of Christ as these may be understood by each individual according to the light given him. This broad principle of universal brotherhood can scarcely fail to exert a salutary influence.

In 1900 there were in the United States a total number of 5,604 churches, with a total membership of 629,874,—a gain since 1890 of 665 churches and 95,715 members. The average yearly gain in number of churches is about 125. In 1895, $2,187,050 were contributed for benevolent purposes, and $7,035,307 for home expenditures. Seven theological seminaries are maintained, located respectively at Andover, Massachusetts; Bangor, Maine; Chicago, Illinois; Hartford, Connecticut; Oberlin, Ohio; Pacific Seminary at Oakland, California; and the Divinity School at Yale University.

Six societies serve to carry on the united work of the denomination. *The American Board of Commissioners for Foreign Missions*, which was organized June 29, 1810, occupied, in 1895, 20 mission fields, with 1,265 stations; had 572 missionaries, assisted by 3,107 native helpers; had 461 churches in these missions, with a total membership of 44,413; had 1,165 Christian schools, with a total enrollment of 53,000 pupils; and spends annually about $600,000.—*The American Congregational Association* was organized in 1853, "to preserve, improve and promote the best use of the Congregational library, and to further the general principles of Congregationalism." The library contained, in 1895, over 73,000 books and pamphlets, and over 47,000 periodicals.—*The Congregational Church Building Society* was organized in 1853 for the purpose of aiding needy churches in building houses of worship. It receives and disburses annually about $140,000.—*The Home Missionary Society*, which was organized in 1826, has for its object the promotion of home missions, organizing new churches, and assisting in the support of their ministers until these mission churches become self-supporting. Up to 1895 this society had organized 6,339 missions, and had disbursed $17,411,950. The yearly receipts now approximate $800,000.—*The Educational Society*, organized in 1816, has for its purpose the assisting of worthy students in colleges and theological seminaries, and to aid in the support of teachers in home missionary colleges and academies in the West and South. This society expends about $150,000 annually. The amount of aid given to a student is usually $75 per annum; to an academy, from $500 to $1,500; to a college, from $1,500 to $5,000.—*The American Missionary Association*, organized in 1846, originated in a general sympathy for the friendless slaves, and its work is still among the friendless of the colored race. The receipts of the society for 1895 were $307,547; expenditures, $337,334.

CONGREGATIONS, ROMAN, are certain committees of cardinals established permanently for the purpose of hearing and deciding, either in the first instance or on appeal, questions or causes referred to the pope as head of the Roman Catholic Church. (See also ROMAN CATHOLIC CHURCH, Vol. XX, p. 644.) There are at least twenty congregations, not counting the special commissions appointed, from time to time, for the

examination of local or special questions. The cardinals (see CARDINAL, in these Supplements) are assisted by various officials and by consultors, all of whom, in a broad sense, are said to belong to the congregations, though strictly only the cardinals constitute these committees. Formerly, all business was transacted in consistory (see CONSISTORY, in these Supplements), but now only the most important affairs are treated therein.

THE CONSISTORIAL CONGREGATION is a committee for the examination and preparation of business to be treated in consistory. It is composed of cardinals, eight to twelve in number, and the pope himself is its prefect. The secretary is a prelate, the same who is secretary to the College of Cardinals. The process for the appointment of bishops is examined by this congregation, and all matters concerning the erection of dioceses are settled by it. Its office is in the Palazzo della Cancellaria Apostolica. A second congregation, which is auxiliary to the consistory, is that *For Choosing Bishops*. Its work formerly was to gather information in regard to candidates for vacant sees, as well as to suggest to the pope desirable appointments. Practically, to-day it is merged with the committee for the examination of bishops, whose duty it is to examine a person chosen for bishop and find out his knowledge of theology and canon law; for, according to the Fathers of Trent, the simple owning a degree of doctor or licentiate in theology or canon law is not deemed sufficient, but it is required that the one to be promoted to the episcopate shall have obtained this degree meritoriously as the result of work and examination. Still another congregation, that *For Extraordinary Ecclesiastical Affairs*, may be called auxiliary to the consistory. It is a development of the particular committee instituted by Pope Pius VI in 1793, concerning the affairs of the French kingdom. As now organized it consists of fourteen cardinals, with a secretary and eight consultors. The competency of this congregation is not limited to a certain kind of business, but affairs which may be treated in this way better than in the ordinary congregations are assigned to it. Especially, all matters pertaining to concordats and other relations of the Holy See with the governments of the world are committed to it. Further, it treats all the church business of the countries subject to the Russian Empire, and also of those of South America. Its office is in the Vatican Palace, next to that of the Secretary of State. The other congregations may be grouped into those which treat matters of faith, those which attend to questions of worship in the church, and those whose special object is the enforcement of discipline.

THE SACRED CONGREGATION OF UNIVERSAL INQUISITION, or the HOLY OFFICE, was established as a committee in the year 1542 by Pope Paul III. Pope Sixtus V later enlarged and confirmed it as a congregation, and decreed that it should rank as the chief of all the Roman Congregations. The pope himself is its prefect, and the cardinals belonging to it, usually ten, are called cardinal inquisitors. To aid them, twenty-two consultors, six qualificators for examining books, and four lesser officials are assigned to the congregation, all chosen by the pope himself from the most learned canonists and theologians of the secular and regular clergy. They are all bound to absolute secrecy in regard to the questions considered, lest harm come to innocent people through divulging what should remain secret. The sentences and judgments of the Holy Office are the judgment of the Holy See, and are treated by Catholics with great reverence, but they are not considered irreformable, for a rehearing is sometimes granted. *The Congregation of the Index* may be considered an auxiliary of the Holy Office for the special work of examining books and condemning such as may be dangerous to the faith or morals of Catholic people. From the first ages bad and dangerous books were condemned by the church, but Pope Paul IV, in 1559, was the first to make a catalogue of them. The Council of Trent drew up ten rules on this matter, which are still in force, though a revision of them was begun in Rome during 1896. A most careful examination is made of a book before it is prohibited either as bad or dangerous; but the decree of the Index is not considered infallible. Books are sometimes prohibited until corrected. The Congregation of the Index is composed of about thirty cardinals, nearly two thirds of whom live away from Rome. It has also thirty-one consultors and four relators to read books, and report what censure they think should be attached to them. The cardinals in general meeting then decide.

THE COMMISSION FOR THE RECONCILIATION OF DISSIDENT CHURCHES is a new congregation established by Pope Leo XIII, March 19, 1895, for the purpose of considering the questions which may arise concerning the reunion of churches or nations with the see of Rome. The restoration of the Coptic patriarchate and the validity of orders in the Anglican Church were two of the first questions treated in this committee. The pope is its prefect, and eight cardinals were appointed its first members. It has also a proper number of consultors to study and prepare matters referred to it, but the submitting of these questions is performed by one of these consultors designated as secretary by the pontiff.

THE CONGREGATION ON STUDIES tends to preserve the faith and guard the faithful against error, by the institution and proper management of universities and other schools. The first universities, which grew out of cathedral and monastic schools, were approved by the Roman Church, which granted them special privileges, and by its action made the degrees conferred by them receive recognition before the civil as well as ecclesiastical authority. The Congregation on Studies was instituted by Pope Sixtus V as a competent tribunal for the settlement of all questions regarding the rights, privileges and exemptions of these universities. It is now composed of 26 cardinals, one of whom is its prefect, and has a secretary, 11 consultors and 6 officials. The establishment of new universities

and their constitutions are matters over which this committee has jurisdiction. Abuse in conferring degrees (see TITLES, ROMAN CATHOLIC, in these Supplements) by Catholic universities is also in its purview. The congregations which attend to questions of worship in the church are: The Congregations of Rites, on Ceremonies, on Indulgences and Relics, for the Fabric of St. Peter's.

THE CONGREGATION OF RITES was instituted by Sixtus V in 1587. About 35 cardinals, half of whom live away from Rome, make up this committee. They are assisted by 31 consultors and other officials.

THE CONGREGATION ON CEREMONIES is a derivation from that on rites, and it exercises a watchful care over the rites and ceremonies, civil and ecclesiastical, of the court of the pope. It also resolves questions regarding pre-eminence among cardinals and prelates. Further, it instructs those concerned in the conferring of insignia on newly created cardinals. The dean of the College of Cardinals is always prefect of this congregation.

THE CONGREGATION ON INDULGENCES AND RELICS was established by Clement IX, in 1669, to do away with any chance of abuse in the matter of indulgences and relics. It does not grant any indulgence, that being done by the pope, but it sees that indulgences are not abused, and that false relics of saints are not given out as true. Thirty-two cardinals are attached to this congregation. It has also 17 consultors and a secretary, all of whom are prelates, and appointed by the pope.

THE CONGREGATION FOR THE FABRIC OF ST. PETER'S church in Rome is a development of a special committee appointed for the rebuilding of this basilica, and was instituted by Clement VIII in 1593. Formerly it had much work; to-day it has little, other than the care of St. Peter's basilica, the cardinal archpriest of which is always its prefect.

The congregations whose specified object is the enforcement of proper discipline are the Congregation of the Council, with several subordinate committees, and the Congregation of Bishops and Regulars, also with subordinate committees.

THE CONGREGATION OF THE COUNCIL interprets and applies the acts of the Council of Trent in all that relates to discipline, but its faculties do not extend to decrees regarding faith. It is composed at present of 28 cardinals, some of whom reside away from Rome, and it has a secretary, an auditor to summarize cases, and eight officials. A school for young canonists is attached to this congregation. A subcommittee for *Receiving and Examining the Reports of Bishops on the State of their Churches* was instituted by Benedict XIV, in 1740, to relieve the main congregation and facilitate the work of examining and replying to the reports and questions which bishops bring or send to the Holy See at stated times. This is termed the visit *ad limina apostolorum*, and must be made every three or five years by bishops of Europe, and every ten years by those of America and other countries. Another subordinate committee is that *For Reviewing Provincial Councils*, which was established by Pius IX, in 1849, to hasten the review and approval of these meetings of local bishops. Both these committees are made up of some of the cardinals belonging to the Congregation of the Council. In the same way the *Congregation on Ecclesiastical Immunity*, which was instituted by Urban VIII for the protection of the rights and privileges of the church, is now merged into that of the council, and much of its work is done immediately by the Cardinal Secretary of State. The *Congregation on the Residence of Bishops*, also auxiliary to that of the council, treats of questions concerning the obligation of bishops to reside in their own dioceses and other beneficiaries in their benefices. Leave of absence is granted by this committee, which formerly had six cardinals, but whose work is now done by the cardinal vicar of Rome, and the secretary of the Congregation of the Council.

THE CONGREGATION OF BISHOPS AND REGULARS is a union of two committees, one of which treated questions concerning the secular, the other questions concerning the regular, clergy. To insure uniformity they were united in 1601. Twenty-four cardinals make up this committee, and they are assisted by consultors and officials. Questions, either in the first instance or on appeal, which arise between bishops and their clergy, or between the secular and regular clergy, are referred to this committee for settlement, either summarily or by judicial process. By special authorization from the pope, it can also try and remove bishops. Special committees on *The Discipline of Regulars* and *State of Regulars* attend to the observance by religious orders of their special rules and constitutions. Changes are also authorized in these rules when circumstances render them necessary. Most of the work of these committees is now done by that on bishops and regulars.

THE CONGREGATION OF THE PROPAGANDA was instituted to spread the faith in infidel countries and attend to questions of discipline which may there arise among missionaries and bishops. (See PROPAGANDA, Vol. XIX, pp. 831–834.) The Roman congregations usually give no reasons for their decisions. They examine the questions, and simply reply affirmatively or negatively. Though each congregation has its special work, questions once referred to a congregation are treated by it also in those matters which may be in the purview of other congregations. The decision of one congregation is always recognized by all the others. Many cardinals belong to several of these committees, there being only about thirty in Rome to do the work of all. Trials before the congregations, except the Holy Office and the Index, are public. The questions are usually presented to the cardinals in general committee by the secretary of the congregation. When a decision is reached, especially in import-

ant matters, it is referred to the pope for approval. The Latin or Italian language may be used. French is tolerated.

P. A. BAART.

*CONGRESS, AND THE LEGISLATIVE POWER OF THE UNITED STATES. The legislative power of the United States is vested in the Senate and House of Representatives, collectively called The Congress, under the supervision of the veto power granted to the President. Each of these bodies is sole judge of the election, returns and qualifications of its members, and has power to compel attendance of its members. Each may determine the rules of its proceedings, may punish members, and, with the consent of two thirds, expel a member. A majority in each constitutes a quorum, the presence of which is necessary to transact business. Each House must keep a journal, and one fifth of the members in each can cause the yeas and nays to be entered on the journal. Neither House, during the session of Congress, can, without the consent of the other, adjourn for more than three days, nor to any other place than where they shall be sitting. Members of Congress are paid for their services out of the Treasury. At present the compensation is $5,000 per annum, payable monthly, and a mileage of twenty cents for each mile traveled by a customary route in going to and returning from each session of Congress. Members can hold no office under the United States. The Congress meets the first Monday in December of each year, can change by law this time of meeting if it sees fit, and can be called in extra session by the President.

The Senate consists of two Senators from each state, chosen by the legislature thereof for six years, and is a permanent body. No state can be deprived, without its consent, of its equal suffrage in the Senate. Senators are divided into three classes, and one third of the number goes out every second year. Besides its legislative duties, the Senate, by its advice and consent on a two thirds vote, enables the President to make treaties, and by a majority vote confirms the appointments of important officers. The Senate is also a court of impeachment, thus in a limited way having executive and judicial, as well as legislative, functions.

As legislative bodies, the Senate and the House have equal powers; but all bills for raising revenue must originate in the House, except that the Senate may propose or concur with amendments, as in other bills. Custom, also, has made it imperative that the general appropriation bills shall originate in the House. The Senate, however, derives power in many ways from the fact that it is a permanent body and from its participation in executive functions.

The ordinary course of business in the Senate requires that after the journal has been read and approved, the presiding officer shall lay before the Senate messages from the President and communications from the heads of departments, commonly called Cabinet officers, and other communications addressed to the Senate, and also such bills, joint resolutions and other messages as may come from the House. He then calls, in the order named, for the presentation of petitions and memorials, reports of committees, the introduction of bills and joint resolutions, and finally, concurrent and other resolutions. Until the morning business shall have been concluded, and so announced from the chair, or until one o'clock, no motion to proceed to any subject on the calendar is entertained by the presiding officer, except by unanimous consent. Petitions and memorials are referred without putting the question, unless there is objection, in which case all motions relating to reception or reference are put without amendment, except to add instructions. Any matter from the President or House may be taken up at once by motion determined without debate, or the presiding officer may lay it before the Senate. Bills offered may be objected to, and thereupon lie over one day. All bills must be read three times, and, except by unanimous consent, on three separate days. After a bill has been twice read, it may be amended or committed. All bills, after the second reading, are considered by the Senate as in the Committee of the Whole, where any amendments are considered, and then reported to the Senate, where the amendments are again considered, after which further amendments may be proposed. After the third reading, amendments are not in order; but the bill may be sent to a committee, and, after the report of the committee, goes to the calendar, and must be again considered in committee of the whole. After each day's morning business is over, or at one o'clock, unless the Senate otherwise order, all bills not objected to are disposed of, debate being limited to five minutes for each Senator. Objection can be made at any time; but on motion without debate, the Senate may continue consideration. In that case the five-minute restriction is removed. This may go on until two o'clock, or until two hours have expired, if the Senate meets at another time than noon. After two o'clock, or after two hours, the calendar of general orders is taken up. This order of business on the calendar may be interrupted by appropriation bills, a motion to take up some other bill, a motion to pass over the bill under discussion, or a motion to put it at the foot of the calendar. All these motions are decided without debate. Any subject may be made a special order by a two-thirds vote, and special orders take rank by seniority, unless changed by direction of the Senate. When bills go to a committee and are reported, they are placed on the calendar with bills which have been read twice and objected to and not referred. When a bill has been taken up and is under discussion, a motion to take up and consider another bill on the calendar, or any question of privilege, disposes of the first, which cannot be again resumed except by a direct vote of the Senate. The precedence of motions is as follows: To adjourn, to adjourn to a day certain, or that when the Senate adjourns it be to a day certain, to take a recess, to proceed to the consideration of executive business, to lay

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on the table, to postpone indefinitely, to postpone to a day certain, to commit, to amend. It will be seen that there is no motion for the previous question; hence there is no method of closing debate except by unanimous consent. On an amendment, however, debate may be closed by laying the amendment on the table, which does not carry the bill with it.

The foregoing is a brief outline of the method of doing business in the Senate, according to the standing rules. In practice this system is much modified by what is called "Senatorial courtesy," which is but another name for the comity that grew up naturally in a body originally small in number, where every consideration is extended by the members each to the other. Sometimes it is claimed rather to the detriment of public business. In ordinary assemblies, for instance, a member discusses a question only when it is before the body for action. In the Senate, if a Senator announces that at a day named in the future he will state his views on a bill presented by him or some one else, he is permitted so to do, and speaks without limit. At no time is there any limit to the time a Senator may speak. Seventy-two hours with intermissions, and 14 hours without intermission, are perhaps the highest records thus far made.

In the House of Representatives, now composed of 357 members, there is necessarily a different system of procedure and different rules. In the days of John Quincy Adams, all matters, even petitions and memorials, were presented in the open House, and much time was consumed in mere routine. Among the more valuable reforms introduced into the House in the Fifty-first Congress (1889–91) was that system which now prevails, by virtue of which, without taking any of the time of the House, all bills, petitions, memorials and communications from the heads of departments and bills from the Senate are referred by the Speaker to appropriate committees, and all reports of committees, or rather the accompanying bills, except those which are privileged, are placed upon the calendars to which they belong. Messages from the President are always read to the House.

The calendars are three in number: The House Calendar, the Union Calendar and the Private Calendar. To the Private Calendar go all the private bills, to the Union Calendar all bills which appropriate money or require such appropriations. The House Calendar receives all other bills. No bill goes to either calendar until reported from a committee.

The order of business is as follows: Bills which do not carry appropriations, and which, having passed the House, are amended by the Senate and sent back, are first disposed of, and then the same class of bills passed by the Senate and sent to the House, which are substantially the same as bills of the House already reported by a House committee, can be disposed of when that committee request it. After this comes the unfinished business of the previous day, and next the morning hour for the consideration of bills. These bills must be on the House Calendar, and must be called up by the committees. The morning hour is not necessarily limited to sixty minutes, but may continue all day if the House so desire. At the end of sixty minutes, however, the House may go into the Committee of the Whole House on the State of the Union, either to take up bills in their order, or, when a committee authorizes a motion to be made, to take up a particular bill. If motions for these purposes are voted down, then the morning hour continues until the adjournment, or until the business in hand is finished. All appropriation bills, and bills to raise revenue, are considered first in a Committee of the Whole House on the State of the Union. The general appropriation bills, which provide for the different branches of the public service, and bills to raise revenue, have the right of way against everything but questions of privilege and conference reports. They cannot interrupt other business already begun, but may at any other time obtain consideration. On Fridays, private bills are entitled to be considered, unless the House refuses to go into the Committee of the Whole, in which case the public business proceeds as on other days. Congress not only legislates for the whole country, but in particular for the District of Columbia. Hence on the second and fourth Mondays of each month District of Columbia business is in order.

On the first and third Mondays of each month, and during the last six days of each session, the rules may be suspended and bills and resolutions may be passed by a two-thirds vote after a discussion of forty minutes, one half of which is given to either side. The precedence of motions in the House is as follows: To adjourn, to lay on the table, for the previous question (which motions shall be decided without debate), to postpone to a day certain, to refer, to amend, or to postpone indefinitely.

It will be seen that, unlike the Senate, the House has the motion for the previous question, and it may be added, that as the previous question may be ordered on any proposition or motion and on a bill to its final passage, the closure is ample. To prevent, however, undue use of it, no main question can be ordered to a vote without debate; for, unless there has been previous debate, forty minutes are allowed, except where the bill has been in a committee of the whole. There are two committees of the whole; the Committee of the Whole House on the State of the Union, in which appropriation bills and revenue bills are considered, and the Committee of the Whole House, wherein are considered private bills alone.

In the House, and in these two committees, each member is limited to one hour, and can speak but once, though this last prohibition is much disregarded. In committees of the whole, after general debate on the whole bill is closed, the bill is open to amendments, and to remarks for or against the amendment, limited to five

minutes for and five minutes against. This is called debate under the five-minute rule. By the device of amending by striking out the last word, this kind of debate is often kept up a long time, as the five minutes are often lengthened by unanimous consent.

Bills and joint resolutions, of course, have to pass both Houses to become law, or in case of concurrent resolutions, to accomplish their purpose. Hence there must be communication between the two Houses, and some joint action. Such communication is by way of messages presented by the clerk of the House to the Senate, and by the secretary of the Senate to the House, and by the conference committees. Each House receives in person or by deputy the clerk or secretary of the other, and suspends all business to receive the message, which is disposed of under the rules of each body. When the two Houses have reached a point of disagreement, each appoints a conference committee of several members, usually three, who meet each other and endeavor to compose the differences. If they do not succeed, each committee reports the continued disagreement to its own House, which either lets the matter drop, in which case the bill is lost, or asks another conference. If the two committees, by a majority of each, agree, then the agreement is reported, and if the two Houses ratify the agreement, the bill thus modified becomes law, so far as the two Houses can make it so.

Under the constitution, however, the bill, after passing the two Houses, must undergo the scrutiny of the President. If he approves it, he signs it, and it becomes a law; if he does nothing, and Congress remains in session for ten days (Sundays excepted) after the bill is presented to him, it becomes a law; otherwise not. If he disapproves the bill, he transmits it, with his objections, usually called a veto message, to the House in which it originated. The objections are entered in the journal, and that House proceeds to reconsider it. If, after such reconsideration, two thirds of that House agree to pass the bill, it is sent, together with the objections, to the other House, and if that House passes it by a two-thirds vote, it becomes a law. The votes of both Houses must be by yeas and nays.

It will be seen that the President thus exercises a very important legislative power, and that a veto message makes one man in either House who thinks with the President the equal of the two who do not.

Such, in general, is the way of doing the routine business of both Houses. In both of them it will be seen that the work and direction of affairs are largely in the hands of committees. In the Senate, a bill, which in this article is used as a general term to include all propositions presented, may go to a committee or not, as the Senate may determine. In the Senate, a committee may, by order of the Senate, be discharged from the consideration of a particular bill, and required to report it back to the Senate, which may then act upon it. In practice, almost all the work is done by committees, certainly in all important cases. In the House, all matters, even those relating to the House alone, go to committees as of course, and are there discussed, acted upon and reported, or laid aside and not reported. The House cannot, under its ordinary course of procedure, discharge one of its committees from the further consideration of a bill and order it reported for action. There are no provisions in the order of business for such a course. The committees of the House have therefore the most complete control of the bill in its early stages. When it is brought into the House and is laid before the House for consideration, it is still under the fostering care of the committee; for the custom of the House requires, or rather expects, that the members of the committee shall first be heard in explanation of the bill, and in debate thereon. This proceeds upon the theory that they, having given special study to the subject, are best fitted to enlighten the House upon it.

Such is the great amount of business presented to the Congress, more than ten thousand bills being before the House of Representatives every two years, that a very small percentage of it is ever discussed or passed upon. A report from a committee is very far from being a passport to consideration, though without a report no progress can be made.

Such being the power of committees, it is important to know how they are created. In the Senate, they are chosen apparently by the body itself, but the choice is really made by caucus committees, selected by each side after division is made between the parties. The Senate thereupon ratifies the action taken. The House is too large a body for such a method. Committee appointments there are all made by the Speaker and announced to the House. Naturally, the Speaker has great power in determining the general policy of the House at the outset. At least, as the power is necessarily vested in him to determine who shall first be recognized in many cases to offer business to the House, he is forced to give much attention to the whole state of public business. As the general order of business is far from reaching all the matters which have to be taken up and disposed of, the Committee on Rules, of which the Speaker is chairman, has gradually become a committee on order of business, and has the power at any time to direct what matters shall be taken up, the method of procedure and the limitation of debate and amendment. The use of this power depends entirely on the amount of business deemed advisable to be done, which, in turn, depends on public sentiment.

The first Senate had 26 members; the Senate of 1896, 90 members. The constitution prescribed that the first House of Representatives should consist of 65 members. The House of Representatives now consists of 357 members. The Representatives are chosen every second year, and the term of service begins the fourth

day of March following the election, which takes place at a time fixed by each state, but this time is usually during November of the even years. Their number is fixed by law, based on the preceding decennial census, and is distributed among the several states in proportion to population, but each state creates its own representative districts, or may elect members at large; that is, members chosen by the entire vote of the state, when the apportionment is in excess of the number of districts. Territories are represented by one delegate each, who may address the House and receive the same pay and perquisites as a member, but cannot vote.

T. B. REED.

CONGRESSIONAL APPORTIONMENTS. See CONGRESS, AND THE LEGISLATIVE POWER OF THE UNITED STATES, in these Supplements.

CONGRESSIONAL LIBRARY. See NATIONAL LIBRARY and ARCHITECTURE, in these Supplements.

CONGREVE, RICHARD, an English philosopher and author; born Sept. 4, 1818, studied at Oxford and became an ardent adherent of Comte's positivism. He died in July, 1899. Besides an edition of *Politics* by Aristotle he published *The Roman Empire of the West*, a work eulogistic on benevolent despotism; *Catechism of Positive Religion*; *Elizabeth of England*, and *Essays—Political, Social and Religious* (1874).

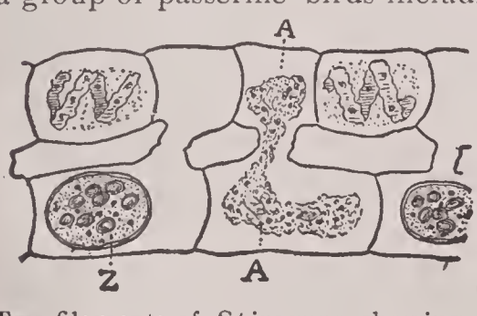
G.A.S.

CONGRUITY, a term applied in geometry to lines and figures which exactly correspond when laid over one another. See COINCIDENCE, in these Supplements.

CONIFERÆ OR CONE-BEARERS. See VEGETABLE KINGDOM, Vol. XXIV, p. 142; also ARBORICULTURE, Vol. II, pp. 276, 282.

CONINE OR CONIA ($C^8H^{15}N$), (or $C^8H^{17}N$, according to Hofmann), a liquid and volatile alkaloid extracted from the HEMLOCK (*Conium maculatum*); q.v., Vol. XI, p. 577. The seeds are crushed and distilled with sodium hydrate, and after passing through several other processes the product is dried over some fragments of calcium chloride and rectified in a vacuum. Conine is a limpid, oleaginous liquid, with a penetrating and nauseating odor, recalling that of hemlock. It boils at 168°, and is a deadly poison.

CONIROSTRES, a name sometimes given to a group of passerine birds including many families, such as the *Ploceidæ* (weaver-birds), the *Fringillidæ* (sparrows and finches), and the *Alaudidæ* (the larks, etc.). R.W.C.



Two filaments of *Spirogyra*, showing conjugation. A. Gametes; Z. Zygospore. (Original.)

CONJUGATION, in botany, a sexual process found among the lower algæ and fungi, and distinguished from *fertilization*. The two sexual cells are known as *gametes*. The fusion of similar gametes is called conjugation and the product a *zygospore*. The fusion of dissimilar gametes (spermatozoid and oösphore) is called fertilization and the product an *oöspore*.

CONJUNCTION, in astronomy, one of the aspects of the planets. Two heavenly bodies are in conjunction when they have the same longitude; that is, when the same perpendicular to the ecliptic passes through both. The sun and moon are in conjunction at the period of new moon. In general, a heavenly body is in conjunction with the sun when it is on the same side of the earth and in line with the sun.

CONKLING, ROSCOE, an American statesman; born in Albany, New York, October 30, 1829. He received his education in the common schools and the Albany Academy, after which he accompanied his father to Auburn and Geneva and there under him commenced preparation for the bar, which he continued for three years. In 1846 he entered the law office of Spencer & Kerman, at Utica. Here he received the appointment of district attorney of Oneida County, not only before his majority, but prior to his admission to the bar of the state. At twenty-one he was admitted to practice and commenced not only a brilliant legal career, but for the next ten years displayed his remarkable qualities as a manager in politics, becoming a recognized leader of his party in New York state. In 1858 he was chosen mayor of Utica, and in the next campaign, he was elected to the Thirty-sixth Congress, taking his seat December, 1859. The first term of his service was memorable on account of the long and bitter contest for Speaker. In 1860 he was re-elected to Congress and again in 1864. In this session he served on the Committee on Ways and Means and Reconstruction. He created a sensation by an arraignment and severe criticism of McClellan's generalship, and sounded the tocsin of a new departure in army work, which was followed by decisive action. In 1862 he opposed by speech and vote Spaulding's Legal Tender Act, sustaining, against the prevailing party views, Horton's amendment, providing for the issue of an interest-bearing note, in opposition to the final passage of the amendment proposed by Thaddeus Stevens. During the same session he voted for the payment in coin of the interest on the public debt. During the Civil War he was a faithful, fearless ally of the President, in his efforts to suppress the Rebellion. In 1866 he was again elected to Congress, but before the commencement of the session he was chosen United States Senator, assuming his duties March 4, 1867. He was re-elected in 1873 and also in 1879. He became an influen-

ROSCOE CONKLING.

tial member of his party, rising from a leader in New York state to a figure of great national prominence. In 1876 he received 93 votes for the Presidential nomination, and in 1880, by his support of Grant, and his personal opposition to Blaine, divided the Republicans into two factions. In 1881 he and his colleague, Thomas C. Platt, suddenly resigned from the Senate, owing to a dispute with President Garfield over a question of the party patronage in New York city and state. The two New York senators, however, instead of retiring from the conflict, became candidates for re-election, and so opened a new and prolonged struggle, the scene of action now being transferred from Washington to Albany. The struggle was carried into every city and town in New York state. At length the contest was closed in the New York legislature by the rejection of both Conkling and Platt, and the election of Warner Miller to succeed Platt and Eldridge G. Lapham as the successor of Conkling, who thereupon resumed the practice of law in New York city. In June, 1880, he was a delegate to the National Republican Convention at Chicago, and in an eloquent speech nominated General Grant for a third term. He was appointed associate chief justice of the United States supreme court in 1882, but declined the position. He died in New York city, April 18, 1888. W.M.C.

CONLIN, BERNARD, American actor; known to the public as WILLIAM J. FLORENCE; born in Albany, New York, July 26, 1831. In his boyhood he took part in neighborhood amateur theatricals, and first appeared as a professional in the character of Peter, in the *Stranger*, at Richmond, Virginia, Dec. 4, 1849. He went to New York, and for the next three years took star parts and supported Forrest at Niblo's Garden, Wallack's Theater, and the Broadway Theater. He married Malvina Pray in 1853. She afterward starred with him in America and England, and contributed much to the successes of his life. Florence was best known for his Bardwell Slote, in the *Mighty Dollar;* Sir Lucius O'Trigger to Joseph Jefferson's Bob Acres, in the *Rivals;* and with the same actor, in the *Heir at Law*, as Zekiel Homespun. It has been said that in adaptability to parts and in the portrayal of varied emotions he has never been equaled. He published a volume of short stories. Died in Philadelphia, Pa. Nov. 20, 1891.

CONNAUGHT AND STRATHEARN, ARTHUR WILLIAM PATRICK ALBERT, DUKE OF, the third son of Victoria, Queen of England, was born at Buckingham Palace, May 1, 1850. He entered the Royal Military Academy at Woolwich in 1866 as a cadet; was commissioned a lieutenant in the Royal Engineers in 1868 and in the Royal Artillery in 1869. Thence he was trained in infantry duties in the Rifle Brigade, attaining the rank of captain in 1871. On obtaining his majority in that year, Parliament voted him an annual sum of $75,000, adding $50,000 more on his marriage to the Princess Louise Margaret of Prussia, March 13, 1879. After various appointments on the staff, including that of assistant adjutant-general at Gibraltar, the Duke was promoted to the rank of general of brigade in 1880. He commanded the brigade of Guards in the Egyptian expedition of 1882, was commander of the forces in Bengal, India, and later held various English commands being advanced to the rank of full general on being appointed commander-in-chief at Aldershot.

CONNECTICUT. The population of Connecticut in 1900, according to the decennial cen

STATE SEAL OF CONNECTICUT.

sus, was 908,420, an increase of 21.7 per cent over that of 1890, which was 746,258. The inhabitants of the state, other than white, consisted of 15,226 colored, 617 Asiatics and 153 Indians. The rank among the states and territories in 1900 was twenty-ninth, a fall of one since the census of 1890. The sexes in 1900 were about equally divided; the increase of males being 22.9, and of females 20.5, in the past decade. A little over 53 per cent of the entire population live in the 16 cities of the state.

Connecticut was one of the original 13 States. Population centers largely in manufacturing localities, the census of 1900 showing 53 per cent. in cities of over 8,000 inhabitants. The total land surface of the State is, approximately, 4,845 miles, the average number of persons to the square mile at the Census of 1890 and 1900 being as follows: 1890, 154.0; 1900, 187.4. The mean summer temperature of Connecticut is about 68°, and in winter about 28°.

Manufacturing, long the leading industry of the state, was increased during the decade preceding the census of 1900 over the one of 1880 to 1890 by about the same percentage that marked the growth of population during the same period, viz.: 21.7 per cent. The census report gives the number of manufacturing establishments as 9,128; their aggregate capital, $314,696,736; employees, 176,694; product of the value of $352,824,106; and wages paid, $82,767,725. These figures all give the rank of fifth to the state, but in diversity of manufactures the rank is first. The manufacture of cotton-goods comes first in importance among the textiles produced, that of silk and silk goods ranking second, and woolens ranking third. After these come hardware, brass and copper goods of all kinds, sewing machines, cutlery, ammunition, foundry and machine shop products, corsets, plated and Britannia ware, paper, clocks, tools, hats and caps, rubber and elastic goods, etc.

The agitation of the subject of child-labor in factories has borne its best fruits in Connecticut, where the number of children employed was cut down from 8,845 in 1880 to 3,479 in 1900, the greatest decrease recorded in any of the states. Trade and industrial education has also received much attention, and some excellent schools have

been established for the preliminary education of those youths who are about to take up some one of the mechanical trades.

The principal agricultural product of the state is tobacco, of which the state raised 16,930,770 pounds in 1899, giving the rank of eleventh in the census reports. In the same year, 316,380 bushels of oats were raised, 203,400 bushels of rye, and 62,962 bushels of buckwheat. Corn, wheat and barley are also grown in the river valleys, which are very fertile. Potatoes and hay are produced in large quantities, and in localities accessible to New York markets, vegetables and small fruit are grown with much more profit than the cereals. Dairy-farming has always received much attention, the hill lands affording excellent pasturage. Seed-growing has proved a profitable pursuit, and in 1890 the state had 85 farms devoted to this branch of agriculture, a greater number than was reported from any other state. The total number of farms reported was 26,948, having an acreage of 2,312,083. The estimated value of the lands, fences, buildings, implements and live-stock was given as $113,305,580, and the value of the farm products, $28,276,948.

The timber of the state is chiefly hickory, white, red and yellow oak, ash, chestnut, white walnut, beech, birch, maple, elm and wild cherry. Limestone for lime, marble and red sandstone are all profitably quarried, as are flagstone, granite and gneiss. Fire-clay, tiling-slate, kaolin and hydraulic lime are also produced and shipped without the state in large quantities. While copper and lead, both combined with silver, are found in considerable quantities, the working of mines has not been carried on to an extent to make the business profitable. Iron ore is found in considerable quantities in many localities, and has been mined for more than a century.

Ten life and accident insurance companies have their general offices in the state, the aggregate of whose gross assets amounts to $141,625,628. Ten insurance companies, other than life and accident, are also local institutions, with a combined paid-up capital of $10,675,000. There are 2 fraternal companies in the state, making the total number of Connecticut corporations in this line of business 22. These bring into the state an immense annual revenue from all parts of the country, and the receipts from the mutual companies alone, as taxes, for 1900 was the sum of $291,067.

In 1900, there were 393,137 depositors in 88 savings banks, whose total deposits amounted to $174,135,195.

The grand list or statement of all taxable property for 1900 is given as $570,163,749. The total indebtedness of all of the towns, cities, boroughs and counties reported at the same time was $20,627,058 and the funded debt of the state $2,108,873. For the year ending Sept. 30, 1900, the total revenue receipts from all sources was $2,876,857, and the expenditure, $2,528,514.

In 1907, the different lines of railway operating within the state had a mileage of 1,367, and the property assets aggregated $175,000,000. The total current liabilities of these corporations within the state is given as $8,002,023, and their gross earnings for the year, $38,663,732. The amount received as taxes from the railway lines was $975,143.

The number of children within the school age of 4 to 16 years was, for the school year of 1900, 189,717, and the total number enrolled in the public schools, 151,325. The number of public

STATE CAPITOL, HARTFORD, CONNECTICUT.

schools was 1,546; number of departments, 3,338; number of schoolhouses, 1,632; number of public high schools, 37; number of evening schools, 35. There were also 7 teachers' institutes and 3 normal schools. The value of the school property was $8,450,600. The number of teachers was given as 3,631, of whom almost 90 per cent were females. The expenditures (1899) for the maintenance of the school system amounted to $3,120,516. There are a number of collegiate schools and 3 colleges, the latter having an enrollment of 2,323 in 1893. The leading institution for advanced education is Yale University, situated at New Haven. (See YALE UNIVERSITY, in these Supplements.) Connecticut has 179 public libraries, of over 300 volumes each, with an aggregate of 707,159 volumes. In 1895 there were 210 newspapers published in the state.

The Storrs Agricultural College, in the town of Mansfield, Tolland County, was established in 1881 for the purpose of educating boys in the practical knowledge and business of agriculture. This college, in addition to state aid and a liberal endowment, is entitled to receive from the general government the amount of the annual donation under the act of 1890. Pending litigation on this donation, the institution has not suffered, as the state expenditure in aid of agricultural affairs is usually about $60,000, about one half of which goes to the Storrs school.

The national guard embraces about 2,800 officers and enlisted men, which includes a division of naval militia. The annual expenditure for the support of the guard approximates $200,000.

The cities and towns located on the sound have a large coasting-trade, and steamboats constantly ply between all important points and the cities

of New York and Philadelphia. Menhaden and oyster fisheries are conducted on an extensive scale, and yield a large revenue.

The state institutions include the state prison at Wethersfield, where about 550 convicts are confined; the Connecticut Hospital for the Insane, at Middletown, accommodating about 1,500 inmates; the Connecticut School for Boys, and the Connecticut Institute and Industrial School for the Blind, both model institutions; two schools for deaf mutes, one of which was the first established in the United States; and the Home for Dependent and Neglected Children, and the Connecticut School for Imbeciles. In addition, there are several state and general hospitals. The humane institutions of the state cost for maintenance during 1900, $314,943.

The most populous city is New Haven, which, according to the Census of 1900, had 108,027 inhabitants. Hartford, the capital, had at the same time a population of 79,850; Bridgeport, 70,996; Waterbury, 45,859; Meriden, 24,296; New Britain, 25,998; Norwich, 17,251; Danbury, 16,537; Norwalk City, 6,125; South Norwalk City, 6,591; Stamford, 15,997; New London, 17,548; Ansonia, 12,681; Middletown, 9,589; Willimantic, 8,937; Rockville, 7,287; Bristol (town and boro'), 9,643.

A constitutional convention was called in January, 1902, to change the method of representation in the Lower House, but the new plan proposed was voted down in June.

The following is a list of the governors of Connecticut since the state organization in 1784, with their term of office:

Matthew Griswold.....1784-86	Alexander H. Holley.....1857-58
Samuel Huntington.....1786-96	William A. Buckingham.1858-66
Oliver Wolcott.....1796-98	Joseph R. Hawley.....1866-67
Jonathan Trumbull.....1798-1809	James E. English.....1867-69
John Treadwell.....1809-11	Mashall Jewell.....1869-70
Roger Griswold.....1811-13	James E. English.....1870-71
John Cotton Smith.....1813-18	Marshall Jewell.....1871-73
Oliver Wolcott.....1818-27	Charles R. Ingersoll.....1873-77
Gideon Tomlinson.....1827-31	Richard D. Hubbard. ...1877-79
John S. Peters.....1831-33	Charles B. Andrews 1879-81
Henry W. Edwards.....1833-34	Hobart B. Bigelow 1881-83
Samuel A. Foote.....1834-35	Thomas M. Waller 1883-85
Henry W. Edwards.....1835-38	Henry B. Harrison.....1885-87
William W. Ellsworth....1838-42	Phineas C. Lounsbury....1887-89
Chauncey F. Cleveland...1842-44	Morgan G. Bulkeley.....1889-93
Roger S. Baldwin.....1844-46	Luzon B. Morris.....1893-95
Isaac Toucey.....1846-47	O. Vincent Coffin.....1895-97
Clark Bissell.....1847-49	L. A. Cooke.....1897-99
Joseph Trumbull.....1849-50	George E. Lounsbury...1899-1901
Thomas H. Seymour.....1850-53	George P. McLean.....1901-03
C. H. Pond (acting).....1853-54	Abiram Chamberlain.....1903-05
Henry Dutton.....1854-55	Henry Roberts.....1905-07
William T. Minor.....1855-57	Rollin Woodruf.....1907 —

See Vol. VI, p. 254.

CONNECTICUT RIVER, the chief river of the New England States, rises in a group of three small lakes in the northern end of New Hampshire, and flows westward to Beecher's Falls at the point where New Hampshire, Vermont and the Province of Quebec come together. Thence it flows south by west, forming the boundary between New Hampshire and Vermont, and thence across Massachusetts and Connecticut to Long Island Sound. Its lower part is navigable, but its chief value is the water supply which it affords to a great number of manufacturing towns and cities in the four states named. W.F.J.

CONNELLSVILLE, an incorporated borough in a township of the same name in Fayette County, Pennsylvania, in the southwestern part of the state. It lies on the Youghiogheny River in the heart of a coal region of great richness, and is one of the chief centers of the coke industry. It has an enormous coal trade, and was formerly a center of the natural gas industry. It is reached by the Pennsylvania and the Baltimore and Ohio railroads, and had a population of 5.629 in 1890, and 7,160 in 1900. W.F.J.

CONNERSVILLE, the capital of Fayette County, southeastern Indiana, situated on Whitewater River, on the Cincinnati, Cleveland and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis and the Lake Erie and Western railroads. The city has a handsome courthouse and manufactories of woolens, furniture, blowers, etc. Population 1890, 4,548; 1900, 6,836.

CONNOR OR CUNNER OR CONNER, the name of several species of fish,—gilt-head (*Crenilabrus melops*) of the British seas; the blue perch (*Ctenolabrus adsperus*); and others. R.W.C.

CONODONTS, small Palæozoic fossils found in Russia, which resemble the teeth of various fishes. They are probably the remains of worms or mollusks. See also ICHTHYOLOGY, Vol. XII, p. 705.

CONRAD, ROBERT T., an American author: born in Philadelphia, June 10 1810. He studied law, but devoted much time to literary pursuits. In 1822 he started the *Daily Intelligencer*, subsequently merged in the *Philadelphia Gazette*. He resumed the practice of law in 1834, and was appointed recorder in 1835, judge of the court of criminal session in 1838, and of the court of general session in 1840. He next became editor of *Graham's Magazine*, president of a railroad company, and mayor of Philadelphia. He wrote the drama *Aylmere, or the Bondman of Kent*. He died in Philadelphia, June 27, 1858. E.E.T.

CONRAD, TIMOTHY ABBOTT, naturalist, was born in New Jersey on June 21, 1803, and was apprenticed to a printer. He soon turned his attention to natural history, and in 1831 published a book on marine conchology. A second volume, on fossil shells, appeared the next year, and in 1834 a third on the fresh water shells of North America. His researches and writings established his rank as a high authority upon American conchology, and he was elected a member of the Academy of Sciences in Philadelphia and became a frequent contributor to its *Journal*. In 1837–42 he was connected with the New York state survey, as geologist and palæontologist. He was the author of various other books, including a volume of verse, and took part in the controversy over Darwin's theory of the origin of species, dissenting temperately but most earnestly from most of Darwin's views. He died on August 9, 1877. W.F.J.

CONSCIENCE. See ETHICS, Vol. VIII, pp. 506 et seq.

CONSCIENCE, Hendrik, a Belgian novelist; born in Antwerp, December 3, 1812. After serving in the army he became a tutor in Flemish to the royal princes, and in 1868 was made conservator of the museum at Brussels. His first story, *In the Wonder Year 1566*, was received with unbounded popular favor and his delineations of lowly Flemish home life soon became familiar throughout Europe. His novels include *The Lion of Flanders* (1838); *What a Mother Can Endure* (1843); *Jakob van Artevelde* (1849); *Wooden Clara* (1850); *Blind Rosa* (1850); *The Conscript* (1850); *The Poor Nobleman* (1851); *The Peasants' War* (1853); *The Miser* (1853); *Batavia* (1858); *The Young Doctor* (1860); *Maternal Love* (1862); *The Burgomaster of Liege* (1866); *The Poet and His Dream* (1872); *Everhard T'Serclaes* (1874). He died in Brussels, Sept. 12, 1883. W.M.C.

CONSCIOUSNESS. See Metaphysics, Vol. XVI, p. 97; and Physiology, Vol. XIX, pp. 24, 48. For different theories of consciousness, see Cartesianism, Vol. V, p. 125; Cousin, Vol. VI. p. 465; Hamilton, Vol. XI, p. 372; and Locke, Vol. XIV, p. 764.

CONSERVATION OF ENERGY. See Energy, Vol. VIII, p. 188.

CONSERVATORS OF THE PEACE are such officers as are vested with the power, and upon whom the duty is imposed, to preserve the peace. It is frequently provided by statute in the various states what officers shall be classed as conservators of the peace. Among the officers usually included in this class are judges, justices of the peace, sheriffs, constables, police-officers, the mayor of a city, and other officers who, by virtue of their offices, are charged with the duty of seeing that the public peace is kept. Such officers are clothed with the right to quell public disturbances and arrest any person guilty of a breach of the peace.

CONSHOHOCKEN, a town of Montgomery County, southeastern Pennsylvania, situated on the Schuylkill River, about three miles below Norristown, on the Pennsylvania and the Philadelphia and Reading railroads. It produces a variety of manufactures, including iron, cotton, shoddy and pottery. It is a well-built and growing town. Population 1900, 5,762.

CONSIDERANT, Victor, French socialist; born Oct. 12, 1808, at Salins, in the department of Jura. He became on the death of Fourier the head of his socialistic school. Elected into the National Assembly, in 1848, and in 1849 he ranged himself with the Radicals. Accused of high treason, he fled to Belgium and went from there to Texas, where he founded a socialist community, which failed, however, after a short time. He returned to France in 1869, and died in Paris, Dec. 27, 1893. Among his works are *Destinée Sociale* (1851); *Manifeste de l'École Societaire, Fondée par Fourier*, (1841); *Theorie du Droit de Proprieté et du Droit au Travail.* G.A.S.

CONSIDERATION, in law, is the material cause which induces one party to enter into a contract with another. Considerations are classed as good, as those of natural love or affection, and the like; or valuable, as the performance of some act or the conferring of some benefit to or upon the party to whom the promise is made, or some third party at his request. A beneficial consideration, however slight the benefit, is sufficient to constitute a valuable consideration, and in the absence of fraud the extent of the benefit will not be inquired into as between the parties to the contract. Without a consideration, either good or valuable, a contract cannot exist. Such a promise is called, in law, a *nudum pactum*, and cannot be enforced. But, at common law, in a contract under seal, a consideration is conclusively presumed, and evidence will not be admitted to deny the consideration. This rule arises from the solemnity and fullness of assent which the act of attaching a seal imports. In many states this rule has been relaxed by custom, or abolished by statute, and the want or failure of consideration may be a good defense against a sealed instrument. A contract based upon a good consideration alone will be enforced as between the parties, if made in good faith, but is void as to a subsequent purchaser for value and without notice, or creditors who are not able to procure other property of the debtor from which to realize their demands. The rule is, that one must be just before he is generous, and when the title to property is passed without valuable consideration, or for a consideration wholly inadequate, creditors may have the transfer set aside or require the payment of the value of the property, so that their demands may be satisfied. But generally, such step can be taken only when the debt existed at the time the property was transferred. In contracts where the consideration is expressed, and in negotiable instruments, the consideration is presumed, but such presumption may be overcome by proof.

CONSISTORY, properly, any place of assembly. According to St. Cyprian it was a most ancient custom of the church that the bishop should do nothing of importance without the meeting and advice of his clergy. The Roman Church early adopted this custom, and the priests and deacons of Rome, together with bishops of other cities who happened to be there, met with the pontiff, and with him decided all causes which were referred from every part of the world to this primary church. Similar was the rule of all metropolitan and cathedral churches, and from this practice sprang the cathedral chapter.

About the time of Constantine, the meeting of the pope with his advisers was given the name "consistory," and to-day it means "the solemn assembly or congregation which is made up of the pope and the college of cardinals gathered together as a senate in the Apostolic Palace." (See Cardinals, in these Supplements.) In olden times the consistory was the only tribunal in the papal court, and in it the Roman pontiffs used to decide all causes which now are examined and decided by the various congregations of cardinals.

(See CONGREGATIONS, ROMAN, in these Supplements.) Hence it met nearly every day, and heard, also, contentious causes. Later, much business was confided to commissions, and a number of permanent tribunals were instituted. Thus it was brought about that only important business was reserved for the consistory.

At the present time a consistory is either ordinary and secret, or solemn and public. Public consistories are called at the will of the pontiff, and in our times are celebrated but once or twice a year. What may be called a semipublic consistory is held when the canonization of a saint is in progress. To it all the bishops and archbishops, titular and residential, who may be in Rome at the time, are admitted. They may also vote. Such a consistory takes on the appearance of a general council, and in a manner represents the universal church.

The ordinary or secret consistories, according to former custom, were held twice a month, the usual time being Monday forenoon; but now the day and hour, as well as the consistory itself, depend entirely on the will of the pontiff. Notice is given the cardinals of the court, usually the day before the consistory. At the appointed time they are present, vested in cappa magna, rochet and beretta, and sit on wooden benches. The pontiff is dressed in ordinary white cassock, rochet, mozetta and pontifical beretta, and occupies a seat somewhat elevated, and covered with a baldachino. In secret consistory the pope is accustomed to address the cardinals on the general condition of the church, or on some storm which has broken out against it in some part of the world. He also points out errors and dangerous doctrines, to the end that, these allocutions being published to the world later, bishops, priests and people belonging to the church may be warned against such errors. The business brought before the consistory is prepared usually by the consistorial congregation, but sometimes by the congregation for extraordinary ecclesiastical affairs. The decrees of the consistory are issued by the apostolic chancery. See CONSISTORY, Vol. VI, p. 260.

P. A. BAART.

CONSOLATO DEL MARE. See CONSULATE OF THE SEA, Vol. VI, p. 282; PRIZE, Vol. XIX, p. 766.

CONSTABLE. In the United States, constables are officers exercising duties similar to those of petty constables in England. They have, to a limited extent, the powers of conservators of the peace. The chief duty of constables is the service of writs in matters arising in justice of the peace courts. They are also authorized to arrest, without warrant, any one who may be guilty of a breach of the public peace in their presence, or whom they may reasonably suspect of felony. The jurisdiction of a constable is confined to the county in which he resides. The office is elective, one or more constables being elected from each township or district within the county. See CONSTABLE, Vol. VI, p. 263.

CONSTANS, JEAN ANTOINE ERNEST, a French politician; born in Beziers, May 3, 1833. He studied law and became a professor at Toulouse and in 1876 was elected a republican member of the Chamber of Deputies. In 1880 he was appointed minister of the interior and in 1885 minister to China. In 1887 he was governor-general of Indo-China. He was elected senator in 1889 and was again minister of the interior in 1890. Having resigned in 1892, he was, in 1897, elected a senator, and in 1898, was made an ambassador to Constantinople. W.M.C.

CONSTANT, JEAN JOSEPH BENJAMIN, a French painter; born in Paris, June 10, 1845. He studied in the École des Beaux-Arts, and under Cabanel, and first exhibited at the Salon in 1869, with his *Hamlet and the King*, which was purchased by the French government. He is best known for his treatment of Eastern subjects. Among the best of his works are *Prisoners in Morocco* (1875); *Mahomet II* (1876); *The Harem* (1878); *The Favorite of the Emir* (1879); *The Day After a Victory in the Alhambra* (1882); and *The Vengeance of the Chérif* (1885). His *Justinian in Council* is in the New York Museum of Art. One of the most popular of contemporary French painters, he won many medals and the Legion of Honor, and figured at the Chicago World's Fair, 1893, where a series of decorated panels for the Sorbonne attracted considerable attention. He died at Paris, May 26, 1902.

BENJAMIN CONSTANT.

CONSTANT-CURRENT MACHINES. See ELECTRICITY, §83, in these Supplements.

CONSTANTIA, a district of Cape Colony, South Africa, lying between Cape Town and Simons Bay. The district consists of three estates, High, Great and Little Constantia, which are famed for the quality of their wines.

CONSTANTINE, Michigan, a village of St. Joseph Co., at the junction of the Fawn and St. Joseph rivers, 120 miles E. of Chicago, with flour, lumber and paper mills. Pop., 1,226. C.L.S.

CONSTANTINE, NIKOLAEVITCH, grand duke of Russia, the second son of Emperor Nicholas I, and brother of Alexander II; born in St. Petersburg, Sept. 21, 1827. In the Crimean War he was admiral of the Russian fleet. He was president of the council of state from 1865 to 1881 but in the latter year being suspected of sympathizing with the revolutionary party, was dismissed from office. Died in St. Petersburg, Jan. 25, 1892. W.M.C.

CONSTANTINOPLE, capital of the Turkish Empire. (See Vol. VI, p. 269). Aside from the ordinary, modern municipal improvements made since 1880, one of the most important changes was wrought by the extensive quays constructed on each side of the Golden Horn. Estimated population 1902, 1,106,000.

CONSTANT-POTENTIAL MACHINES. See ELECTRICITY, § 84, in these Supplements.

CONSTIPATION, an irregular and insufficient action of the bowels, due either to deficient secretion of fluids in the digestive organs, or to imperfect muscular action of the bowels, but usually to both these causes combined. The retention, within the organism, of matters which should regularly be evacuated as they are formed, and their consequent absorption into the blood and tissues of the body, often lead to a whole train of unpleasant symptoms; headache, or pain in other regions, irritability, lassitude and debility.

CONSTITUTION OF THE UNITED STATES. For its history and limitations, see UNITED STATES, Vol. XXIII, pp. 786 et seq. The text of the constitution of the United States of America is as follows:

PREAMBLE.

We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this constitution for the United States of America.

ARTICLE I.

Sec. 1. All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

Sec. 2. 1. The House of Representatives shall be composed of members chosen every second year by the people of the several states, and the electors in each state shall have the qualifications requisite for electors of the most numerous branch of the state legislature.

2. No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state in which he shall be chosen.

3. Representatives and direct taxes shall be apportioned among the several states which may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and, excluding Indians not taxed, three fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each state shall have at least one Representative; and, until such enumeration shall be made, the state of New Hampshire shall be entitled to choose three, Massachusetts eight, Rhode Island and Providence Plantations one, Connecticut five, New York six, New Jersey four, Pennsylvania eight, Delaware one, Maryland six, Virginia ten, North Carolina five, South Carolina five, and Georgia three.

4. When vacancies happen in the representation from any state, the executive authority thereof shall issue writs of election to fill such vacancies.

5. The House of Representatives shall choose their Speaker and other officers; and shall have the sole power of impeachment.

Sec. 3. 1. The Senate of the United States shall be composed of two Senators from each state, chosen by the legislature thereof for six years; and each Senator shall have one vote.

2. Immediately after they shall be assembled in consequence of the first election, they shall be divided, as equally as may be, into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one third may be chosen every second year; and if vacancies happen by resignation or otherwise during the recess of the legislature of any state, the executive thereof may make temporary appointments until the next meeting of the legislature, which shall then fill such vacancies.

3. No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state for which he shall be chosen.

4. The Vice-President of the United States shall be President of the Senate, but shall have no vote, unless they be equally divided.

5. The Senate shall choose their other officers, and also a president *pro tempore*, in the absence of the Vice-President, or when he shall exercise the office of President of the United States.

6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the chief justice shall preside; and no person shall be convicted without the concurrence of two thirds of the members present.

7. Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust or profit, under the United States; but the party convicted shall, nevertheless, be liable and subject to indictment, trial, judgment and punishment according to law.

Sec. 4. 1. The times, places and manner of holding elections for Senators and Representatives shall be prescribed in each state by the legislature thereof; but the Congress may at any time, by law, make or alter such regulations, except as to the places of choosing Senators.

2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

Sec. 5. 1. Each House shall be the judge of the elections, returns and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner and under such penalties, as each House may provide.

2. Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two thirds, expel a member.

3. Each House shall keep a journal of its proceedings, and, from time to time, publish the same, excepting such parts as may, in their judgment, require secrecy; and the yeas and nays of the members of either House, on any question, shall, at the desire of one fifth of those present, be entered on the journal.

4. Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

Sec. 6. 1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall, in all cases, except treason, felony and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House, they shall not be questioned in any other place.

2. No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased, during such time; and no person holding any office under the United States shall be a member of either House during his continuance in office.

Sec. 7. 1. All bills for raising revenue shall originate in the House of Representatives; but the Senate may propose or concur with amendments as on other bills.

2. Every bill which shall have passed the House of Representatives and the Senate shall, before it become

a law, be presented to the President of the United States; if he approve, he shall sign it, but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If, after such reconsideration, two thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered, and if approved by two thirds of that House, it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each House, respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law, in like manner as if he had signed it, unless the Congress, by their adjournment, prevent its return, in which case it shall not be a law.

3. Every order, resolution or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States, and before the same shall take effect shall be approved by him, or being disapproved by him, shall be repassed by two thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Sec. 8. The Congress shall have power,—

1. To lay and collect taxes, duties, imposts and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts and excises shall be uniform throughout the United States;

2. To borrow money on the credit of the United States;

3. To regulate commerce with foreign nations, and among the several states, and with the Indian tribes;

4. To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies, throughout the United States;

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures;

6. To provide for the punishment of counterfeiting the securities and current coin of the United States;

7. To establish post-offices and post roads;

8. To promote the progress of science and useful arts, by securing, for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries;

9. To constitute tribunals inferior to the supreme court;

10. To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations;

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water;

12. To raise and support armies; but no appropriation of money to that use shall be for a longer term than two years;

13. To provide and maintain a navy;

14. To make rules for the government and regulation of the land and naval forces;

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections and repel invasions;

16. To provide for organizing, arming and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states respectively the appointment of the officers, and the authority of training the militia, according to the discipline prescribed by Congress;

17. To exercise exclusive legislation, in all cases whatsoever, over such district (not exceeding ten miles square) as may, by cession of particular states, and the acceptance of Congress, become the seat of the government of the United States, and to exercise like authority over all places, purchased by the consent of the legislature of the state in which the same shall be, for the erection of forts, magazines, arsenals, dockyards and other needful buildings; and

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this constitution in the government of the United States, or in any department or officer thereof.

Sec. 9. 1. The migration or importation of such persons as any of the states now existing shall think proper to admit shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight; but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

2. The privilege of the writ of *habeas corpus* shall not be suspended, unless when, in cases of rebellion or invasion, the public safety may require it.

3. No bill of attainder or *ex post facto* law shall be passed.

4. No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

5. No tax or duty shall be laid on articles exported from any state.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one state over those of another; nor shall vessels bound to or from one state be obliged to enter clear or pay duties, in another.

7. No money shall be drawn from the Treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

8. No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office or title, of any kind whatever, from any king, prince or foreign state.

Sec. 10. 1. No state shall enter into any treaty, alliance or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No state shall, without the consent of the Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts laid by any state on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No state shall, without the consent of Congress, lay any duty of tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another state, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II.

Sec. 1. 1. The executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice-President, chosen for the same term, be elected as follows:

2. Each state shall appoint, in such manner as the legislature thereof may direct, a number of electors, equal to the whole number of Senators and Representatives to which the state may be entitled in the Congress; but no Senator or Representative, or person holding an office of trust or profit under the United States, shall be appointed an elector.

3. The electors shall meet in their respective states and vote by ballot for two persons, of whom one, at least, shall not be an inhabitant of the same state with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each; which list they shall sign and certify, and transmit, sealed, to the seat of the government of the United States, directed to the president of the Senate. The president of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of

votes shall be the President, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose, by ballot, one of them for President; and if no person have a majority, then, from the five highest on the list, the said House shall, in like manner, choose the President. But in choosing the President, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two thirds of the states, and a majority of all the states shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice-President. But if there should remain two or more who have equal votes, the Senate shall choose from them, by ballot, the Vice-President. [This clause is annulled by Article XII of the Amendments.]

4. The Congress may determine the time of choosing the electors, and the day on which they shall give their votes; which day shall be the same throughout the United States.

5. No person, except a natural-born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years, and been fourteen years a resident within the United States.

6. In case of the removal of the President from office, or of his death, resignation or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice-President, and the Congress may by law provide for the case of removal, death, resignation or inability, both of the President and Vice-President, declaring what officer shall then act as President, and such officer shall act accordingly, until the disability be removed, or a President shall be elected.

7. The President shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive, within that period, any other emolument from the United States, or any of them.

8. Before he enter on the execution of his office, he shall take the following oath or affirmation:

"I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will, to the best of my ability, preserve, protect and defend the Constitution of the United States."

Sec. 2. 1. The President shall be commander-in-chief of the army and navy of the United States, and of the militia of the several states, when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two thirds of the Senators present concur; and he shall nominate, and, by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the supreme court, and all other officers of the United States whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments.

3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions which shall expire at the end of their next session.

Sec. 3. 1. He shall, from time to time, give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and in case of disagreement between them with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Sec. 4. 1. The President, Vice-President and all civil officers of the United States shall be removed from office on impeachment for and conviction of treason, bribery, or other high crimes and misdemeanors.

ARTICLE III.

Sec. 1. The judicial power of the United States shall be vested in one supreme court, and in such inferior courts as the Congress may, from time to time, ordain and establish. The judges, both of the supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services a compensation which shall not be diminished during their continuance in office.

Sec. 2. 1. The judicial power shall extend to all cases, in law and equity, arising under this constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more states, between a state and citizens of another state, between citizens of different states, between citizens of the same state claiming lands under grants of different states, and between a state, or the citizens thereof, and foreign states, citizens or subjects.

2. In all cases affecting ambassadors, other public ministers and consuls, and those in which a state shall be a party, the supreme court shall have original jurisdiction. In all the other cases before mentioned, the supreme court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

3. The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the state where the said crimes shall have been committed; but when not committed within any State, the trial shall be at such place or places as the Congress may by law have directed.

Sec. 3. 1. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attainted.

ARTICLE IV.

Sec. 1. Full faith and credit shall be given in each state to the public acts, records and judicial proceedings of every other state. And the Congress may, by general laws, prescribe the manner in which such acts, records and proceedings shall be proved, and the effect thereof.

Sec. 2. 1. The citizens of each state shall be entitled to all privileges and immunities of citizens in the several states.

2. A person charged in any state with treason, felony or other crime, who shall flee from justice, and be found in another state, shall, on demand of the executive authority of the state from which he fled, be delivered up, to be removed to the state having jurisdiction of the crime.

3. No person held to service or labor in one state, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Sec. 3. 1. New states may be admitted by the Congress into this Union; but no new state shall be formed or erected within the jurisdiction of any other state, nor any state be formed by the junction of two or more states,

or parts of states, without the consent of the legislatures of the states concerned as well as of the Congress.

2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this constitution shall be so construed as to prejudice any claims of the United States, or of any particular state.

Sec. 4. The United States shall guarantee to every state in this Union a republican form of government, and shall protect each of them against invasion; and on application of the legislature, or of the executive (when the legislature cannot be convened), against domestic violence.

ARTICLE V.

1. The Congress, whenever two thirds of both houses shall deem it necessary, shall propose amendments to this constitution, or, on the application of the legislatures of two thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid, to all intents and purposes, as part of this constitution, when ratified by the legislatures of three fourths of the several states, or by conventions in three fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; *provided*, that no amendment which may be made prior to the year one thousand eight hundred and eight shall, in any manner, affect the first and fourth clauses in the ninth section of the first article; and that no state, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI.

1. All debts contracted and engagements entered into before the adoption of this constitution shall be as valid against the United States under this constitution as under the confederation.

2. This constitution, and the laws of the United States which shall be made in pursuance thereof, and all treaties made or which shall be made under the authority of the United States, shall be the supreme law of the land; and the judges in every state shall be bound thereby, anything in the constitution or laws of any state to the contrary notwithstanding.

3. The Senators and Representatives before mentioned, and the members of the several state legislatures, and all executive and judicial officers, both of the United States and of the several states, shall be bound, by oath or affirmation, to support this constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII.

1. The ratification of the conventions of nine states shall be sufficient for the establishment of this constitution between the states so ratifying the same.

Done in convention, by the unanimous consent of the states present, the seventeenth day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the independence of the United States of America, the twelfth. In witness whereof, we have hereunto subscribed our names.

GEORGE WASHINGTON,
President, and Deputy from Virginia.

New Hampshire.
JOHN LANGDON.
NICHOLAS GILMAN.

Massachusetts.
NATHANIEL GORHAM.
RUFUS KING.

Connecticut.
WILLIAM SAMUEL JOHNSON.
ROGER SHERMAN.

New York.
ALEXANDER HAMILTON.

New Jersey.
WILLIAM LIVINGSTON.
DAVID BREARLEY.
WILLIAM PATERSON.
JONATHAN DAYTON.

Pennsylvania.
BENJAMIN FRANKLIN.
ROBERT MORRIS.
THOMAS FITZSIMMONS.
JAMES WILSON.
THOMAS MIFFLIN.
GEORGE CLYMER.
JARED INGERSOLL.
GOUVERNEUR MORRIS.

Delaware.
GEORGE READ.
GUNNING BEDFORD, JR.
JOHN DICKINSON.
RICHARD BASSETT.
JACOB BROOM.

Maryland.
JAMES MCHENRY.
DANIEL OF ST. THOMAS JENIFER.
DANIEL CARROLL.

Virginia.
JOHN BLAIR.
JAMES MADISON, JR.

North Carolina.
WILLIAM BLOUNT.
RICHARD DOBBS SPAIGHT.
HUGH WILLIAMSON.

South Carolina.
JOHN RUTLEDGE.
CHARLES PINCKNEY.
PIERCE BUTLER.
CHARLES COTESWORTH PINCKNEY.

Georgia.
WILLIAM FEW.
ABRAHAM BALDWIN.

Attest: WILLIAM JACKSON, *Secretary.*

The constitution was ratified by the conventions of the several states, as follows:

Delaware, Dec. 7, 1787; Pennsylvania, Dec. 12, 1787; New Jersey, Dec. 18, 1787; Georgia, Jan. 2, 1788; Connecticut, Jan. 9, 1788; Massachusetts, Feb. 6, 1788; Maryland, April 28, 1788; South Carolina, May 23, 1788; New Hampshire, June 21, 1788; Virginia, June 26, 1788; New York, July 26, 1788; North Carolina, Nov. 21, 1789; Rhode Island, May 29, 1790.

The following are the articles in addition to and in amendment of the constitution of the United States of America, proposed by Congress, and ratified by the legislatures of the several states, pursuant to the fifth article of the original constitution.

[During the session of the First Congress of the United States in 1789 the first ten of the amendments were proposed. They were afterward ratified by the states in 1791. The Eleventh Amendment was proposed by the Third Congress in 1794 and ratified in 1798. The Twelfth Amendment was proposed by the Eighth Congress in 1803 and ratified in 1804. The Thirteenth Amendment was proposed by the Thirty-Eighth Congress in 1865 and ratified the same year. The Fourteenth Amendment was proposed by the Thirty-Ninth Congress in 1866 and ratified in 1868. The Fifteenth Amendment was proposed by the Fortieth Congress in 1869 and ratified in 1870.]

ARTICLE I.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for redress of grievances.

ARTICLE II.

A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed.

ARTICLE III.

No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

ARTICLE IV.

The right of the people to be secure in their persons, houses, papers and effects against unreasonable searches and seizures shall not be violated; and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

ARTICLE V.

No person shall be held to answer for a capital or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled, in any criminal case, to be a witness against himself; nor be deprived of life, liberty or property without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI.

In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, by an impartial jury of

the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law; and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor; and to have the assistance of counsel for his defense.

ARTICLE VII.

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved; and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

ARTICLE VIII.

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX.

The enumeration, in the constitution, of certain rights shall not be construed to deny or disparage others retained by the people.

ARTICLE X.

The powers not delegated to the United States by the constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people.

ARTICLE XI.

The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by citizens of another state, or by citizens or subjects of any foreign state.

ARTICLE XII.

The electors shall meet in their respective states, and vote by ballot for President and Vice-President, one of whom, at least, shall not be an inhabitant of the same state with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President, and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit, sealed, to the seat of the government of the United States, directed to the president of the Senate; the president of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such a majority, then, from the persons having the highest numbers, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two thirds of the states, and a majority of all the states shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in case of the death, or other constitutional disability, of the President. The person having the greatest number of votes as Vice-President shall be the Vice-President, if such number be a majority of the whole number of electors appointed; and if no person have a majority, then, from the two highest numbers on the list, the Senate shall choose the Vice-President; a quorum for the purpose shall consist of two thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

ARTICLE XIII.

Sec. 1. Neither slavery nor involuntary servitude, except as a punishment for crime, whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Sec. 2. Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XIV.

Sec. 1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the state wherein they reside. No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Sec. 2. Representatives shall be apportioned among the several states according to their respective numbers, counting the whole number of persons in each state, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a state, or the members of the legislature thereof, is denied to any of the male inhabitants of such state, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such state.

Sec. 3. No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any state, who, having previously taken an oath as a member of Congress, or as an officer of the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may, by a vote of two thirds of each House, remove such disability.

Sec. 4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any state shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave, but all such debts, obligations and claims shall be held illegal and void.

Sec. 5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

ARTICLE XV.

Sec. 1. The right of citizens of the United States to vote shall not be denied or abridged by the United States, or by any state, on account of race, color or previous condition of servitude.

Sec. 2. The Congress shall have power to enforce this article by appropriate legislation.

CONSTITUTIONS OF CLARENDON. See CLARENDON, CONSTITUTIONS OF, in these Supplements.

CONSUBSTANTIATION (Lat. *con*, together; and *substantia*, being substance); a name often given to the Lutheran doctrine of the real presence of Christ in the Lord's Supper. The doctrine is, that the body and blood of Christ are really present in and under the bread and wine, so that the communicant partakes of them, while yet the bread and wine are not changed into them, and while no new substance is formed by a union of the bread and wine with them. The name has never been used by the Lutherans to designate their doctrine; on the contrary, they repudiate it, on the ground that it more naturally designates the doctrine held by John of Paris, that there is a substantial conjunction of the bread and wine and the body and blood. Those who ap-

ply the name to the Lutheran doctrine do not use it in this sense, however, and do not misunderstand the position of the Lutherans; they use it simply for want of a better term. It seems to them well adapted to distinguish the Lutheran doctrine from that of the Roman Catholic Church called "transubstantiation." See LUTHER, Vol. XV, p. 83.

F. JOHNSON.

CONSUETUDINARY OR CUSTOMARY LAW, an unwritten law established by usage, and derived by immemorial custom from remote antiquity. When universal, it is called common law; when particular, it is called custom, in a narrower sense, as the custom of a trade, or of a district.

CONSUMPTION. See PHTHISIS, Vol. XVIII, p. 869; and see also PATHOLOGY, Vol. XVIII, pp. 415, 416.

CONTARINI, the name of a noble family of Venice. Domenico, the most important member of the house was doge of Venice from 1043 to 1073. Vincenzo, the last of the family, who died in 1617, was a famous scholar. Others of the family were soldiers, painters, and diplomats.

W.M.C.

CONTINENTAL SYSTEM, Napoleon's fatuous project for ruining England by ruining her trade. He first announced this plan on Feb. 9, 1801, and on Nov. 21, 1806, issued the notorious Berlin Decree. By its five terms,—1. The British Isles were declared to be in a state of blockade; 2. All commerce and correspondence with Great Britain were forbidden; 3. Every Englishman found on the continent of Europe was declared a prisoner of war; 4. All British goods and merchandise were to be considered lawful prizes; and 5. All vessels coming from England or an English colony were to be refused admission into any continental harbor. The folly of boycotting England was this: As Great Britain was the best customer of these continental nations, they ruined their own commerce at the Corsican despot's bidding, and to gratify his personal malice and revenge. Austria acceded to the system, Nov. 24, 1807; Sweden, Sept. 17, 1809; and the petty Roman states, in December, 1809. Russia withdrew from the alliance in 1810, though Napoleon tried to enforce the system in 1812, but after the retreat from Moscow it was abandoned wholly.

CONTINGENT REMAINDER, an estate in expectancy in law. See REMAINDER, Vol. XX, p. 384.

CONTINUITY OF THE GERM-PLASM. See HEREDITY, in these Supplements.

CONTINUITY, LAW OF. See PSYCHOLOGY, Vol. XX, pp. 47, 50.

CONTINUOUS POTENTIAL DIFFERENCE. See ELECTRICITY, Vol. VIII, p. 23; and see also ELECTRICITY, § 39, in these Supplements.

CONTRAYERVA ("counter-poison"), an aromatic bitterish root of different species of *Dorstenia*, of the family *Urticaceæ;* used as a stimulant and tonic. *Dorstenia* is a tropical American genus closely related to the mulberries, and is of interest as showing a transitional form to the fig in its flat, open inflorescence.

CONTRIBUTION, in law, is the payment of the proportionate share of a loss by each or any one of several persons, who were liable in common in some transaction, to such one or more of the others who, being also liable, may have been compelled to discharge the entire liability. When one person has been compelled to discharge a liability with which he was charged in common with others, he has a right to contribution, from each of the others, of his proportionate share of such loss, and may bring suit to enforce such right. The occasion for exercising this right frequently arises between sureties, where one of several sureties has been compelled to make good the default of the principal, or more than his share of such loss, in which case contribution can be enforced. The right of contribution also exists in favor of one partner who has borne more than his share of the losses or expenses of the partnership, as against the other members of the firm. In the case of joint owners of property, or tenants in common, contribution will be enforced where one has paid more than his share of the expenses for the common benefit. Suits to compel contribution are generally brought in chancery, especially when in partnership matters.

CONVENTIONAL, IN ART. See DRAWING, Vol. VII, pp. 386, 387.

CONVENTION PARLIAMENT, a name given to two English Parliaments. The first, in 1660, after the Restoration, consisted of both houses, was not called together by the sovereign, but was merely convened by General Monk. It passed an act restoring the ancient general constitution of kings, lords and commons, and was legalized by Charles II. It was the most bloodthirsty and infamous of all the Parliaments in the annals of English history, even condemning the immortal John Milton to death. It first met April 25, 1660, and dissolved Dec. 29, 1660. The second Convention Parliament met Jan. 22, 1689, and dissolved Jan. 29, 1691. It conferred the crown on William and Mary.

CONVERSION, IN LAW. See TROVER, Vol. XXIII, p. 626.

CONVEYANCE is a general term embodying all the various methods for the transfer of the title to real estate. The word is used to indicate the act and also the instrument by which title is passed. A deed, mortgage, release, lease, will or any other instrument by which any interest in real property is transferred is a conveyance. The expense of the conveyance is usually to be paid by the purchaser, unless there is an express agreement to the contrary.

CONVEYANCING is the science of the transfer of title to real estate from one to another. It includes, also, the examination of the title of the grantor.

The question of simplifying the system of conveyancing has been largely discussed throughout the United States during the past few years,

and in some states legislation has been attempted with the view to reach that result. The delay and expense necessary to the transfer of real estate has become exceedingly vexatious since the chain of title to property has become more drawn out and involved, and especially is this true in large cities, where many transfers occur, and where frequently the proper care is not given by those who examine the abstract of title. The most feasible system which has yet been introduced into the United States with a view to avoid these difficulties is that familiarly known as the "Torrens Land Title System," and it has met with much favor in many states within the last few years. The essential feature of this system is the registration of titles. The public registrar, when once the title has been examined by public examiners appointed for that purpose, and found to be valid, places the description of the property on the registration books, and issues a certificate of ownership to the party entitled thereto. All mortgages or valid liens must be noted on the register and on the certificate, and no claim can defeat the title as shown on the register. Abstracts of title are practically avoided, as all valid claims against the property are shown on the register. Clouds cannot be placed upon the title by means of some other transfer made under an error in description; because only the person legally authorized to make a conveyance can interfere with the title, and before he can have the title transferred he must produce his certificate, which will be canceled, and another issued to the party entitled thereto, containing the notation of all liens and mortgages. No judgment can become a lien upon real estate except by filing a transcript thereof and having same noted on the page of the register devoted to that tract. Thus the difficulty of having a judgment recorded against the land of every person having the same name as the one against whom the judgment is rendered is avoided. The chief virtue of this system is the simplicity and absoluteness of the title which is given. The certificate of title is absolute, and subject only to the conditions noted upon it. If the register shows a mortgage canceled, it is not necessary to examine the instrument to see if it is in proper form, as the certificate which shows that it is canceled is absolute, and the duty is upon the registrar alone to see that the release is in proper form. The title is kept clear by this method continually, and an examination of the page of the register containing the title of the last owner is sufficient to obtain all information required to pass safely upon the title. The registrar does not enter an instrument in the register unless it is properly drawn, and the party executing the instrument can legally do what he thereby undertakes. The fact of its entry makes an instrumeut absolute in effect.

This system of land titles was first introduced in 1858 by Sir Robert Torrens in South Australia, and has been in operation continually since that time. It was adopted in Great Britain in 1875, and in various provinces of British Columbia between 1870 and 1888. Practically, the same system is now in operation in the German Empire. Bohemia has had a system of land titles quite similar in many respects for the last two hundred years, and Hamburg for one hundred years. Japan has also had a similar system for many years. The first state in the United States to adopt the Torrens system was Illinois, in which state a law was enacted, June 13, 1895, but it was declared unconstitutional in November, 1896, for vesting the registrar with judicial functions. It was adopted in the state of Ohio early in 1896. Many other states have given much consideration to the subject. In Massachusetts, New York and Kentucky, bills have been introduced providing for the Torrens system, but for various reasons have not been adopted. The law was declared unconstitutional by the Illinois Supreme Court, Oct. 9, 1896.

Another method which has been tried in various portions of the United States is that of the guaranty of titles by private individuals or corporations organized for that purpose. A number of title guaranty companies have been organized, which, upon application of the owner, examine the title to real estate, and if found to be good, these companies will issue a written guaranty of the title somewhat in the nature of a policy of insurance. These policies are issued for a consideration, and have been a source of some benefit. The difficulties which stand in the way of good titles, however, are not effected by these companies, and the benefit is only extended to the particular title which they guarantee.

CONVOLVULUS, a genus of the family *Convolvulaceæ*, to which it has given its name. The species commonly are called bindweeds, and are related closely to the morning glory (*Ipomœa*), from which it differs chiefly in its two linear stigmas. The funnel-form flowers are colored variously as in the morning glory, and the plants are spreading or twining. There are no native species of *Convolvulus* proper in the United States, but the European *C. arvensis* has become a naturalized weed. The old genus *Calystegia*, however, is now included in *Convolvulus*, characterized by its large leafy bracts surrounding the calyx, and is represented in the United States by several species.

CONVULSIONISTS, a term applied in 1632 to the persons afflicted by the convulsion epidemic which broke out in the nunneries about Bordeaux, France, especially in the Ursuline convent of Loudun. In 1686 the French refugees, driven from house and home by the infamous dragonnade expeditions, were affected by a similar epidemic. In 1882 the term was used in France to denote an extreme democrat or radical, whose platform was the convulsion or plucking up the established order of all things by the roots.

CONVULSIONNAIRES, a term given to certain fanatical Jansenists of France, who met in St. Medard's churchyard, in the suburbs of Paris, where was the tomb of a certain Abbé François de

Paris, who had died in 1727, where numberless miracles were alleged to have been done. There these fanatics threw themselves into the most violent contortions. Louis XV ordered them to be imprisoned in 1733, but was unable to stamp out the fervor entirely.

CONVULSIONS. See PATHOLOGY, Vol. XVIII, p. 400.

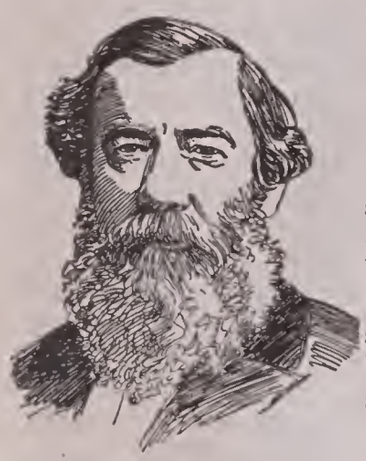
CONWAY, Arkansas, the seat of the north-central Faulkner County, 32 miles northwest of Little Rock on the Little Rock and Fort Smith division of the St. Louis, Iron Mountain & Southern railroad. It has two sectarian colleges, and carries on an active corn and cotton trade. Population, 1900, 2,003. C.L.S.

CONWAY, a town and a river in North Wales. See CONWAY, Vol. VI, p. 293; CARNARVON, Vol. V, p. 105. Population 4,660.

CONWAY, a village and the capital of Horry County, eastern South Carolina, about 100 miles N.N.E. of Charleston on the Waccamaw River, at the head of navigation, and a terminus of the Atlantic Coast Line railroad. It has several lumber-mills and a depot for naval supplies. Population 1900, 705.

CONWAY, HUGH, pseudonym of FARGUS, FREDERICK JOHN; q.v., in these Supplements.

CONWAY, MONCURE DANIEL, clergyman and author, was born in Virginia on March 17, 1832, and was graduated from Dickinson College in 1849 and from the Harvard Divinity School in 1854. He also studied law. In 1850–52 he was a minister of the Methodist Episcopal Church, but then became a Unitarian, and was minister of a Unitarian Church in Washington in 1854–56 and of one in Cincinnati in 1856–61. He was for a time editor of *The Dial* in Cincinnati, and of the Boston *Commonwealth*. He was at first a strong supporter of pro-slavery ideas, his work in the Methodist ministry having been chiefly in the South. But on entering the Cambridge Divinity School and the Unitarian ministry he came under the influence of Boston abolitionists, with the result that he joined the anti-slavery movement before the Civil War, and wrote some books and pamphlets in advocacy of emancipation. Early in the Civil War he went to England on a lecturing tour, and became minister of a Unitarian Church in London from 1863 to 1884. He has been a member of the staff of the London *Daily News* and of the *Pall Mall Gazette*, and has written much for various English and American magazines and reviews. His published books include lives of Edmund Randolph, Thomas Paine, Nathaniel Hawthorne, and Thomas Carlyle, *Emerson at Home and Abroad*, *The Earthward Pilgrimage*, *Idols and Ideals*, *Demonology and Devil Lore*, *The Wandering Jew*, *The Sacred Anthology*, *George Washington and Mount Vernon*, *Pine and Palm*, *Republican Superstitions*, *Barons of the Potomac and Rappahannock*, *Prisons of Air*, and *Solomon and Solomonic Literature*. Died Nov. 15, 1907. W.F.J.



MONCURE D. CONWAY.

CONWAY, THOMAS, an American soldier; born in Ireland about 1730. He was educated in France, and in 1777 came to America with the expectation of being made major-general, but was disappointed at receiving only a brigadiership. He entered into intrigues to promote Gen. Gates to the supreme command of the army. In November, 1777, he had been promoted inspector-general with the rank of major-general over Washington's protest, and he endeavored to undermine the General's position by anonymous and forged letters. "Conway's Cabal," as it was termed, ultimately became known to Congress and to the army, and Conway's position became so unpleasant that early in 1778 he sent his resignation to Congress, which promptly accepted it. On July 4, 1778, he was shot in a duel by Gen. Cadwallader, but recovered and returned to France. E.E.T.

CONY, a rabbit, especially the European rabbit (*Lepus cuniculus*). See RABBIT, Vol. XX, p. 199. The cony of the Old Testament is supposed to be the Syrian hyrax, or daman (*Hyrax Syriacus*). See HYRAX, Vol. XII, p. 633.

CONYBEARE, WILLIAM JOHN, clergyman, teacher and author; was born in England on August 1, 1815, the son of an eminent geologist and Dean of Llandaff. He was educated at Cambridge and became a fellow of Trinity College there. In 1842 he was made principal of the Liverpool Collegiate Institution, and later retired to the vicarage of Axminster. He wrote a novel, a volume of essays, and, in conjunction with Dean Howson, the well-known *Life and Epistles of St. Paul*. He died in 1857. W.F.J.

CONYERS, Georgia, the seat of Rockdale County, a town 31 miles southeast of Atlanta on the Georgia railroad. The Yellow River supplies power for flour milling and cotton raising interests. Population, 1900, 1,605. C.L.S.

COOK, ALBERT STANBOROUGH, an American educator; born in Montville, New Jersey, March 6, 1853. He was graduated from Rutgers College in 1872 and studied at Göttingen and Leipsic. In 1880 he was professor of English in the University of California and in 1882 became professor in Yale University. He has written *The Phonological Investigation of Old English* (1888); *First Book in Old English* (1894); *Glossary of the Old Northumberland Gospel* (1894); *Biblical Quotations in Old English Prose Writers* (1898); *Select Translations from Old English Poetry* (1902). W.M.C.

COOK, CLARENCE CHATHAM, art critic, was born at Dorchester, Mass., on September 8, 1828, and was graduated from Harvard College in 1849. He studied architecture, was a teacher for twenty years, and then became a member of the staff of the New York *Tribune*, serving that paper with distinction for a number of years as art critic and as

Paris correspondent. In 1884 he founded and for some years edited *The Studio*, an art magazine. He wrote *Central Park*, *The House Beautiful*, *Stools and Candlesticks*, *Essays on Beds and Tables*, etc., and edited Viardot's *Wonders of Sculpture* and Lübke's *History of Art*. He was also the author of some poems of merit, and was a keen critic and controversialist. He died on June 1, 1900. W.F.J.

COOK, Edward Dutton, an English dramatic critic and novelist; born in London, January 30, 1820. He was educated at King's College and became dramatic critic for the *Pall Mall Gazette*. His books include *The Trials of the Tredgelds* (1864); *Hobson's Choice* (1865); *Art in England* (1869); *Nights of the Play* (1883) He died in London, Sept. 11, 1883. W.M.C.

COOK, Edward Tyas, a British journalist and man of letters. He was born at Brighton, May 12, 1857; educated at Winchester School and New College, Oxford. In 1890–92 he was editor of the *Pall Mall Gazette* in succession to W. T. Stead, and in 1896 editor of the *Daily News*. In 1893 he became first editor of *The Westminster Gazette*. He is the author of *A Popular Handbook to the National Gallery* (5th ed. 1896); *Studies in Ruskin* (1890); and *Popular Handbook of the Tate Gallery* (1898).

COOK, Eliza, a favorite minor English poetess, daughter of a London tradesman; born at Southwark Dec. 24, 1812. She contributed poetical pieces to various magazines from an early age, and issued *Lays of a Wild Harp* (1835); *Melaia, and Other Poems* (1840); and from Sept., 1849, to 1854 successfully conducted *Eliza Cook's Journal*. She wrote verses such as *The Old Arm Chair;* also, *Jottings from My Journal* (1860); *New Echoes* (1864); and *Laconics* (1865). She died Sept. 24, 1889.

COOK, Francis Augustus, American naval officer, was born in Massachusetts in 1843. On Sept. 20, 1860, he was appointed from that state to the Naval Academy, where he remained till 1863. In October, 1863, he was made ensign, and for about two years was attached to the steam-sloop *Seminole*, of the West Gulf blockading squadron. On Nov. 10, 1866, he was promoted to be master, and in 1867–68 was attached to the North Atlantic squadron. He gained his commission as lieutenant on Feb. 21, 1867, and as lieutenant-commander on March 12, 1868, and served successively on the *Independence*, *Richmond*, *Sabine*, and *Plymouth*, obtaining his promotion as commander in October, 1881. In 1883–86 he was light-house inspector; in 1890–93 inspector of ordnance at the Navy Yard, Boston; and in 1893–95 assistant at the Bureau of Navigation. On Feb. 28, 1896, he was made captain. During the war with Spain (April–August, 1898) he was captain of the first-class armored cruiser *Brooklyn*, Commodore Schley's flagship, and did splendid service at the battle off Santiago de Cuba (July 3), the speed of the *Brooklyn* enabling her to overhaul and head off, and so prevent the escape of, the *Cristobal Colon*, the fleetest of the Spanish vessels, and thereby make the victory complete.

COOK, Joseph, lecturer, was born at Ticonderoga, N. Y., on January 26, 1838, and was educated at Yale and Harvard (1865) and Andover Theological Seminary, and preached occasionally for some years, but never was ordained. He began in 1875 a series of Boston Monday Lectures on the relations of religion and modern civilization. These courses were continued in the Park Street church and in Tremont Temple, Boston, until 1881, and were renewed in 1883 and in some later years. He died on June 24, 1901. W.F.J.

COOKE, George Frederick, an English actor; born in Westminster, April 17, 1756. He made his first public appearance at Brentford in 1776 and between 1784 and 1800 became very popular in the English provinces and in Ireland. From 1801 to 1810 he played at Covent Garden. His best characters were *Richard*, *Shylock*, *Iago*, *Sir Giles Overreach*, and *Sir Pertinax MacSycophant*. In 1810 he visited the United States and appeared in the chief cities. He died in New York city, September 26, 1811. W.M.C.

COOKE, George Willis, an American clergyman and author; born in Comstock, Michigan, April 28, 1848. He was graduated from Olivet College, and studied for the Unitarian ministry. He was ordained in 1872 and held Unitarian pastorates in Wisconsin, Michigan, Indiana, and Massachusetts. He has published *Ralph Waldo Emerson, His Life and Writings* (1881); *Life of George Eliot* (1883); *Poets and Problems* (1887); *The Spiritual Life* (1893); *History of Unitarianism in America* (1903). W.M.C.

COOKE, Jay, financier, was born at Sandusky, Ohio, on August 10, 1821. At the age of twenty-one he became partner in a banking house which during the Mexican War was prominent in the negotiation of government loans. In 1861 he formed the banking house of Jay Cooke & Co. for the purpose of handling the government's loans, and thus supplied the national treasury with more than $2,000,000,000, and rendered the nation incalculable service. When Lincoln was assassinated Mr. Cooke averted a disastrous financial panic by instantly ordering his agents at all points to raise the price of United States securities. In 1873 his house failed, but with splendid energy he paid all his creditors and restored his fortune. In the later years of his life he invested largely in mining lands in Montana and Idaho, and farming lands in Utah and Southern California, and became interested in half a dozen railroads. He died at his home at Ogontz, Pennsylvania, on February 16, 1905. W.F.J.

COOKE, John Esten, author and soldier; was born at Winchester, Virginia, on November 3, 1830, was educated for the bar, and practiced law for a few years. Then finding literature more to his taste, and being successful with his first tales, he devoted himself to novel writing. Before the Civil War he had written half a dozen novels, and then he relinquished the pen for the sword, and served through the war in the Confederate army. At the end of the war he was inspector-general of horse artillery in Lee's army.

After the war he resumed literary work, producing admirable biographies of General Lee and General "Stonewall" Jackson, and a number of novels and short stories, chiefly depicting phases of Virginian life. All his writings were marked with exquisite refinement and romantic charm, with mingled comedy and pathos; but he never brought himself into harmony with the "realism" of the later school of American novelists. Among his best works of fiction were *The Virginia Comedians; The Last of the Foresters; Leather and Silk; The Youth of Jefferson; Henry St. John; Surrey of Eagle's Nest;* and *Stories of the Old Dominion.* He died at his home in Clark County, Virginia, on September 20, 1886.

W.F.J.

COOKE, Josiah Parsons, chemist, was born in Boston on October 12, 1827, and was educated at Harvard, with which university he was afterward identified all his life as tutor, instructor in chemistry, professor of chemistry and mineralogy, and director of the chemical laboratory. He was the author of a number of important works on chemistry, and also of several on the relations of religion and science, the last and perhaps most noteworthy of them being *The Credentials of Science the Warrant of Faith.* He received honorary degrees from Harvard and from the University of Cambridge, England, for his achievements. His death occurred on September 3, 1894. W.F.J.

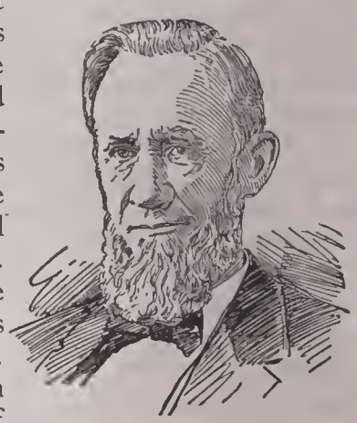
COOKE, Mordecai Cubitt, botanist; was born in Norfolk, England, on July 12, 1825, and was chiefly self-educated. He was appointed to the India Museum in 1860, from which he was transferred to the herbarium of the Royal Gardens at Kew. He has written more than forty botanical works, has received the Victoria Medal of Honor from the Royal Horticultural Society, and the Linnæan Gold Medal from the Linnæan Society, and several honorary degrees from American universities. W.F.J.

COOKE, Philip St. George, soldier, was born in Virginia on June 13, 1809, and was graduated from West Point in 1827. He served in the Black Hawk War and was at the battle of Bad Axe. In 1846 he conducted the "Mormon brigade" to California, and was conspicuous in some Indian fighting there. In 1855 he was in command at Fort Union, New Mexico, and fought the battle of Cineguilas, with the Comanches. During the "civil war" in Kansas he had an important command in the field, being entrusted with the execution of the policy of the national administration. He was an officer in the Utah expedition and made a notable march across the plains in midwinter. At the outbreak of the Civil War he was commissioned a brigadier-general of volunteers, served in the chief battles of the Peninsular campaign, in Virginia, and rose to the rank of brevet major-general "for gallant and meritorious conduct during the war." He was retired for age in October, 1873. In addition to his military career, he practiced law and wrote a number of books, including *Scenes and Adventures in the Army, The Conquest of New Mexico and California,* and several works on military tactics. He died at Detroit, Mich., on March 28, 1895. W.F.J.

COOKE, Rose (Terry), an American author and poet; born in West Hartford, Connecticut, February 17, 1827. She was graduated from the Hartford Female Seminary and in 1873 was married to Rollin H. Cooke. A volume of her complete poems was first published in 1888. *The Two Villages* was her best known poem. Her short stories of New England life appeared originally in the *Atlantic Monthly* and in *Scribner's Magazine.* Her published books include *Poems* (1860); *Happy Dodd* (1878); *Somebody's Neighbors* (1881); *The Sphinx's Children and Other People's* (1886); *Complete Poems* (1888); *Steadfast,* a novel, (1889); *Huckleberries,* a collection of short stories (1891). She died in Pittsfield, Massachusetts, July 18, 1892.

W.M.C.

COOLEY, Thomas McIntyre, jurist, was born at Attica, N. Y., on January 6, 1824, studied in private schools, taught school, and in 1846 was admitted to the bar. He practiced law and edited a paper at Adrian, Michigan, and in 1857 was chosen by the legislature to compile the general statutes of that State. The next year he became reporter of the decisions of the supreme court. Upon the organization of the law department of the University of Michigan in 1859 he became its professor of law. In 1864 he was elected a justice of the supreme court of the State, and became its chief justice, remaining upon the bench twenty-eight years. He was lecturer on law at Johns Hopkins University in 1877–79, arbitrator between various railroads, receiver of the Wabash railroad system, and Commissioner of Interstate Commerce, and ranked among the foremost jurists of his time. He died on September 12, 1898. W.F.J.



THOMAS M. COOLEY.

COOMBE, Thomas, clergyman and author, was born in Philadelphia on October 21, 1748, and was graduated from the College of Philadelphia in 1766. He became a clergyman of the Church of England and was rector of a parish in Philadelphia. In 1775 he preached a sermon in favor of the colonial cause, but a year later became a Tory on ecclesiastical grounds. He soon went to England, and became a chaplain to the King. He was a friend of Oliver Goldsmith, and wrote a poem entitled *The Peasant of Auburn,* which he dedicated to Goldsmith and which was apparently an attempt to continue the latter's *Deserted Village* to scenes in America. He died in London on August 15, 1822. W.F.J.

COON, Henry Clarke, physician and educator, was born at West Edmeston, N. Y., on

January 28, 1828. He became a Homœopathic physician, and was also a minister of the Seventh Day Baptist Church. From 1872 to 1898 he was professor of physics and chemistry in Alfred University, at Alfred, N. Y. He was a member of the American Association for the Advancement of Science and other learned bodies, and was the author of an admirable *Manual of Civil Government*, widely used as a text-book. He died on May 9, 1898. W.F.J.

COOPER, Myles, an American educator; born in England, about 1737. He was educated at Oxford, emigrated to New York in 1762, and at the instance of the Archbishop of Canterbury was appointed professor of moral philosophy in King's College, New York, now Columbia University. In 1763 he succeeded Dr. Samuel Johnson as president. In 1775 the course of political events compelled him to return to Great Britain, where he became one of the ministers of the Episcopal chapel of Edinburgh. He published a volume of *Poems* (1758); a *Fast Sermon* (1776); a *Sermon on Civil Government* (1777); and wrote on the subject of an American Episcopate. To his pen is ascribed *A Friendly Address to All Reasonable Americans on Our Political Confusions, and the Necessary Consequences of Violently Opposing the King's Troops*, etc. (1774), which gave much offence to the Whigs. He died in Edinburgh, May 20, 1785. E.E.T.

COOPER, Peter, inventor, manufacturer, and philanthropist, was born in New York City on February 12, 1791, the son of a hat manufacturer. His schooling was confined to a half day's attendance for a single year, and at the age of seventeen years he was apprenticed to a coachmaker, whose business he afterward followed for a time on his own account. He also engaged in the manufacture of machines for shearing cloth, in the manufacture of cabinet ware, and in the grocery trade. Finally he began the manufacture of glue and isinglass, in which he was highly successful and in which he continued for many years. About 1830 he became interested in the manufacture of iron, established a mill near Baltimore, and another in New York, in which he first successfully employed anthracite coal in puddling. In 1845 he removed his works to Trenton, N. J., where he erected what was then and for many years the largest rolling-mill in America. There he manufactured railroad rails, and was the first to roll wrought-iron beams for fireproof buildings. His business was extended to the ownership of mines and blast furnaces. At his Baltimore works Mr. Cooper built, from his own plan, the first railroad locomotive engine ever built in America, which was used with success on the Baltimore and Ohio railroad. He was intimately connected with the development of telegraphy, investing much capital in the early lines, and at one time being president of companies owning most of the telegraph lines on this continent. He was also president of the New York, Newfoundland and London Telegraph Company, and an honorary director of the Atlantic Telegraph Company, and thus one of the promoters of the first ocean telegraphic cable. While engaged in these various enterprises he invented many valuable mechanical devices, including a machine for mortising the hubs of carriage wheels, a machine for grinding iron plates of any size to a perfect plane, another for puddling iron, and yet another for using condensed air as a motive power. He took a keen interest in all public affairs, and served for some years in the New York common council, and as a school commissioner. About 1850 his solicitude for popular education led him into the work with which his name is most identified and which forms the best basis for his lasting fame. This was the erection and endowment of the noble institution in New York City known as "The Union for the Advancement of Science and Art," but popularly called the Cooper Institute. He bought the block of land at the junction of the Bowery and Third and Fourth Avenues, and in 1853 began the erection of a stately and commodious fireproof building, which took five years to complete and which cost more than $700,000. The purpose of this institution was to provide for the people free instruction in the arts and sciences, a free reading room and library, and free lectures on various topics. He provided it with an endowment of $150,000, and arranged for the renting of stores and offices in the building to provide a further income. On April 20, 1859, he turned the splendid property over to a board of trustees named by the legislature, to be held in trust forever for the use of the people of New York. For more than half a century that institution has been one of the most potent forces for popular enlightenment in the American metropolis, affording to a multitude of students admirable educational advantages which they could not have had elsewhere. Mr. Cooper was nominated for the Presidency in 1876 by the "Greenback" party. He was the author of *Political and Financial Opinions* and *Ideas for a Science of Good Government*. His name was among the first to be placed in the Hall of Fame of New York University. He died in New York on April 4, 1883. W.F.J.

PETER COOPER.

COOPER, Susan Fenimore, author; was the second daughter of James Fenimore Cooper (q.v., Vol. VI, p. 299), and was born at Scarsdale, New York, in 1813. During the closing years of her father's life she was his secretary and amanuensis. A year before his death she published her first book, *Rural Hours* (1850), and it was followed with *Country Hours; or, Journal of a Naturalist* (1852); *Fields Old and New* (1854); *The Shield, a Narrative* (1858); *Mount Vernon to the Children of America* (1858);

Rhyme and Reason of Country Life, and some others. She founded an orphange at Cooperstown, New York, in 1873, and later organized a benevolent society of women to care for its inmates. She was a woman of fine benevolence, of shrewd observation, and of a degree of literary culture and talent which should give her works greater permanence of popularity. She died on December 31, 1894. W.F.J.

COOPER, THOMAS, an English and American scientist; born in London, Oct. 22, 1759. He studied and practised law, but devoted much time to science. Being unsuccessful in a bleaching and calico-printing business in Manchester, he emigrated to America and practised law in Pennsylvania. He was professor of chemistry successively in Dickinson, Pennsylvania, and Columbia (S.C.) colleges, and became president of the latter in 1820. He retired in 1834, and then revised the State statutes. He died in South Carolina, May 11, 1840. E.E.T.

COOPER, THOMAS, the poet and one of the leaders of CHARTISM (q. v., Vol. V, p. 375); was born at Leicester, England, in March, 1805, was apprenticed to a shoemaker, taught himself Latin, Greek, Hebrew and French, and at the age of twenty-three became a school-teacher and a local preacher of the Methodist Church. He also engaged in newspaper work in the midland counties. There he became interested in industrial and social reforms, and in 1841 became a leader of the Chartists of Leicester. He wrote and edited many Chartist tracts, made speeches, and was a leader in the riots of August, 1842, on which account he was sent to jail for two years for conspiracy and sedition. While in jail he wrote a long poem in Spencerian stanzas, called *The Purgatory of Suicides*, and also a number of tales. Afterward he wrote much in prose and verse, largely on social reforms. In 1855 he began lecturing in support of the evidences of Christianity, in 1872 he published his *Autobiography* and in 1878 his collected poems appeared. He died on July 15, 1892. W.F.J.

CO-OPERATIVE BANKS. See BUILDING AND LOAN ASSOCIATIONS, in these Supplements.

COOPERSTOWN, New York, the seat of Otsego County, and a summer resort on Otsego Lake, 92 miles west of Albany, in a region immortalized by James Fenimore Cooper after whom the town is named. It is the terminus of the Cooperstown & Charlotte Valley railway, has benevolent institutions, knitting and other mills, and an agricultural trade. Pop., 1900, 2,568. C.L.S.

COOSA, a river of Alabama with its headwaters in Georgia; it enters Alabama in Cherokee County and flows south with a westerly trend to Montgomery, where it joins the Alabama River after a tortuous course of about 240 miles. It is navigable to Wetumpka, about 30 miles above the confluence with the Alabama. C.L.S.

COOS BAY, Oregon, an inlet of the Pacific Ocean, in Coos County, with northern, eastern, and southern reaches, forming a good harbor with a narrow entrance. Coos River and its tributary Marlow Creek enter from the east. Marshfield is the principal town on its shores whence a railway penetrates south to Myrtle point affording an outlet for a lignitic coal region. C.L.S.

COPAIBA, BALSAM OF. See BALSAM, Vol. III, p. 253.

COPAIS, also called Lake of Topolia, a marshy low land in Bœotia, Greece. It formerly discharged the waters received from the Kephiso and other small streams through subterranean channels, but so unequally that during the winter months its entire surface was covered with water, while during the hot season the water receded to such a degree that large tracts could be used for agricultural purposes. Since 1883 it has been systematically drained by a tunnel. G.A.S.

COPE, CHARLES WEST, an English artist; born at Leeds, 1811. His subjects were historical and domestic, and from the poets. He was elected a Royal Academician, 1848, and professor of painting to the Academy, 1867; and was an original member of the Etching Club. He worked eight remarkable frescoes for the peers' corridor of the Houses of Parliament; while his *Life-Class* is a famed etching. His works include *Hagar and Ishmael* (1836); *The Cronies* (1837); *Edward the Black Prince Receiving the Order of the Garter* (1845), and, as a private order from Prince Albert, *The Last Days of Cardinal Wolsey;* etc. He died at Bournemouth, August 21, 1890. R.C.A.

COPE, EDWARD DRINKER, an American naturalist and anatomist; born in Philadelphia, Penn., July 28, 1840. His great-grandfather was Caleb Cope and his grandfather Thomas Pym Cope, both celebrated in early American history. His father, Alfred Cope, was at the head of a large linen house in Philadelphia. He was educated at the University of Pennsylvania and studied comparative anatomy at the Philadelphia Academy of Sciences. After two years of study in Europe he became professor of natural science in Haverford College, and was for many years curator and corresponding secretary of the Academy of Natural Sciences. In 1871 he explored the cretaceous formations of Kansas and in 1872 the Eocene of Wyoming. In 1873 he explored the Tertiary beds of Colorado, and in 1874 was employed by the United States Geodetic and Geological Survey in New Mexico; in 1875 in northern Montana; in 1877 in Oregon and in Texas. He had charge of several parties exploring the western regions in 1878. He made a collection of over 600 species of extinct vertebrate animals, of which he made known to science at least 400 species. Many of these animals he described in numerous papers, read before the scientific socie-

E. D. COPE.

ties of Philadelphia, or published in the reports of the United States Geological Survey. He was a member of the National Academy of Science and was one of the editors of the *American Naturalist*. He received the Bigsby gold medal of the Geological Society of London in 1879, in recognition of his services in the field of vertebrate palæontology. Among his other publications not already mentioned are *On the Origin of Genera* (1866); *The Origin of the Fittest* (1866); *The Energy of Life Evolution* (1885); *Report upon the Extinct Vertebrata Obtained in New Mexico in 1874* (1877); *The Short Footed Ungulata of the Eocene of Wyoming* (1873); *Hypothesis of Evolution, Physical and Metaphysical* (1870); *Evolution and Its Consequences* (1872); *Origin of Man and Other Vertebrates* (1885); *The Primary Factors of Organic Evolution* (1896), and *The Snakes and Lizards of North America* (1896). He died in Philadelphia, April 12, 1897.

W.M.C.

COPEHAN INDIANS. See *California Indians*, under INDIANS, Vol. XII, p. 866.

COPELAND, RALPH, astronomer royal for Scotland and professor of practical astronomy in the University of Edinburgh. He was born at Woodplumpton, Lancashire, in 1837, and studied at the University of Göttingen, assisted at the observatory there, and in 1876 became connected with Lord Crawford's observatory at Dun Echt. In order to observe properly the transit of Venus, he visited Mauritius and Jamaica, and traveled extensively in Peru and Bolivia. Died Oct. 27, 1905.

COPENHAGEN, the capital of Denmark, and a progressive, important commercial city. Where the ramparts of the city formerly stood are some new public buildings, notably the Royal Library, Mineralogical Museum, Polytechnic School and Town Hall. The last named has a tower whose spire rises to the height of 330 feet. Copenhagen's university has about 80 professors an 1,900 students. There are also many other institutions affording ample facilities for all branches of education. It has a large establishment for the construction of iron steamers and engines, and some other factories but it is more of a commercial than an industrial city, and, in 1899, 284 sailing vessels above four tons, with an aggregate tonnage of 18,145 tons belonged to Copenhagen, together with 292 steamers whose total tonnage was 219,055 tons. The cargoes which arrived from foreign ports was 1,580,002 tons, of which 750,257 tons were carried by Danish vessels. Population of city 1906, 426,540.

COPEPODA. See CRUSTACEA, Vol. VI, p. 587.

COPPÉE, FRANCIS EDOUARD JOACHIM, sometimes known as François Coppée, a French author; born in Paris, Jan. 12, 1842, and educated at the St. Louis Lyceum. His first laurels were won as a poet, and while young. Romantic verse for recitation soon made him famous. Then he wrote several popular dramas. Napoleon III appointed him one of the librarians in the Luxembourg Palace. In 1878 he was chosen archivist of the Comédie Française, was elected to the French Academy, Feb. 24, 1884, and in 1888 was made an officer of the Legion of Honor. Among his most successful plays may be mentioned *Le Passant* (1869); *Fais ce que Dois* (1871); *Le Luthier de Crémone* (1877); *La Guerre de Cent Ans* (1878); *Madame de Maintenon* (1881); *Les Jacobites* (1885); *For the Crown* (1895). His collected plays were published in four volumes in 1886.

COPPEE, HENRY, soldier and educator, was born at Savannah, Georgia, on October 13, 1821, and was educated at Yale and at West Point (1845). He served in the Mexican War, and was an instructor at West Point. From 1855 to 1866 he was professor of English literature in the University of Pennsylvania, from 1866 to 1876 he was president of Lehigh University, and after 1876 he was professor of English literature at Lehigh. He was the author of numerous works. During the Civil War he was editor of *The United Service Magazine*. He also edited the Count of Paris's history of the Civil War. For the last twenty-one years of his life he was a regent of the Smithsonian Institution. He died on March 22, 1895.

W.F.J.

COPPERHEAD (*Ancistrodon contortrix*), a venomous serpent of the rattlesnake family, found in eastern North America. It possesses no rattles. The name refers to the bronze-colored head. The body is reddish brown above, with dark-brown transverse stripes and scattered spots; below, it is flesh-colored and spotted. Like its allies, it is viviparous. The term *copperhead* had a political significance during the stormy period of the Civil War. From the stealthy advance of the copperhead-snake, which, unlike the rattlesnake, gives no notice of its approach, the word was applied to the Northern sympathizers with slavery, secession and the South, who by secret organizations endeavored to impede the due prosecution of the war. Previously it had been first applied to the Indians, and later to the Dutch colonists.

COPPERMINE RIVER, a stream in Canada, which enters a bay of the Arctic Ocean, northeast of the Great Bear Lake, after a course of about 300 miles. See also HEARNE, SAMUEL, XI, 492.

COPPER-MINING IN THE UNITED STATES. The copper-production in the United States in 1900 amounted to 600,830,000 pounds, and was chiefly confined to five or six states and territories. Montana came first, with a production of 254,460,713 pounds; Michigan second, with 144,227,340 pounds; Arizona third, with 115,403,846 pounds; California, with 29,639,987 pounds; Utah, with 18,504,726 pounds; and Colorado, with 7,826,949 pounds.

The United States if by far the largest producer of copper in the world, and possesses at least two of the greatest copper-mines in the world, the Anaconda of Montana being the first in size and the Calumet and Hecla of Lake Superior the third in size and importance in the world. The second place is held by the Rio Tinto mines of southern Spain, which produced about 50,000,000 pounds in 1895.

Of the United States ores, the richest in quality are those of Arizona, being oxides yielding about

ten per cent of metallic copper, and are easily reduced. The Montana ores yield about seven per cent of copper and a large amount of both silver and gold.

The Lake Superior ores are chiefly of native copper, and nearly pure, but the cost of production is not materially less than the Arizona or Montana ores.

Notwithstanding the disturbances and vicissitudes of the commercial world, the copper output in the United States in 1900 exceeded that in 1899 by about 20,000,000 pounds, and the market price of copper remained firm, even showing some advance. These facts are owing to the large extension of the uses into which the metal is coming. The chief demand is for electrical uses and appliances; but, besides this, there has been an increased demand for the brass and yellow-metal trade, as well as for the manufacture of weapons and cartridges, and in ship-building.

COPPER OR ATNA RIVER, a river of southeastern Alaska, which rises at the foot of Mt. Wrangell, at about lat. 62° 20′ N., long. 144° W., and flows west-northwest till it reaches the valley of the Alaskans; then along their southern slopes, then turns south and flows into the Pacific Ocean, where it has formed a delta. Its course is tortuous, and its length is about 400 miles. Its name comes from the copper found at points in its course.

COPPER OR CUIVRE RIVER, a stream of eastern Missouri, which rises in Audrain County, flows southeast, and empties into the Mississippi, 50 miles above St. Louis. It flows through a fertile, undulating agricultural and forest district. It is 130 miles long, and affords considerable motive power.

COPPER OXIDE CELL. See ELECTRICITY, § 105, in these Supplements.

COPRA, the native name for the dried kernel of the cocoanut, broken into small pieces for better stowage.

COPTIC CHURCH. See EGYPT, Vol. VII, pp. 631, 648, 649; see also ROMAN CATHOLIC CHURCH, Vol. XX, p. 647.

COPTIC LANGUAGE AND LITERATURE. See EGYPT, Vol. VII, p. 625.

*COPYRIGHT. The article on COPYRIGHT, Vol. VI, pp. 316–325, brought the subject of protection to the reproduction of literary and art work down to 1877, and since that time the subject of international copyright has entered upon new phases, as well in Europe as in the United States. This is the only important part of the legislative system that needed much modification, and it was the one through which the greatest injustices were wrought. While most European states were well disposed to accord protection to pure mental productions, without regard to boundary lines, differences of speech lowered the value of such protection, except as to translations and dramatic, musical and art works, without the author's consent. Between the United Kingdom and the United States the condition of affairs was quite different, for together they comprised the largest reading constituency using one speech in the world. It has generally been represented that the United States most obstructed provisions for fair adjustments, owing to an enthusiasm there for cheap books, obtained in whatever way, a respect for protective principles of trade and the peculiar greed of American publishers. There is no real ground for this invidious distinction between the two countries. If piracy was not equally common, it was because literary fecundity was greater in Great Britain than in America, and her authors enjoyed the wider celebrity. That insular realm thought no good could come out of the Transatlantic Nazareth, and when it did come, publishers were more careful to suppress the knowledge of its origin than to forego the profits of its reproduction. American books were garbled, their scenes and names changed until they had the appearance of British authorship, and American authors were compelled to witness the filching, not only of their property, but of their renown.

For years there were prolonged discussions on this subject in literary and secular papers on both sides of the sea, and repeated essays were made by both nations to come to some agreement on a reciprocal basis by treaty, but if the American publisher wished to get his literary wares for nothing, England, too, was reluctant to be just without compensation. So long as the publishers could influence their governments, all treaty negotiations were doomed to failure. The British publisher wished the American market opened to his expensive three-volumed editions without competition, and would approve of no copyright which would not secure him that boon. On the other hand, the American publisher was perhaps no less reluctant to be obliged to pay royalties on books that he heretofore had obtained freely by piracy. It is true that Parliamentary statutes made provision for copyright reciprocity, and the legislation of the United States did not. But it gradually became manifest that nothing would be accomplished by negotiation, and that the solution of the problem must be sought in Congressional legislation alone.

A movement began in 1878, in Paris, to promote greater security for authors and artists, and its promoters took the name of the Literary and Artistic International Association, and after seven years succeeded in organizing, at Berne, Switzerland, the International Copyright Union. The Berne conference of 1885 comprised representatives from Britain, Germany, France, Spain, Switzerland and Sweden and Norway, and it drafted a convention which gradually extended to Belgium, Italy, Portugal, Denmark and Mexico, and it now regulates the copyright reciprocity of those nations.

An act of Congress approved on the 3d of March, 1891, committed the United States to reciprocal international copyright, and went into operation on the following July 1st. Among the causes contributing to the revolution in a policy that had lasted for a century, the most potent

*Copyright, 1897, by The Werner Company.

was the union of organizations of authors, publishers and typographers to effect it.

From time to time, bills had been introduced into Congress to establish international copyright, but they had been smothered under the pretext that the public did not demand any change of legislation. It was necessary, therefore, to create a sentiment strong and definite enough to command respect at Washington. Abandoning all hope from treaty negotiations, an Authors' International Copyright League was organized on the 13th of April, 1883, to agitate for a reform on the moral ground of observing the sixth commandment. This association eventually became known as the American Copyright League, and it soon found allies in local organizations of like character.

American authors claimed that the production of pirated books was fatal to the welfare of their craft, because it enabled publishers to supply the reading demand of the public by cheap editions of foreign authors, on which they had no royalties to pay. Who would buy at a fair price an American manuscript, when he could reproduce, without other charge than the cost of manufacture, the best books of the best-known foreign writers?

There had also sprung up among the older publishers a usage known as the "courtesy of the trade." Under it an American publisher who bought advance sheets of any work from a British publisher, or made engagements with him for the reproduction of one of his books, was permitted by his American competitors to enjoy the monopoly of reproducing that publication in the United States. It was a usage that began with Matthew Carey and Sons of Philadelphia, who first bought advance sheets of the *Waverley Novels*, and it grew into an imperious custom of certain great houses. No profit accrued to authors, for they were not in the trade. When Anthony Trollope complained that his books were republished in the United States, from which he received not a penny of advantage, the American publisher of his novels publicly replied that he had uniformly remitted money proportionate to his sales to the English publisher. But there the money remained, leaving Trollope no richer. The usage had the peculiar merit that the American republisher could make his own terms, for, of course, the foreign house could not sell the American market, to which he had no legal title. The arrangement only operated to protect one American publisher against those of his competitors in this country who respected the "courtesy of the trade." But the gentility of this modified piracy could not obscure the lucrative character of the business, and new houses sprang up that did not observe the usage. To repress these cheap Ishmaelites of the trade, the older houses came at last to think an international copyright desirable. Hence, at the suggestion of the Authors' League, the American Publishers' Copyright League was organized in 1887, in New York. The two associations co-operated, and drew to their support two of the leading typographical unions in the country. After several bills upon which this federation was agreed had failed in Congress, but by decreasing majorities, the Chase bill, so named from its author, a Senator from Rhode Island, reached the President on the last day of the Fifty-first Congress, when his signature made it a law.

Under this act, copyright was opened to any author, without regard to nationality, with this restriction:

> "That this act shall only apply to a citizen or subject of a foreign state or nation when such foreign state or nation permits to citizens of the United States of America the benefit of copyright on substantially the same basis as its own citizens, or when such foreign state or nation is party to an international agreement which provides for reciprocity in the granting of copyright, by the terms of which the United States of America may, at its pleasure, become a party to such an agreement. The existence of either of the conditions named shall be determined by the President of the United States by proclamation made from time to time, as the purposes of this act may require."

In 1896 the United States had entered into agreements of reciprocal copyright with Belgium, France, Germany, Great Britain and her possessions, Italy, Portugal, Spain, Switzerland and Denmark. An American may secure copyright in Belgium by registering his work at the Department of Agriculture, Industry and Public Works in Brussels. In France it is given upon the deposit of two copies of the work with the Minister of the Interior in Paris. In Great Britain the title must be entered at Stationers' Hall, London, and a fee of five shillings paid, with an equal additional sum if a certified copy of the entry is demanded. The work must be published simultaneously in the realm and in the United States, and five copies deposited at the Hall for four libraries and the British Museum. In Canada the work must be registered, and two copies deposited with the Minister of Agriculture at Ottawa, and a fee of one dollar paid, fifty cents being required for a certified copy of the entry. In Switzerland nothing is required, but the owner may register his work at Berne, in the Department of Commerce and Industry, and deposit a copy there, paying a fee of two francs.

A long mooted question as to whether one may reproduce anything one can memorize from the public representation of a drama or musical composition, not copyrighted, is definitely settled. Every unauthorized reproduction of a manuscript renders the perpetrator liable to action for damages. Copyrights are still assignable and heritable, and no change is made in the proprietary rights of renewal. Copyrightable works must be manufactured in the United States, and all piratical copies of them are to be destroyed at the custom-house, except that any person may purchase for use, and not for sale, not more than two copies of a foreign duplication of a copyrighted work, subject to tariff duties. Copyright covering only translations does not forbid the importation of copies of the original text. The Secretary of the Treasury is directed to make

up lists of copyrighted books from reports of the Librarian of Congress, and furnish them to custom-house officers weekly, in order to suppress the importation of duplicates, and for five dollars annually any one is entitled to receive these weekly statements. Amended editions of foreign works already published in the United States are subject to copyright, but no serial work, except magazines and other periodicals, of which the reproduction in the United States had begun before this act went into operation could be copyrighted as to their still unpublished parts. Publication must be at least simultaneous in the United States and any other country. Various penalties are provided for violations of copyright laws, from forfeiture of all unauthorized copies and damages to the injured party to fines divisible between the government and the copyright proprietor. The penalty for falsely printing on any work notice of copyright is one hundred dollars, to be divided between the United States and the complainant; for an unauthorized reproduction of any painting, statue or statuary a penalty of ten dollars for each discoverable copy may be collected.

The fees for copyright to a person resident in the United States are fifty cents for recording title or description, fifty cents for a certified copy of the record, one dollar for record of assignment, and one dollar for certified copy thereof. Foreigners must pay one dollar for orignal entry, and fifty cents for an official copy of it. All publications must be delivered to the librarian of Congress free of charge, and he has no authority to refuse any application for copyright for works not immoral, nor to decide questions of priority or infringement. The copyright jurisdiction is in the hands of the United States courts; the common-law rights to literary property still belong to state courts. Authors and assigns have exclusive right to translate or dramatize their own works, after having copyrighted the original. No copyright is valid unless notice thereof is in some way stamped or inscribed upon the work thus protected. In all other respects the provisions of the law of 1874 are in force. Amendments further desired by authors and artists, as represented in the Literary and Artistic International Association of Europe in the autumn of 1895 are: That the right of reproduction shall inhere in the author, and exist for the benefit of his heirs or assigns for fifty years after his death; that the sale or transfer of a material work, as a manuscript, picture or design, shall not, by implication, carry with it the right of reproduction; that the author who has parted with his copyright shall retain the right to supervise reproductions of his work and to prosecute piracies or unauthorized changes in it; that in encyclopædic work, while the director of the compilation remains in legal possession of the copyright for the whole work, individual contributors to it shall be entitled to reproduce their contribution, if by so doing they do not injure the entire publication; that works of art belonging to public museums shall not be reproduced without the consent of the original artist, or his heirs or assigns; and that anonymous, pseudonymous and posthumous works shall be entitled to protection for fifty years from the date of their first publication. The present tendency is to carry to its logical amplitude the doctrine that copyright shall recognize an author's or artist's work as personal property as much as if it were in its original form of manuscript, composition or design, save that a time-limit of protection is still respected, its extension, rather than abolition, being sought.

D. O. KELLOGG.

COQUELIN, BENOIT CONSTANT ("Coquelin Aîné"), a French actor; born at Boulogne-sur-Mer, Jan. 23, 1841; the son of a baker. Evincing a great aptitude for the stage, he went to Paris and was admitted to the Conservatoire on Dec. 29, 1859. He made his *début* at the Théâtre Français on Dec. 7, 1860, in the character of Gros-René in the *Dépit Amoureux*. He afterward played with success in the *Fourberies de Scapin*, *Le Mariage de Figaro*, *Don Juan*, and other classical pieces; Lupin in *La Mère Confidente*, the Marquis in *Le Joueur*, Don Hannibal in *L'Aventurière* etc. He created the *rôle* of Anatole in *Une Loge à l'Opéra*, John in *Trop Curieux*, Gagneux in *Jean Baudry*, Vincent in *L'Œillet Blanc*, Aristide in *Le Lion Amoureux*, Grinsoire in a play of that name, Beaubourg in *Paul Forestier*, Eucrate in *Le Coq de Mycille*, etc. Coquelin obtained great success in society by reciting in private and at public meetings, and has also added to the reputation of new poets, particularly of Eugène Manuel and François Coppée. In a professional visit to America he met with a most enthusiastic reception. He has, to the great regret of all admirers of French comedy, persisted in his intention of keeping away from the Théâtre Français.—His books comprise several valuable contributions to the history of the stage and the art of acting.—His brother, ERNEST ALEXANDRE HONORÉ COQUELIN (Coquelin cadet), also a noted French actor, was born at Boulogne-sur-Mer, May 16, 1848. He also was intended for a baker, but preferred the risks attendant upon the duties of a railroad employee. Irresistibly attracted to the theater, he began a careful training at Paris in 1864, and made his initial appearances at the Odéon Théâtre. In 1868 he joined the Comédie Française and earned the applause of Parisian audiences by the side of his elder brother. When the Germans besieged Paris, Ernest Coquelin left the boards to follow the bugle, and won the Military Medal for his valor at the battle of Buzenval. His favorite *rôles* are those of Ulrich in Octave Feuillet's *Le Sphinx*, Frippesauce

M. COQUELIN.

in *Tabarin*, Isidor in *Le Testament de César Girodot*, Frederick in Erckmann-Chatrian's *L'Ami Fritz*, and Basil in *Le Barbier de Séville*. Like his elder brother, he has made several valuable contributions to the literature of the French stage.—The son of Coquelin Aîné, JEAN COQUELIN, has also distinguished himself as an actor. Born Dec. 1, 1865, he was destined for the stage from his earliest years. Attached to the Comédie Française, he has frequently, and with much success, filled the *rôles* so famous by his father's creation of them.

COQUILLA-NUTS. See NUT, Vol. XVII, p. 684; and ATTALEA, in these Supplements.

COQUIMBO, a province and city of central Chile. The province is bounded by Aconcagua on the south and Atacama on the north, with the Andes and the sea on the east and west. Its area is 12,873 square miles; population 1905, 200,423; capital, Serena; population 1905, 24,425. The city is on the coast, seven miles S.W. of Serena, and separated from it by a bay; has smelting-works, a large trade in copper and ores; chief industries, hay-raising, copper-smelting, and cattle-raising. The country is of little use for agriculture, except where it is irrigated.

COQUIMBO OWL. See BURROWING OWL, in these Supplements.

COQUINA. See ST. AUGUSTINE, Vol. XXI.

CORAL ISLAND AND REEFS. See POLYNESIA, Vol. XIX, pp. 432–435.

CORALLIGENA OR SEA-ANEMONE. See ACTINOZOA, Vol. I, pp. 120–122.

CORALLINES, a name given to a highly organized group of red algæ with branching bodies, and so encrusted with carbonate of lime that the plant becomes very hard and of a coral-like appearance. As a consequence of this structure, they occur as fossils. Common genera are *Corallina*, *Lithothamnion*, and *Lithophyllum*.

CORAOPOLIS, a post borough in Allegheny Co., Pa., 13 miles W. by N. of Pittsburg; has 3 churches, a newspaper office, oil-wells and refineries, lumber-mills, and tool-factories. Pop. 1900, 2,555.

CORATO, a town in province of Bari, Italy, 14 m. S. E. of Barletta. Pop. 1901, 40,884.

CORBET, RICHARD, an English poet and bishop; born at Ewell, Surrey, 1582. He was educated at Westminster School, Broadgates Hall (now Pembroke College), and Christ Church, Oxford. He took orders and in 1620, he was made dean of Christ Church. In 1624 he was appointed to the see of Oxford, and translated to that of Norwich in 1632. Corbet's poetry reflects the genial temper and wit for which he was famous. His longest work is *Iter Boreale*, an account of the holiday tour of four students, written in a light, easy strain of descriptive humor; the best, as well as the best known, is the *Fairies' Farewell*. He died in Norwich, July 28, 1635.

CORBIN, AUSTIN, banker and railroad president; was born at Newport, New Hampshire, on July 11, 1827, studied at the Harvard Law School, and was admitted to the bar in 1849. In 1854 he became a banker at Davenport, Iowa, and in 1865 opened a banking house in New York city. In 1873 he became interested in the eastern part of Coney Island (q. v.), and purchased it, and there created the great resort known as Manhattan Beach. Turning his attention also to railroads he became the president of several lines in the west, and also of the Long Island railroad, comprising all the lines on Long Island. He did a great work for the development of villages, towns and summer resorts on Long Island. He also took the lead in rehabilitating the great New Jersey Central and Philadelphia and Reading railroads. He had a fine estate of 12,000 acres in New Hampshire, which he stocked with game of various kinds and maintained as a forest park and as a select preserve for sportsmen. He died from the effects of an accident at Newport, New Hampshire, on June 4, 1896. W.F.J.

CORCORAN, WILLIAM WILSON, banker, was born at Georgetown, D. C., on December 27, 1798, and was educated at Georgetown College. From 1828 to 1836 he was agent for two Washington banks for the care of their real estate, and in 1837 himself became a banker and broker. Three years later he formed a partnership with George W. Riggs, a banker of Washington, and the firm soon rose to the foremost rank among bankers in that city and amassed great wealth. In 1854 Mr. Corcoran retired from active business, though he continued to give advice in important financial affairs. The Washington Soldiers' Home corporation invested some of its trust funds in Virginia state bonds, upon his advice, and when those bonds fell in value at the outbreak of the Civil War he voluntarily made good the loss from his own pocket. He gave to Washington the Corcoran Art Gallery, the Louise Home, and other institutions, and was the benefactor of various colleges, hospitals and charities, his gifts aggregating upwards of $5,000,000. For many years he was one of the most honored citizens of Washington, and is remembered as one of its chief benefactors. He died there on February 24, 1888.

WM. W. CORCORAN.

W.F.J.

CORCYRA, the ancient name of CORFU; q.v., Vol. VI, p. 351.

CORDER, FREDERICK, a British musical composer; born in London, England, Jan. 26, 1852. He showed a strong inclination for music from his earliest years, and, released from business by the failure of a firm, he entered the Royal Academy of Music at the age of eighteen. Here, in eighteen months, he won the Mendelssohn scholarship, and was sent to Cologne to pursue his studies. In four years' time he returned to England as conductor at the Brighton Aquarium. In the judgment of Sir George Grove, he is one of

the foremost of rising young composers. His romantic opera, *Nordisa*, is the most popular of some twenty published works.

CORDILLERAS (Sp., "chain of mountains"), a term occasionally used of the mountains in the region west of the great plains of North America, and frequently of the Andean chain of South America. See AMERICA, Vol. I, p. 595; ANDES, Vol. II, p. 16; ECUADOR, Vol. VII, p. 558; PERU, Vol. XVIII, p. 685; HONDURAS, Vol. XII, p. 133; MEXICO, Vol. XVI, p. 223; PARAGUAY, Vol. XVIII, p. 247; and UNITED STATES, Vol. XXIII, p. 844.

CORDITE. See GUNPOWDERS, in these Supplements.

CORDOVAN LEATHER is largely manufactured in Germany, Scotland, and in more recent years in America. It is produced from the skins or hides from horses, asses, mules and colts.

The process is as follows: After removal of the hide from the animal it is customary to cut it into two parts, measuring from the root of the tail 18 inches forward on the backbone. The hide is cut, at right angles to the backbone, directly across; the part so cut off is termed a "butt," and as such becomes a distinct article of commerce. The forward part of the hide is termed a "front," and is used, after being divided on the line of the backbone, for various purposes, principally, after being tanned, for use as glove-leather, or, blackened, to be used in the tops of shoes. These fronts are tanned so as to be finished on the grain side. The thinness of the shoulder and flanks renders this leather not altogether desirable for many purposes. The grain of the fronts, however, is particularly fine, and by careful manipulation can be made to closely represent that of genuine kangaroo. As a substitute for the latter it finds ready sale for shoe purposes. The butts, after undergoing a special tanning process, tending to produce a pliable and at the same time non-stretching leather, are passed through a splitting-machine which removes the grain, or hair side, revealing what is termed the "shell." This shell is found to lie on either side of the backbone, never, except in mule-hides, extending over the backbone. In appearance it is almost black, the line of demarcation being distinct and vivid between it and the other portions of the butt. In nature, the shell is exceptionally close-fibered, and makes, when properly blackened and finished, a leather impervious to water, and so smooth and pliable that it is used only in the manufacture of fine shoes for both men and women.

The term *Cordovan leather*, in trade circles, applies to the product both of the tanned fronts and tanned butts, but is especially used in connection with the term *galoshes*, meaning the vamps or boot-fronts cut from the shell of the butt. There are few, if any, other than the above-named animals whose hides present this peculiar region or so-called shell. In form it is elliptical, and extends well back upon the hips of the animal, and forward, covering the region of the vital organs which are not protected by the ribs.

As above stated, there are two distinct shells upon each butt, separated, except in case of asses and mules, by a strip four to six inches in width, lengthwise of the backbone. In area each shell contains from three to five square feet, according to the size of the animal. The remainder of the butt, in its nature and in its products, is identical with that of the so-called fronts.

COREA (CH'AO-HSIEN) or KOREA. In addition to the description given under COREA, Vol. VI, pp. 346–350, a more extended knowledge has been gained of the statistics, people and topography of the "Hermit Kingdom" by the events of the Yellow War. In 1894 China and Japan became involved in hostilities from their conflicting claims to regulate the affairs of Corea. In 1876 Corea had concluded a treaty with Japan, in 1882 with China (Trade and Frontier Regulations) and the United States, in 1883 with Germany and Great Britain, in 1884 with Italy and Russia, in 1886 with France, and in 1892 with Austria. An overland trade convention has also been concluded with Russia. In these treaties Corea was treated with as an independent state, and by virtue of them, Seoul and the three ports of Jenchuan, Fusan, and Yuensan were opened to foreign commerce. In 1894 violent internal disturbances occurred. The Coreans, split into Chinese and Japanese factions, and appealed to each power for aid. When China sent troops to quell the riots, Japan protested against a violation of the treaty of 1876. Then Japan landed five thousand men on the west coast, June 3, 1894, under the pretext of escorting the Japanese minister in safety from the country. The army having seized strategical positions, the Mikado's ambassador, Mr. Otori, made a demand for five immediate reforms in Corean affairs. China demanded the withdrawal of the Japanese troops, invoked in vain the aid of Russia, but secured an appeal by the European representatives for mutual concessions. Then the Japanese seized the Corean king, July 23d, and compelled him to appoint Tai Wen Kun as regent. Hostilities began with a naval engagement in Prince Gerome Gulf, July 25th, and a sea battle between cruisers, on the same date, off Fontao Island. In each case the Japanese were victorious. The formal declaration of war was made August 1st, and by the 26th of the same month Mr. Otori had concluded a treaty of alliance between Japan and the Corean government. Then the "Yellow War," as it has been well termed, began in good earnest on land. Its whole burden fell on Li Hung Chang, the Viceroy of China. His army was not one quarter the strength of the Japanese. Deficient and antiquated in equipment, with poltroons for commanders, the land forces were on a par with a navy crippled by the resignation of all the English engineers (in accordance with neutrality proclamations), and commanded by cowardly mandarins. Under Field-Marshal Count Yamagata the Japanese soon landed 10,000 troops at Fusan, 3,000 at Gensan, near Port Lazareff, and 30,000 at Chemulpo. To oppose these, some 30,000 Chinese

troops were concentrated at Wiju, whence, with some reinforcements, they were marched 100 miles southward to confront the victorious Japanese at Ping Yang. In this vicinity strategic movements and skirmishes occurred for some time, generally resulting in favor of the Japanese. The Japanese commanders were graduates of the first military schools of Germany, the soldiers armed with modern rifles, and the entire army drilled in European methods. To confront these were venal and ignorant mandarins, supported by a barbarian horde, more suited, as to arms and equipment, for an encounter with crusaders of a long past age. On September 16th, the Japanese, attacking the Chinese lines at Ping Yang in front, at the same moment that a second column came into action on the flanks and in rear, routed their opponents with terrific slaughter. The Chinese loss was over 16,000, as against a Japanese casualty list of 30 killed and 270 wounded. Four Chinese generals, many thousand rifles, immense military stores and three million dollars fell into the victors' hands. Disaster on sea followed the next day, and at the sea fight of the Yalu River the Chinese navy was almost entirely destroyed or captured. The only vessel which did fight in earnest for the honor of the Flowery Kingdom was, it may be said, commanded by an American graduate of Annapolis. After the capture of Ping Yang and the whole of the Chinese invading force, the Japanese marched to invade Manchuria. Victorious at Wiju, and carrying Hu-Shan by vigorous assault on October 25th, the Japanese columns marched through Manchuria and proceeded to invest Port Arthur. Here the demoralized remnants of the Chinese army made a desperate stand, until panic-stricken by repeated assaults, and, deserted by their commanders, they fled in disorder, and Port Arthur fell on November 22d into the hands of the Japanese, with 80 guns and immense stores.

With the fall of Port Arthur the reserves of Japan were called to the colors, and a second army mobilized and landed on the Chinese coast, near Kinchow, in the Gulf of Liao. Marching through Manchuria, in the direction of Ninchang, though retarded by the severe cold, the Japanese fought at Kungwasai, on December 19th, the most stubbornly contested battle of the war. Four charges were necessary to carry the Chinese works, and these cost the Japanese 450 men. The victors advanced to To Chung Su and occupied a position of great strategic value, preparatory to a march on Pekin in the spring. On February 16th the naval station of Wei-Hai-Wei fell into the invaders' hands, and China hurried a peace embassy to Tokyo to beg for terms. By the treaty of Shimonoseki, signed April 17, 1895, and ratified at Chefoo, May 8th, the independence of Corea was proclaimed and declared, and the part of Manchuria occupied in the war, also Formosa ceded to Japan, with a war indemnity of $150,000,000, and Port Arthur evacuated by the victors at the request of Russia.

In 1904, an agreement had been signed at Seoul between Japan and Corea, guaranteeing the independence and territorial integrity of the latter country. Furthermore, Corea agreed to adopt Japan's advice in regard to internal and foreign affairs. By virtue of another treaty signed in the same year, Corea accepted a Japanese financial adviser, and a foreign diplomatic adviser for Foreign Affairs. In 1905, Japan entered treaties with England and Russia by which the two countries acknowledged Japan's full control of Corea. In the same year an agreement of the same tenor was made between Corea and Japan. By its provisions a Resident-General was stationed at Seoul to which position Marquis Ito was appointed in 1906. This caused numerous bloody insurrections of the Coreans which were, however, suppressed by the Japanese soldiery. On July 20, 1907, the emperor of Corea, Yi Hiung, born in 1852, and ruling since 1864, abdicated, and was succeeded by his son, Yi Chök, born 1874. He concluded, in the same year, another treaty with Japan which puts the entire control of the country Corea into the hands of the former power.

Area of Corea, 70,000 square miles. Population about 10,000,000. Capital, Seoul, population 196,646. The estimated revenue for 1907 was $4,783,000, and the expenditure $4,607,000. The imports of 1906 amounted to 30,136,300 yen, and the exports to 8,289,460 yen.

The railroad from Seoul to Tusan (286 miles), is in operation since 1905, also the line from Seoul to Wiju, 130 miles long. They belong to Japan. There are 2,170 miles of telegraph lines in Corea.

CORELLI, Marie, English novelist, was born of Italian parents and adopted when a child by the late Dr. Charles Mackay, and at his death became the ward of his son, Eric S. Mackay, author of *The Love Letters of a Violinist.* Her writings are pervaded by an element of mysticism. Among her writings are *The Romance of Two Worlds* (1886); *Vendetta* (1887); *Thelma* (1888); *Ardath* (1889); *Wormwood* (1890); *Soul of Lilith* (1892); *Barabbas* (1893); *The Sorrows of Satan* (1894); *The Mystery of an Atom* (1895); *The Murder of Delicia* (1896); *Ziska* (1897); *Jane* (1897); *The Master Christian* (1900); *Temporal Power* (1902).

CORENTYN, a river of Guiana, South America, separating the British and Dutch possessions. It rises in the Acara Mountains and flows generally northward, emptying into the Atlantic at long. 57° W. It has four large cataracts, the lower two being of great beauty. It is about 500 miles long, and is navigable for vessels of light draft for 150 miles.

COREOPSIS, a large genus of the family *Compositæ*, abundant in North and South America and in South Africa. The involucre is double, the rays are mostly yellow and the flat akenes (fruits) have generally two or three teeth or awns, but not barbed, as in the closely related *Bidens.* The species are generally known as "tickseeds," and several of them are cultivated on account of their showy flowers. The most common cultivated form is *C. tinctoria*, the common Coreopsis or Calliopsis of the gardens, with the large yellow rays brownish purple at base,

or even brownish throughout. See Vol. XII, p. 258.

CORFIELD, William Henry, an English physician and sanitary expert; born at Shrewsbury in December, 1843. Studying medicine, hygiene and natural science, he took many honors and degrees, was appointed professor of hygiene and public health at University College, London (1869), and has written *Dwelling Houses: Their Sanitary Construction and Arrangement* (1879); *The Treatment and Utilization of Sewerage;* and *The Water Supply of Ancient Roman Cities.* He is chairman of the Council of the Sanitary Institute of Great Britain.

CORINTH, the capital of Alcorn County, northeastern Mississippi, and the most prominent city of the northern part of the state, is situated on the Memphis and Charleston and the Mobile and Ohio railroads, about 93 miles from Memphis, Tennessee. During the Civil War it was occupied successively by the Union and Confederate armies, being regarded by the commanders of the contesting forces as a point of the greatest strategical importance. After the battle of Pittsburg Landing, the Confederate army fell back upon Corinth. On May 30th following, General Beauregard evacuated the place, and it was taken possession of by the Union army under General Halleck. The command of the district was intrusted to Gen. W. S. Rosecrans, who made his headquarters at Corinth. On the night of October 3d of the same year, the place was attacked by the Confederate army under General Earl Van Dorn, consisting of the forces commanded by Generals Lovell, Price, Villepigue, Rust and others, and numbering, in the aggregate, about thirty thousand men. The attack was repulsed, but on the succeeding morning Van Dorn renewed hostilities, directing the movements of his army in person. For a brief period success crowned the efforts of the Confederates, but finally they were hurled back, and before noon were in full retreat. They were pursued by the commands of Generals Hurlbut and Ord, but ultimately escaped beyond the Hatchie River. Their losses amounted to 1,423 killed, and 2,225 wounded and prisoners. The Union army sustained a loss of 315 killed, 1,812 wounded and 232 missing. Since the close of the war, Corinth has experienced a substantial and permanent growth. It now contains ten churches, schools and other institutions of learning, several weekly papers, many stores, and manufactures of lumber, woodenware, brooms, etc. Pop. 1890, 2,111; 1900, 3,661.

CORINTH SHIP CANAL. See Canal, in these Supplements.

CORINTO, a port of the department of Chinandega, western Nicaragua, 12 miles by rail S. of Chinandega City. It is on a fine harbor, and consequently has an important trade. In the year 1893–94, its exports amounted to 3,642,997 pesos, over two-thirds of which was coffee. Pacific Mail steamers touch here. Population, about 2,000.

CORLISS, George Henry, engineer, was born at Easton, New York, on June 2, 1817, and early in life manifested inventive talent. His first device was a machine for sewing boots and shoes. In 1844 he settled in Providence, R. I., and became the head of a firm engaged in the manufacture of steam engines and other machinery. Here his talent found full scope, and in 1848 he completed the original form of what has since become known the world over as the "Corliss engine." This invention largely revolutionized the use of stationary engines everywhere, and was of inestimable importance to the industrial world. One of his monster engines was used to move all the machinery at the Philadelphia Centennial Exposition of 1876. Medals and diplomas of honor were bestowed upon him in America and in Europe, and his engine works at Providence became one of the greatest in the world. He died at Providence on February 21, 1888. W. F. J.

CORNACEÆ, a small family of dicotyledonous plants, chiefly trees and shrubs, of the northern temperate regions. The most common genera of the United States are *Cornus*, whose numerous species are called "cornals" or "dogwoods"; and *Nyssa*, the "tupelo," "pepperidge," or "sour gum tree." The fruit is a drupe or berry, and in some cases edible.

CORN-APHIS (*Aphis granaria*), a plant-louse which is often injurious to corn and wheat crops. See Wheat, Vol. XXIV, p. 565.

CORN-BEETLE (*Cucujus testaccus*), a minute beetle, whose yellow-colored larva is very destructive to wheat in granaries.

CORNBRASH, a coarse, shelly limestone of the Lower Oölite group in geology. See Geology, Vol. X, p. 315.

CORN-COCKKLE or CORN-ROSE (*Lychnis Githago*), a tall weed of the family *Caryophyllaceæ* ("pink family"), a native of Europe or the west of Asia, but now found in many countries. It is a frequent weed among crops of grain, and is well known on account of its large purple flowers, long linear leaves and black seeds.

CORNCRAKE or LANDRAIL, a bird. See Crake, Vol. VI, p. 481; and Rail, Vol. XX, p. 229.

CORNELL, Alonzo B., financier, was born at Ithaca, New York, on January 22, 1832, the son of Ezra Cornell (q. v.). He became a telegraph operator and afterward one of the managers of the Western Union Telegraph Company. He also acquired a large interest in steamboat lines and railroads, and became a bank officer. In 1869–73 he was surveyor of customs at the port of New York, from 1876 to 1878 naval officer at that port, and from 1880 to 1883 was governor of the state of New York. He also served as member and speaker of the state assembly, and as chairman of the state Republican central committee. His home was at Ithaca, N. Y., where he was deeply interested in the university of which his father was the founder. Died Oct. 15, 1904. W. F. J.

CORNELL, Ezra, founder of Cornell University, was born in Westchester County, New York, on January 11, 1807, and learned his father's trade as a potter. Later he worked in various industries until 1843, when he became interested in Morse's invention of telegraphy, and began the building of the first telegraph lines. It was he who devised the use of poles for carrying the wires. In this business he greatly prospered and

grew rich. In 1862 he was chosen president of the New York State Agricultural Society and gave $50,000 for a public library at Ithaca, where he made his home. In 1864 he was a state senator, and while in that office conceived the scheme of founding a university "where any person can find instruction in any study." He financed the Federal land grant so as to make it enormously profitable, added to it from his own fortune, and thus established Cornell University, at Ithaca, to the promotion of which he gave the rest of his life. He died on December 9, 1874. W.F.J.

EZRA CORNELL.

CORNELL COLLEGE, an educational institution at Mount Vernon, Iowa, founded in 1857 under the auspices of the Methodist Episcopal Church. There are five college buildings, including a Gothic chapel, art and science halls, the Bowman Hall and the main college building. The institution has a fund of $405,000, over 25,000 volumes in the library, and in 1904 there were 40 instructors and 763 students. William F. King was president of the college in 1905. The grounds and buildings are valued at $225,000. The college has productive funds of $188,813 and an annual income of $36,875. There are classical, scientific, philosophical and civil-engineering courses of study, and normal, art, musical and preparatory departments. W.M.C.

CORNELL UNIVERSITY, a non-sectarian, educational institution at Ithaca, New York, the grounds of which cover a tract of 270 acres. It owes its origin to the Land Grant Act of Congress of 1862 "donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and mechanic arts." It was named after Ezra Cornell, who gave it upwards of $750,000 with which to erect buildings. Other bequests were made by Henry W. Sage, John McGraw, Hiram Sibley, Andrew D. White, Dean Sage, A. S. Barnes, and Oliver H. Payne. In 1907 the university had 467 professors and instructors; 3,461 students and a library containing 249,583 volumes. It has funds to the amount of $8,000,000. There are 36 university undergraduate scholarships good for two years each, 18 of which are annually granted upon competitive examination to members of the freshman class. The university annually grants free tuition to 600 students of New York state, also to students in agriculture and to New York state students in forestry and veterinary medicine. The grounds, buildings, equipment and other property used by the university were estimated at $3,092,715.81 in 1902, not including the valuation of the new Medical College in New York, estimated at $1,000,000. The president of the university in 1905 was Jacob G. Schurman. W.M.C.

CORNELL UNIVERSITY.

CORNER. In the vernacular of the commercial world, a corner is an existing shortage in any particular stock or commodity, brought about by the preconcerted purchase, by one or more parties, of such stock or commodity in such quantities as practically to preclude others from buying on the open market. The result of this is to place all outsiders at the mercy of the cornerer, who thus is enabled to dictate his own terms of sale.

CORNET, a wind-instrument. See ZINCKEN, Vol. XXIV, pp. 826, 827.

CORN-FLOWER, a name given to *Centaurea Cyanus*, a star-thistle of the family *Compositæ*. It is a native of Europe, but is cultivated in gardens and runs wild in the United States. It is cottony, with linear stem leaves, a solitary long-stalked head of large blue flowers, varying to white and rose-color. It also is called "bluebottle."

CORN-HARVESTERS. See HARVESTING MACHINERY, in these Supplements.

CORNIFEROUS, a period in geology to which belongs the corniferous limestone. This latter extends from near the Hudson, in eastern New York, westward through the state, and at the Niagara River forms the rapids at Black Rock. It also occurs in Ohio, northern Michigan, Illinois, Kentucky, eastern Iowa and Missouri. The limestone is commonly light gray to bluish or buff; occasionally it is blackish and rough, from the abundance of hornstone masses which are left projecting by surface wear. See also GEOLOGY, Vol. X, p. 306.

CORNING, Iowa, the seat of Adams County on the Nodaway River, and on the Chicago, Burlington & Quincy railroad, 21 miles west of Creston. It is in a coal-mining, farming and fruit raising region, the products of which supply local manufactures, and a growing export trade. Population, 1900, 2,145. C.L.S.

CORNING, an important town of Steuben County, western central New York, and one of the capitals of the county, pleasantly situated on the Chemung River, about 17 miles W. of Elmira, on the Fall Brook and New York, Lake Erie and Western

railroads. It has excellent educational facilities, and contains a variety of manufactories, including flint-glass and railroad cars. Pop. 1900, 11,061.

CORNISH DIALECT. See CELTIC LITERATURE, Vol. V, p. 258.

CORN, MAIZE OR INDIAN CORN. Corn, as usually applied, is a generic name for all seeds used in making bread, especially the seeds of cerealia. In England, corn means wheat, rye, oats or barley; in Scotland, oats; and in the United States, maize. SEE AGRICULTURE, in Supplment and MAIZE, Vol. XV, p. 311.

CORN-MOTH (*Tinea Granella*), a small species of moth, very destructive to grain-sheaves in the field and stored grain, among which it lays its eggs. The larva, which, for its voraciousness, is known as "the wolf," eats into the grain and joins it together by a web. Frequent turning is resorted to for the destruction of the eggs and larva, and salt is mixed with grain for the same purpose.

CORNPLANTER, an American Indian chief, head of the Six Nations; born in 1732. He was a half-breed of the Seneca tribe, his father being a French-Canadian. With his followers he aided the French in the war with the colonists and was active during the campaigns on the frontier. After peace was declared he became friendly with the United States. He was an Indian of more than ordinary intelligence, and after his death, which occurred in Warren County, Pennsylvania, February 18, 1836, the state erected a monument to his memory. W.M.C.

CORNSNAKE, a large harmless snake (*Coluber guttatus*) of North America. R.W.C.

CORNO, MONTE OR GRAN SASSO D'ITALIA, a mountain in southern Italy, the culminating peak of the Apennines. See APENNINES, Vol. II, p. 150; and ITALY, Vol. XIII, p. 447.

CORNS. See SKIN DISEASES, Vol. XXII, p. 129.

CORNU, MARIE ALFRED, a French scientist; born March 6, 1841. In 1867 he was appointed professor of physics at the École Polytechnique, and succeeded Becquerel as member of the Academy of Science; received the Rumford medal of the Royal Society of London. He was president of the French Association for the Advancement of Science, and was decorated with the Legion of Honor. Professor Cornu's researches have chiefly been devoted to optical subjects. He gave to measurements of the velocity of light a precision which was previously impossible. His principal experiments upon this subject are recorded in the annals of the Paris Observatory; many of his other papers are in the *Comptes Rendus*, and deal with crystalline reflexion, the reversal of the lines in the spectrum of metallic vapors, the spectra of the aurora borealis and the normal solar spectrum.

CORNWALL, the county seat and a port of entry of Cornwall and Stormont County, in the eastern part of Ontario, Canada. It lies on the St. Lawrence River, just above St. Francis Lake, about 75 miles southeast of the city of Ottawa. It has a large commerce by way of the river, and is also reached by the Grand Trunk railway. Its population in 1901 was 6,704. W.F.J.

CORN-WEEVIL, a wheat-pest. See WHEAT, Vol. XXIV, p. 566.

CORN-WORM (*Heliothis armigera*), a name applied to the larva of a moth, also known as boll-worm. The larva feeds on corn, cotton, tomato and other plants. Some years almost one-fourth of the cotton-crop in the southern United States has been destroyed by this worm. It is called boll-worm because it begins its ravages by destroying the young bolls, or fruit, of the cotton-plant.

CORŒBUS, a Phrygian hero who fought in the Trojan war on the side of the Trojans. He was one of the suitors of Cassandra. See CHRONOLOGY, Vol. V, p. 711. W.R.B.

CORONA BOREALIS, the constellation known as the Northern Crown, lying between Bootes and Hercules, containing three double stars of 4th, 5th, 6th magnitudes. W.R.B.

CORONADO, a celebrated summer and winter resort of San Diego County, California, situated on the Pacific Coast, near San Diego, and just north of the Mexican boundary line. It is noted for its medicinal spring, its fine bathing facilities, its exhilarating climate and its magnificent scenery. The springs are sulpho-carbonated sodic.

CORONADO, FRANCISCO VASQUEZ DE, a Spanish explorer; born in Salamanca, Spain. He organized an expedition which left Culiacan, on the Pacific coast, in April, 1540, and traversed what is now the state of Sonora to the river Gila. Crossing this, he came to the Little Colorado (which he called the Rio del Lino) and visited the cities of Cibola (probably India pueblos) which had been mentioned by Cabeçade Vaca and De Niza. Thence he travelled eastward to the Rio Grande, and beyond to the city of Quivira, in the course of which journey he encountered herds of buffalo, which he described as "a new kind of oxen, wild and fierce," and as "crooked-back oxen," of which "the plains are as full . . . as the mountain Sereña in Spain is of sheep." The journey resulted disastrously to Coronado, as at Tiguex, near the Rio Grande, in March, 1542, he fell from his horse, and "with the fall fell out his wits, and he became mad." E.E.T.

CORONATION GULF, an inlet of the Arctic Ocean, in B.N.A., forming the S.E. part of the land-locked and isle-studded bay that receives the Coppermine River. Lat. 68° 30′ N., long. 46° 52′ W.

CORONELLA, a genus of small, non-venomous serpents of the family *Colubridæ*, having a somewhat compressed and pentagonal body, and long, conical tail. Inhabits warm and temperate zones.

CORONER. The gradual progress of codification and revision of statute law in England brought the office and duties of a coroner within the contemplation of Parliament in 1890. A Coroner's Act was passed, abolishing many useless and obsolete incidents of the office, clearly defining the duties of a coroner, and codifying, within the brief limits of a single statute, the common-law decisions in relation to the office, which previously had reposed in the midst of hundreds of dusty volumes evolved by 850 years of English jurisprudence and its proverbially slow progress. See CORONER, VI, 381.

CORPANCHO, MANUEL NICHOLAS, a Peru-

vian patriot and poet; born in Lima, December 5, 1830; died there September 13, 1863. W.M.C.

CORPUS CHRISTI, a city and the capital of Nueces County, southern Texas, on the Mexican National railroad. It is on Corpus Christi Bay, and has a harbor unsurpassed by any on the coast. It is the terminus of the San Antonio and Aransas Pass railroad, and is the center of a large and growing commerce. Population 1890, 4,387; 1900, 4,703.

CORPUSCULAR THEORY OF LIGHT. See LIGHT, Vol. XIV, p. 584.

CORPUS DELICTI, a term used in criminal law, signifying the substance of a crime, or the actual fact that a crime has been committed as charged. Thus in the case of murder, the fact of the death of the victim and that the crime charged against the accused had actually been committed by some one, is called the *Corpus Delicti;* and without proof of this fact, no matter how suspicious the other circumstances, such as the disappearance of the victim, the known hatred of the accused toward him, or other actuating motives, the opportunity for the commission of the crime, or the innumerable other incriminating circumstances, a conviction of murder would not be justified. The fact that the person was killed as charged must always be proved. The fact that, after the accused has been convicted and put to death, the supposed victim has in several instances made his appearance alive, makes the wisdom of the rule apparent. The rule that the *corpus delicti* must be proved applies to other crimes.

CORRIGAN, MICHAEL AUGUSTINE, third Catholic Archbishop of New York; born in Newark, N. J., on August 17, 1839, of Irish parentage. He was educated at St. Mary's College, Wilmington, Del., and at Mount St. Mary's College, Emmitsburg, Md., where he graduated in 1859. As one of the twelve original scholars enrolled on the foundation of the American College in Rome, he completed his academic studies there and graduated D.D. in 1864. The year previously, he had been ordained priest. From 1864–1868 he was professor of dogmatic theology and sacred scripture, and from 1868 president of Seton Hall College, Orange, New Jersey, until appointed bishop of the diocese of Newark in 1873. In 1880 he was made titular Archbishop of Petra and coadjutor to the Archbishop of New York, succeeding to the metropolitan dignity upon the death of Cardinal McCloskey in 1885. Archbishop Corrigan died on May 5, 1902.

C.L.S.

CORRY, a city of Erie County, northwestern Pennsylvania, 26 miles E.S.E. of Erie, on the New York, Lake Erie and Western, the Pennsylvania and the Western New York and Pennsylvania railroads. It has a large number of manufactories, among them boring-machine factories, locomotive and car shops, boiler-works and numerous other machine-shops. The town has electric lights, water and gas works. Pop. 1890, 5,677; 1900, 5,369.

CORSE, JOHN MURRAY, soldier, was born at Pittsburg, Penn., on April 27, 1835, studied at West Point, and was admitted to the bar. He did fine service in the Civil War and rose to the rank of Maj.-Gen. of volunteers. At Allatoona Pass, on Sherman's march to the sea, he was the hero of the "Hold the fort" incident. In 1886 he was postmaster of Boston. He died on April 27, 1893. W.F.J.

CORSICANA, a city and the county seat of Navarro County, Texas, in the northeastern part of the state. It is 52 miles south by east from Dallas, and is an important railroad and commercial center, being reached by the Houston and Texas Central and the St. Louis Southwestern roads. Population, 9,313 in 1900. W.F.J.

CORSITE. See CORSYTE, in these Supplements.

CORSNED OR CORSNÆD. See ORDEAL, Vol. XVII, p. 843.

CORSON, HIRAM, educator, was born in Philadelphia in 1828, filled various professorships, and has been professor of English literature at Cornell University since 1870. He is the author of a great number of books on English literature, Shakespeare, Chaucer, etc. W.F.J.

CORSYTE, a term in geology to describe eruptive rocks in Corsica and the Shetland Isles. It also is called Orbicular Dioryte, and consists of anorthite and hornblende, with some quartz and biotite.

CORTELYOU, GEORGE BRUCE, Secretary of Commerce and Labor, was born in the city of New York, July 26, 1862; was educated at public and private schools; graduated at Hempstead (L. I.) Institute and State Normal School, Westfield, Mass.; received the degree of LL.B. from Georgetown and that of LL.M. from Columbian University, and, on June 10, 1903, the degree of LL.D. from the former University; in 1883 was a general law and verbatim reporter in New York; was principal of preparatory schools in New York from 1885 to 1889; in the latter year entered the public service, and was private secretary to various public officials, among them the post-office inspector in charge at New York, the surveyor of the port of New York, and the Fourth Assistant Postmaster-General; November, 1895, was appointed stenographer to President Cleveland; February, 1896, executive clerk; July 1, 1898, assistant secretary to President McKinley; April 13, 1900, secretary to the President; reappointed March 15, 1901, and September 16, 1901, reappointed by President Roosevelt; was appointed secretary of Commerce and Labor, Feb. 16, 1903, which position he resigned, July 1, 1904, to accept the chairmanship of the Republican National Committee. He was appointed Postmaster-General, March 6, 1905.

GEORGE B. CORTELYOU.

CORTLAND, a railroad junction and the county seat of Cortland County, New York, 37 miles S. of Syracuse. It has a state normal school, an academy and numerous manufactories, among them factories for wire-drawing and wire-weaving, carshops, etc. Pop. 1890, 8,590; 1900, 9,014.

CORUMBA, Brazil, a fortified town in the state of Matto Grosso, near the Bolivian frontier, and at the head of navigation on the west bank of the Paraguay River, about 350 miles S.E. of Matto Grosso, the state capital. It is the port of entry and outlet for an extensive region, including southern Bolivia. Pop., with Larida, 7,000. C.L.S.

CORUNDUM. See EMERY, Vol. VIII, p. 157.

CORUNNA, a city and the county seat of Shiawasse County, Michigan, in the central part of the state. It lies on Shiawassee River, 28 miles from Lansing, and is reached by the Toledo, Ann Arbor and Northern Michigan, and the Detroit, Grand Haven and Milwaukee railroads. Its population was 1,510 in 1900. W.F.J.

CORVALLIS, a city and the county seat of Benton County, Oregon, near the center of the seacoast of that state. It lies on the Willamette River, 28 miles south of the city of Salem, and is reached by the Oregon Pacific and the Southern Pacific railroads. It has a considerable commerce in lumber, fish, and other products. Its population was 1,819 in 1900. W.F.J.

CORVIDÆ. See CROW, Vol. VI, p. 545.

CORWEN ("the white choir"), a town in Merionethshire, North Wales, on a height overlooking the Dee, 10 miles W. of Llangollen. It is said to be the place to which Owen Glendower retreated when Henry IV invaded and overran Wales, and tradition points out his tomb in the parish churchyard. It has a railway station. Pop., 2,646.

CORWIN, THOMAS, an American statesman; born in Bourbon County, Ky., July 29, 1794. In 1798 his father settled in Warren County, Ohio, where Thomas was brought up on a farm. He was largely self-taught, but in 1815 he began to study law, and in 1818 was admitted to the bar. He distinguished himself in chamber practice and as a pleader. In 1822 he was elected to the lower House of the Ohio legislature, where he remained for seven years, and in 1830 he was sent to the national House of Representatives. He was a prominent supporter of the Whigs, and in 1840 was elected by that party governor of Ohio. In 1844 he was elected to the United States Senate, and when the Mexican War broke out he distinguished himself by the oft-quoted speech in which he denounced the intentions of the party in power to seize Mexican territory which it had failed to purchase by treaty. In 1850 he vacated his seat on being appointed Secretary of the Treasury. In 1853 he resigned this office; sat in the House of Representatives, 1859–63; was minister to Mexico, 1861–64; and then retired to Washington, D. C., where he died, Dec. 18, 1865. E.E.T.

THOMAS CORWIN.

CORYDON, a town and the capital of Harrison County, southeastern Indiana, and former capital of the state, situated on Indian Creek, 115 miles S. of Indianapolis, and on the Louisville, New Albany and Corydon railroad. It is the seat of an academy, contains various manufactories, and is noted for its sulphur spring. Pop. 1900, 1,610.

CORYDON, a town and the capital of Wayne County, central southern Iowa, 61 miles S. of Des Moines, on the Keokuk and Western railroad. Population 1890, 962; 1900, 1,477.

CORYMB. See BOTANY, Vol. IV, p. 110.

CORYMBUS, a mode of dressing the hair among the Greeks by tying it in a cluster or knot on the top of the head. The hair often was covered with a sort of open ornamental work. The name was also given to the cluster of ivy leaves, garlands or berries with which Greek vases were encircled, and to the high sterns of ships.

CORYPHA, a genus of tropical fan-leaved palms found in Ceylon and Molabor, whose leaves are made into fans, helmets and tents. W.R.B.

CORYPHENE (*Coryphæna*), a genus of fishes of the family *Coryphænidæ*. This family comprises the fishes known as dolphins, related to the mackerels. Most of them exhibit brilliant, iridescent colors. Some of them are excellent as food. Two species have been found along the Atlantic coast of the United States.

CORYPHODON. See MAMMALIA, Vol. XV.

COSCINOMANCY, a form of divination practiced in early times by suspending a sieve from the point of a pair of shears. See DIVINATION, VII.

COSEGUINA OR COSIGÜINA. The mountain is three thousand feet in height, and occupies a promontory on the south side of the Gulf of Fonseca, in the department of Chinandega. See NICARAGUA, Vol. XVII, p. 490.

COSHOCTON, the capital of Coshocton County, eastern central Ohio. It lies on the Muskingum River, and on the Ohio canal, 26 miles N. of Zanesville, on the C. C. & S. and P. C. C. & St. L. railroads. It has a paper-mill and iron and steel works. Pop. 1890, 3,672; 1900, 6,473.

COSTA, ISAAC DA, a Dutch poet and religious writer; born at Amsterdam in 1798; died in 1860. In his twentieth year he acquired the degree of LL.D., and, embracing Christianity, was baptized. This subjected him to considerable persecution, which, however, subsided as his genius gradually gained recognition. The most interesting of his writings are his translation of Byron's *Cain; Harmony of the Gospel;* etc. His *Battle of Nieuwpoort*, the last of his poems, is one of his masterpieces.

COSTA, SIR MICHAEL, musician; was born in Naples on February 4, 1810, studied in his native city, and went to England at an early age. He produced his ballet, *Kenilworth*, in 1831; his masterpiece, the oratorio *Eli*, in 1855; *Naaman*, in 1864, and the operas, *Malek Adhel*, in 1838, and *Don Carlos*, in 1844. He conducted the Handel festivals for 20 years, was knighted in 1869, and died on April 29, 1884. W.F.J.

COSTANOAN INDIANS. A name sometimes applied to the coast tribes of California converted by the Jesuits. See CALIFORNIA, Vol. IV, p. 615.

COSTA RICA (República de Costa Rica), the southernmost republic of Central America. (See COSTA RICA, Vol. VI, pp. 397–399.) The legislative power is vested in a single chamber of 21 representatives—one for each ten thousand inhabitants—the members of which serve for four years, one half retiring every two years. The President is elected for four years in the same manner, the present occupant of the office being Señor Don Rafael Iglesias, whose term expires May 8, 1902 Official statistics make the area of the republic 23,000 square miles, but geographers deny that it exceeds 20,980 square miles. The census of Feb. 18, 1892, showed a population of 243,205, of whom 122,480 were males and 120,725 females. In Dec., 1906, the population was put at 341,590. In 1896, the republic took the unusual course, for a South American republic, of declaring against a silver monetary standard, and of adopting a gold standard. As regards commerce, the development of the coffee industry has made Costa Rica one of the richest countries, for its size, in the world. The revenue of the republic in 1900 was $4,000,000, and the expenditure $4,200,000; foreign debt, $10,400,000. The chief exports are coffee, bananas and sugar. Valuable metals exist in various parts of the country, and the mining industry is making progress. In 1906, there were 294 miles of railway and 1,026 miles of telegraph. Education is compulsory and free. In 1905, there were 386 primary schools with 22,274 pupils, besides 90 private schools with 2,500 pupils. The army consists of 600 men in time of peace, and on a war-footing commands 35,000 militia, as every male between 18 and 50 is bound to serve. The imports for 1900 amounted to $6,084,895, and the exports to $6,321,192. To facilitate agricultural operations and immigration, a concession has been granted for an agricultural bank with a capital of $5,000,000. The bank makes advances on the security of lands and produce, and will bring out colonists and settle them on lands ceded to the company. In 1896 Costa Rica adopted the single gold monetary standard.

COSTMARY ("plant of Mary") *Tanacetum Balsamita*), a perennial plant of the family *Compositæ*, a native of the south of Europe, long cultivated in gardens for the agreeable fragrance of its leaves.

COSTROMA OR KOSTROMA, a town and the capital of the province of Costroma, central European Russia, situated at the confluence of the Costroma with the Volga. It has manufactories of linen, leather, soap and Prussian blue. Population, 41,336.

COSWAY, RICHARD, a noted English artist; born at Tiverton, Devonshire, in 1740. As a miniature-painter he was particularly famous, and gained the patronage of most of the nobility of his time. Many of his works were distinguished by great delicacy of treatment and correctness of detail. He died in London, July 4, 1821.

COTA-CACHI, Ecuador, a snow-capped and extinct Andean volcano, in the western Cordillera, 16,301 feet high. It is 58 miles north of Quito and at its base is the small town of Cota-Cachi, with cotton and other manufactures and a population of 5,000. The ascent of the mountain is difficult; its crater, 10,000 feet above sea-level on the southern slope, is occupied by one of the highest lakes in the world, locally known as Cuycocha. C.L.S.

COTES, MRS. EVERARD (pen name, SARA JEANNETTE DUNCAN), a Canadian novelist and writer of travels and descriptive sketches; born in Brantford, Ontario, Canada, in 1863, and educated at the Collegiate Institute of that city. She was the daughter of Charles Duncan, a merchant of Brantford, and made her *début* as a writer in the *Canadian Monthly* of Toronto. During the years 1883–88 she wrote largely for the Canadian newspaper and periodical press, including the Toronto *Globe*, *The Week* and the Montreal *Star*, and was for a time a newspaper correspondent at Washington, District of Columbia. She early developed a felicitous prose style, which gave charm to her social and literary contributions, which at this period appeared under the *nom de plume* of "Garth Grafton." In 1888 she made a tour of the world in the interest of a Canadian literary syndicate, accompanied by a fellow-journalist, Lilian Lewis, a young lady of Montreal. The result of this tour is embodied in her first production, *A Social Departure; or, How Theodocia and I Went Round the World.* The work, which appeared simultaneously in England and America in 1890, was first contributed to the London *Ladies' Pictorial*, by whose artist staff it was delightfully illustrated. This was quickly followed (for *A Social Departure* was a gratifying success) by *An American Girl in London* (1891). In 1893 appeared *The Simple Adventures of a Mem-Sahib*, and in the following year *A Daughter of To-day* and *Vernon's Aunt.* In 1895 two further works came from her pen, *The Story of Sonny Sahib* and *His Honor and a Lady.* The latter, a clever, realistic novel of Anglo-Indian life, appeared serially in the *Pall Mall Magazine*, and in book-form was also issued on both sides of the Atlantic. All of Mrs. Cotes's productions show the working of a bright and original mind. She is gifted with a fine perception of the eccentricities and weaknesses of human nature, and a pervasive humor. She has also great facility in portraying character and sketching lightly scenes and incidents in social life. In 1890 she married Everard Cotes, a scientist in the East India Company's service, and made her home in Calcutta, India. G. MERCER ADAM.

COTGRAVE, RANDLE, an English lexicographer, of whose life little is known save that he was a native of Cheshire, and was admitted scholar of St. John's College, Cambridge, in 1587; became secretary to William Cecil, Lord Burghley, and was living as late as 1632, and died probably in 1634. He was author of our earliest French dictionary (1611), a remarkable book for its time, and still of value to the philologist, as it fixes the actual forms of French words at the time when they were borrowed.

COTINGA, a genus of birds of the family *Cotingidæ*, found in tropical regions of America. They are remarkable for their splendid and bright-colored plumage and curious ornamentation.

COTONEASTER, a genus of hardy ornamen-

tal shrubs, of the order *Pomaceæ*, closely allied to the hawthorn, medlar and quince. The name is derived from *Cotoneum*, a quince tree, in reference to the downy leaves of this genus being similar to the quince. They are common mountain plants of central Europe and Asia, and are especially useful for covering walls and rock work. They bear small, unpalatable but bright-colored fruit, persistent in winter. W.R.B.

COTTA, Bernhard von, German geognost; born Oct. 24, 1808, at Kleinen Fillbach, near Meiningen; studied at the mining academies of Freiburg and at Heidelberg. In 1842 he was appointed professor of geology at Freiburg, where he died, Sept. 14, 1879. He prepared a geonostical map of Saxony and Thuringia. He wrote *Anleitung zum Studium der Geognosie and Geologie* (1839); *Gesteinlehre; Geologie der Gegenwart*, etc. G.A.S.

COTTAGE CITY, Massachusetts, a town of Dukes County, Martha's Vineyard, on Nantucket Sound, six miles N. of Edgartown. Pop., 1900; 1,100. C.L.S.

COTTBUS, town in Brandenburg province, Prussia. Pop. 1905, 46,260. See Kottbus, XIV, 145.

COTTEREAU, Jean, the leader of the Chouans; which see, Vol. V, p. 596.

COTTIDÆ, a family of shore fishes inhabiting the Arctic regions. See Ichthyology, Vol. XII, p. 728.

COTTON. See Cotton, Vol. VI, pp. 427–451; and Agriculture, in these Supplements.

COTTON, Charles Stanhope, naval commander, was born at Milwaukee, Wis., on February 15, 1843, and entered the U. S. navy in 1858. He served throughout the Civil War, on the *St. Lawrence*, on the *Monitor* in the duel with the *Merrimac*, and on the *Oneida* in Mobile Bay. He was on active duty in the war with Spain in 1898, and in 1900 was promoted to be real-admiral and was put in charge of the navy yard at Norfolk, Va. W.F.J.

COTTON, James Sutherland, an English writer and editor; born in the Madras presidency, July 17, 1847; educated at Winchester and Oxford; called to the bar in 1874; assistant to Sir W. W. Hunter, the great English authority on Indian affairs; the author of several Indian blue-books; contributed to this Encyclopædia and *Leslie Stephen's Dictionary of National Biography;* edited *The Academy*, and conducted an annual containing important acts of Parliament, entitled *Paterson's Practical Statutes.*

COTTON, John, an American clergyman; born in Derby, England, Dec. 4, 1585. He was educated at Trinity College, Cambridge, and became a fellow of Emmanuel College. About 1612 he was appointed vicar of St. Botolph's Church, Boston, Lincolnshire, where he remained twenty years, noted as a preacher and controversialist and inclining toward Puritanism. This attitude brought him into conflict with Archbishop Laud, and he fled to Boston, Mass., where he arrived Sept. 4, 1633. Here he was ordained colleague with Mr. Wilson, the pastor of the first church established in Boston, and in this connection he remained for 19 years. He had a high reputation for learning, and published many theological works, the most celebrated of which were in defence of the interference of the civil power in support of "the" truth. He died in Boston, Mass., Dec. 23, 1652. E.E.T.

COTTON-GRASS, a popular name for the genus *Eriophorum*, plants of the family *Cyperaceæ*, common in swampy land. It has spikes resembling tufts of cotton, and the cottony substance has been used for stuffing pillows, making candle-wicks, etc.

COTTON-RAT (*Sigmodon hispidus*), a rodent resembling the Norway rat, common it the cotton-fields of the southern United States.

COTTONSEED and COTTONSEED-OIL, one of the most important industries in the United States and other countries is the manufacture of cottonseed-oil and its bye products from cotton-seed. After having been thrown aside for centuries, as a waste article, cottonseed was first used as a fertilizer, then as a source of oil and cattle food. It is now made to yield nutritious table food and useful articles of industrial pursuits. No portion of the seed is wasted. After the oil, which is its main product, is extracted, the residuum makes the best cattle food, while the hulls are used as bran, for making paper, as fuel, and as a fertilizer. The seed is first of all separated from the cotton wool by the process known as "ginning." The seed is a gray farinaceous kernel, enveloped in a hard black hull. The seed is first of all separated from the lint that still adheres to it in a linting machine, and then passes to a hulling machine in which a cylinder covered with knives cuts the seeds into small bits, which are conveyed to the revolving screens that separate the kernels from the hulls. The kernels go to the crushing rolls. The new steel plate hydraulic press has 15 plates on top of each other, and each plate makes a cake about 14 by 30 inches, weighing, after the oil is expressed, about 12 pounds. A ton of seed yields 40 gallons of oil.

The oil as it runs from the presses is mahogany-colored, known commercially as "crude oil," and to fit it for industrial and domestic purposes, it must be subject to two treatments: purging and refining. For the first of these caustic soda has a special adaptability, and is universally employed. An aqueous solution of soda of about 72 per cent purity, is prepared, and about 24 gallons of this liquor, per ton of oil, will separate the grosser impurities as a mucilaginous deposit, involving a certain percentage of oil. This is a desirable material for soap-making and for this purpose it finds an extensive outlet. The "purged" oil still contains a remnant of foreign matters, dark color, foul odor, rough taste and a rancidity, all of which must be removed. Acids and chemical bleaching agents of various kinds are resorted to, their effect being either to mask such impurities as they are incapable of removing, or remove them altogether. The favorite bleaching agents are chloride of lime dissolved in water, supplemented by sulphuric acid, the ratio being 6½ lbs. of chloride of lime, plus 5 lbs. of sulphuric

acid, to one ton of oil. Fuller's earth is sometimes used as a cleanser and sweetener, also a solution of 98 per cent of pure caustic soda, as alternative methods of purification. Finally, powdered whiting is used to still further purify the oil. Pure cottonseed-oil is of a bright golden tint; the pale, or lemon-colored oils, have been chemically bleached. The natural flavor is sweet and nutty. The refined oil boils at about 600° F. and congeals at 50° for summer, and 32° for winter pressed.

The American seed yields a clearer oil than the Egyptian, or the Indian; and that from our seacoast is a darker oil than that from the uplands. The oil made in Great Britain is not so clear as the American oil, because the seed treated is Egyptian, or Indian, and is not decorticated owing to the difficulty of picking it. The present consumption of cottonseed for oil-making purposes is about three million tons a year, from which there are made about 100,000,000 gallons of oil worth about 30 cents per gallon in the refined condition. The principal use to which it is put, is for food purposes. It is not only nutritious and healthful, but the fact that it is more easily digested than almost any other article of food, accounts for the rapid increase of its use for culinary purposes. Nine-tenths of the 100,000,000 gallons made each year enter into the composition of food products, principally refined lard, and salad and cooking oil. At first employed to temper down hogs' lard intended for sale in cold climates, and which, for this reason, required its stiffening point lowered, it was afterwards used in lard for temperate climates, its extreme fluidity being corrected by the use of a sufficient proportion of pure caul fat of beef. This admixture is sold as "cottolene." Three-fourths of all lard made and used contains cottonseed-oil, in proportions from ten to twenty-five per cent; most of it avowedly, although for years, leading houses used it secretly, for fear of popular prejudice. At present the tide of public opinion is setting in favor of its use, which extends to butterine, oleomargarine and other products. The principal refiners not only admit that they use it, but take pains to have the fact known, as an argument in favor of the purity of the product. In point of fact, when it is considered that under sworn testimony it has been proven that, in the manufacture of "prime lard," many diseased, crushed and smothered animals are used, as well as the feet, hoofs, entrails and other objectionable parts of healthy hogs, the cottonseed-oil is frequently the only pure ingredient in the combination. Many, who have no scruples against eating hog products, avoid hog's lard on account of its revolting suggestions.

As an illuminant the cotton oil ranks between sperm, which has the highest illuminating power of all burning oils, and lard, which is about the next best. Alone it may be burned in any of the ordinary lamps used in burning either sperm or lard oils. It is not, however, of special value as a lubricant. Much of the oil is exported to various Mediterranean ports and not only sold as olive-oil, but is mixed with olive-oil, or otherwise "prepared," and sold as olive-oil. Much of the "olive-oil" exported from Genoa, Nice, Naples and Marseilles to the United States is only cottonseed-oil with a new label.

The cakes, after the oil is expressed, are sometimes ground into fine meal and sometimes left whole for export to England and Scotland, where they are coarsely ground, or broken up for feeding sheep or cattle. In Germany the demand is for the finest meal that can be produced. About ten per cent of the oil still remains in the cake. Cottonseed meal as a food for cattle largely increases the flow of milk, makes richer milk, gives butter and cheese, more and better meat, and richer manure. Its main value is that it supplies the albuminoids and fat, which in hay, straw and corn-stalks are lacking.

A ton of cottonseed, that is 2,000 lbs., will yield of lint 20 lbs.; of crude oil 289 lbs.; of cake, or meal, 800 lbs.; of hulls, 891 lbs. The crude oil becomes purified oil, salad oil, lard, cottolene, miner's oil, stearine and soap stock and soaps. The hulls are made into high grade paper, bran, fertilizing fuel ashes and fertilizer.

The figures that indicate the growth of this great industry are immense. Given an average cotton crop of 10,000,000 bales, there will be 2,500,000 tons of seed to be crushed valued at $25,000,000. This will yield close to 100,000,000 gallons of crude oil and nearly 900,000 tons of cotton-oil cake and meal. In 1902, from some 400 mills, 736,000 tons were exported. W.R.B.

COTTONWOOD FALLS, a city and the capital of Chase County, eastern central Kansas, 66 miles S.W. of Topeka, on the Cottonwood River, and on the Atchison, Topeka and Santa Fé railroad. The vicinity is a forest and grain-raising district, and the river gives good power for flour and lumber mills. Population, 1900, 842.

COTTONWOOD SPRINGS, a popular health and pleasure resort of Chaffee County, central Colorado, about six miles S.W. of Buena Vista. It is noted for its medicinal springs and for its charming scenery.

COTTONWOOD TREE. See POPLAR, Vol. XIX, p. 526.

COTTON-WORM, the caterpillar of an owlet-moth (*Aletia xyliria*) which is in some years very destructive to the cotton crop of the United States. The caterpillar is green with yellow stripes and black dots and grows to a length of an inch and a half. W.R.B.

COTULLA, a town and the capital of La Salle County, southern Texas, 86 miles by rail S.S.W. of San Antonio, on the Nueces River, and on the International and Great Northern railroad. Industry, grazing. Population, 1,016.

COUCH-GRASS (*Triticum repens*), a species of grass common in Europe and North America, known to farmers as a troublesome weed; it spreads over the field with great rapidity, and on account of its tenacity of life is eradicated with difficulty. The roots are sweet and mucilaginous, and are collected at Naples for feeding horses.

COUCY, Renaud, Châtelain de, a court poet belonging to the north of France, who flourished in the latter part of the twelfth century. He became a Crusader; it is supposed that he accompanied Philippe Auguste and Richard Cœur de Lion to the Holy Land, probably in the service of Raoul Sieur de Coucy, with whom he often is confounded. His poems were songs of passion, distinguished for their ardor and animation. They are preserved in the *Chansons du Châtelain de Courcy*, by F. Michel, Paris.

COUDERSPORT, an organized borough and the county seat of Potter County, Pennsylvania, in the "northern tier" of that state. It is in an agricultural and oil region, and is reached by the Coudersport and Port Allegheny railroad. Its population was 3,217 in 1900. W.F.J.

COUES, Elliott, naturalist, was born at Portsmouth, N. H., on September 9, 1842, and was graduated from Columbian University, Washington, in 1861, and from its Medical Department in 1863. He served for many years as an army surgeon, and as surgeon and naturalist of the U. S. northern boundary survey. In 1876 he became geologist and naturalist to the U. S. geological and geographical survey of the territories. His work, his official reports, and his own writings on zoölogical and other topics, attracted wide attention, and Darwin, Huxley, and other eminent scientists joined in an invitation to him to remove to London and become connected with the British Museum. Instead of accepting this flattering invitation he remained in America. Finding his scientific work hampered by military duties and by the petty jealousies of his fellow-officers, he resigned his commission and thereafter devoted himself to work at the Smithsonian Institution and in the chair of anatomy in the National Medical College at Washington. He was the author of numerous books and magazine articles, and one of the editors of *The Century Dictionary*. He died on December 25, 1899. W.F.J.

ELLIOTT COUES.

COULANGES, Numa Denis Fustel de, a French essayist; born in Paris, March 18, 1830. He became a professor of history in the University of Strasburg in 1859, and in 1879 a professor at the Sorbonne. His published essays are principally on historical subjects. His history of serfdom in France, *Recherches sur Quelques Problèmes d' Histoire*, is the best authority on the subject extant, and its discussions throughout are founded on original sources.

COULDOCK, Charles Walter, an English actor; born in London, April 26, 1815. He made his first appearance on the stage in London in 1835. He made remarkable success in the English provinces supporting Macready and Kean, and in 1849 visited the U. S. He returned to New York in 1869 and took up his permanent residence there. He was best known as Dunstan Kirk in *Hazel Kirk*. He excelled in old men's parts. He died in New York city, Nov. 27, 1898. W.M.C.

COULTER, John Merle, an American educator and botanist; born in Ningpo, China, of American parentage, November 20, 1851. He was graduated from Hanover College in 1870. Until 1873 he was botanist with the United States Geological Survey in the Rocky Mountains. From 1874 to 1879 he was professor of natural sciences at Hanover College; from 1879 to 1891 professor of biology at Wabash College, and from 1891 to 1893 president of the University of Indiana. From 1893 to 1896 he was president of the Lake Forest University and in the latter year became professor of botany at the University of Chicago. In 1875 he founded the *Botanical Gazette*. His works include *Manual of Rocky Mountain Botany; Manual of Texan Botany; Handbook of Plant Dissection*, and Gray's *Manual of Botany* (revised edition). He wrote the botanical articles in these Supplements. W.M.C.

COUNCIL BLUFFS, a city of southwestern Iowa and capital of Pottawattamie County. The city was incorporated in 1853 and is now the largest city in the western part of the state. It contains a fine courthouse and other county buildings, a Roman Catholic seminary, a high school, several graded schools, and a state institution for deaf mutes, founded in 1855. Two iron railway and wagon bridges, each about a mile in length, span the Missouri and connect the city with Omaha. Its manufactories produce iron, paper, agricultural implements, machinery, carriages, etc., and it has an extensive wholesale trade. The population, was in 1900, 25,802. See Council Bluffs, Vol. VI, p. 455.

COUNCIL GROVE, a city and the county seat of Morris County, Kansas, in the east central part of that state. It is in a rich agricultural and cattle country, and is the seat of mills, canning factories and other establishments, chiefly tributary to agriculture, as well as a center of commerce. It lies on the Neosho River about 50 miles southwest of Topeka, and is reached by the Missouri Pacific and the Missouri, Kansas and Texas railroads. Its population was 2,221 in 1890 and 2,265 in 1900. W.F.J.

COUNCILMAN, William Thomas, an American physician; born in Pikesville, Maryland, January 2, 1854. He was graduated from the University of Maryland, became assistant professor in Johns Hopkins University and in 1900 was appointed professor of pathological anatomy at Harvard. He has written a *Contribution to the Study of Inflammation* (1879); *On the Etiology of Malaria* (1884); *Syphilis of the Lungs* (1890). W.M.C.

COUNCIL OF THE INDIES was a partly political partly ecclesiastical body, organized by King Ferdinand of Spain in 1511, at the suggestion of Bishop Fonseca, for the advice and assistance of the crown in the administration of colonial

affairs. Its jurisdiction extended over the Spanish settlements in the Americas, and also over those in the Philippine Islands and elsewhere. Composed of statesmen and ecclesiastics who remained at home in Madrid, and who knew little or nothing about colonial affairs, its measures were often ill-advised, and it was frequently in conflict with Columbus and others who had discovered and explored the new lands, and who knew their real condition and needs. Much of the failure of Spain's colonial policy may be attributed to this body, which reached the summit of its power under Charles V. W.F.J.

COUNTERFEITING is the act of imitating or copying anything with the intent of fraudulently passing off the copy as original and genuine. Under the provisions of the Revised Statutes of the United States many illegal acts are classed as counterfeiting. Counterfeiting the signature of any person to obtain the approval, allowance or payment of a claim against the government, when done by a person in the military or naval service of the United States, subjects the convicted person to such punishment as a court-martial may fix. Counterfeiting any instrument in writing concerning lands, mines or minerals within the state of California is also made a felony, punishable by imprisonment for not less than three years or more than ten years, and a maximum fine of $10,000, or both. It is also made an offense to counterfeit, alter or reuse the revenue stamps designed to be placed on packages of fermented liquor or wine made in imitation of sparkling wine or champagne, as well as stamps for use on proprietary medicines. Sections 5414–5416 provide that every person who, with intent to defraud, falsely makes, forges or counterfeits any obligation or security of the United States shall be punished by a fine of not more than $5,000, and imprisoned at hard labor for not more than 15 years; counterfeiting the circulating notes used by any banking association, a penalty of from 5 to 15 years' imprisonment and a maximum fine of $1,000; counterfeiting letters patent, a maximum fine of $5,000 and imprisonment not to exceed 10 years. The counterfeiting of any certificate of entry required by any officer of the customs is punishable by a fine of not more than $10,000 and imprisonment for not more than three years. To counterfeit any bid, proposal, guaranty, official bond, public record, affidavit or other writing, for the purpose of defrauding the United States, subjects the convicted person to a fine of not less than $1,000 and imprisonment for not more than ten years, or both. The seal or signature of an official of the United States is protected from being counterfeited by the provisions of section 5419, which imposes a penalty of from $500 to $5,000 fine and not more than five years' imprisonment. Other subjects of counterfeiting are military bounty land-warrants, power of attorney, order, certificate or receipt, and protection is also given to ship's papers, custom-house documents, naturalization papers and other papers pertaining to the naturalization of aliens, the penalties being very heavy. The coin of the United States and foreign countries is protected under section 5457, which provides against the counterfeiting of any coin or bars in resemblance or similitude of the gold or silver coins current. It also provides against the bringing into the United States of any such counterfeit money. The maximum penalty is $5,000 fine and ten years' imprisonment. Section 5458 provides against the counterfeiting of the minor coins; one, two, three and five cent pieces are additionally protected by section 5462, the penalty on conviction being a fine of not more than $1,000 and imprisonment for not more than five years. Section 5463 prohibits the counterfeiting of postal money-orders; 5464 covers the counterfeiting of postage stamps, and 5465 protects foreign stamps. Counterfeiting any key suited to any lock adopted by the post-office department subjects the offender to imprisonment at hard labor for a period of not more than ten years. The statutes also provide that any person who makes, aids in making, or causes to be made, or has in his possession with fraudulent intent, or permits to be used, any die, hub or mold of any substance whatever, in likeness of any die, hub or mold, used for coining United States coins, shall be fined not more than $5,000, or imprisoned at hard labor for not more than ten years, or both. In the case of foreign coins, the fine is $2,000 and the imprisonment five years, or both. All counterfeits and implements are confiscated by the government, and officers, when authorized by United States judges or commissioners, may enter any place, in the daytime only, to search for the same. For the purpose of keeping the counterfeiting of money as much in check as possible, the territory of the United States is divided into ten districts, and experienced secret-service officers are constantly engaged in ferreting out counterfeiters and suppressing the business. Congress provides for the support of the service by annual appropriations, which are expended under the direction of the Secretary of the Treasury. The South and West are the sections most infested with counterfeiters, and much more work is done in counterfeiting coin than bank or treasury notes. The vigorous crusade of the government officials in recent years has done much to stamp out this nefarious business, and but little counterfeiting is now done in the United States.

COUNTER-IRRITANT, a substance used to produce local inflammation or congestion upon the surface of the body, for the purpose of relieving some internal inflammation or congestion. It is generally applied to a part of the surface at some distance from the diseased organ. The counter-irritant causes the blood to flow in increased quantities to the part to which it is applied, which results in lessening the flow of blood through the diseased part, thus reducing its congestion or inflammation. Counter-irritants that simply redden the skin are called rubefacients, as mustard, red pepper, turpentine; those that blister, epispastics, as cantharides, ammonia, croton-oil; and those that actually destroy the tissues with which they come in contact, caustics, as silver nitrate, caustic potash, caustic soda, etc. The cautery, in the form of a red-hot iron, or a wire heated by passing through it a current of electricity, is also used.

COUNTY COUNCILS, a system of local government established in England and Wales by the Local Government Act of 1888, by which all duties relating to strictly local matters that were formerly performed by the justices in quarter sessions were transferred to the county councils, which were brought into existence by the act. For the purpose of the establishment of these councils, what are termed administrative counties were formed. The powers and duties of the councils refer to county finance, rating and assessment, county buildings, bridges, lunatic asylums, reformatories, registration and polling of Parliamentary electors, cattle diseases, the appointment of coroners, the maintenance of highways, preventing the pollution of rivers, and many other matters of minor importance. The police is under the joint management of the councils and the courts of quarter sessions. In regard to finances, the councils have the power of levying county and other rates, and they receive a share in certain licenses collected by the imperial government, and also a proportion of the probate duties.

The most interesting of all the councils is the London county council. London is an administrative county, covering an area of 121 square miles; and has absorbed, so far as ratable value is concerned, about seven eighths of Middlesex, about two thirds of Surrey and about one third of Kent counties. In it the city of London is an electoral division. The administrative county of London includes within its limits the county of the city of London and the county of London—that is, the metropolis outside the city of London proper—the two latter being counties for such non-administrative purposes only as quarter sessions, justices, etc. Such matters as require the consideration of both the administrative and non-administrative county are referred to the "standing joint committee" of the London county council and the London quarter sessions. In that the administrative county of London has no jurisdiction over the police, it differs from other county councils. The council comprises a chairman, 19 aldermen and 118 councilors—in all, 138. The term of office for each alderman is six years, and nine or ten retire every three years. The councilors are elected for three years. The functions of these two classes of members are the same except as to term of service. The councilors are elected directly by the rate-payers; the councilors elect the aldermen. Among some of the more important works accomplished by the council are the clearing of large, unhealthy areas and rebuilding thereon suitable artisan houses. The council has established a model lodging-house, capable of accommodating 324 men, located at Parker Street, Drury Lane. The most important work has been the Thames tunnel at Blackwell (see BINNIE, ALEXANDER R., in these Supplements). The free ferry at Woolwich and the rebuilding of the Vauxhall bridge are other improvements undertaken by the council. See also LOCAL GOVERNMENT, ENGLAND AND LONDON, in these Supplements.

COUPLE, the name given in statics to a pair of equal forces acting on the same body in opposite and parallel directions. The effect of a couple is to rotate the body about a certain definite line (the axis) perpendicular to the plane in which the forces constituting the couple lie.

COURBET, GUSTAVE, a French painter; born at Ornans, in Franche-Comté; died at Vevay, Switzerland, Dec. 31, 1877. The son of well-to-do farmers in the Jura region, he manifested early dispositions toward art; he received his education at Besançon, and when 20 years old, was sent to Paris to study law. But he abandoned everything for painting. He soon showed himself refractory to the influence of any of the leading teachers of his time, and struck boldly forward on the road toward realism, open-air art and impressionism. His first attempts to present his views of nature as he saw it, with an exuberance of light-and-shade effects unknown up to his day, were mockingly received, and in 1855, at the time of the first Paris exposition, he had to build his own exhibition-rooms close to the main entrance to the world's fair grounds. He was quite well known already, and admired by many, but his fame was of slow growth. He joined the Paris Commune, in hopes of helping the triumph of socialism. In a foolish moment he urged the pulling down of the Colonne Vendôme. For this act of vandalism he was sentenced to prison and a heavy fine, the amount of which was used to rebuild the column, every fragment of which was recovered. His recognition as one of the masters of modern landscape-painting is not discussed any longer. Two of his masterpieces adorn the National Museum of the Luxembourg, and the influence of his truthful, vivid and intensely original representation of nature is strongly felt among the present generation of landscape-painters. A list of his more prominent works include *After Dinner at Ornana* (1849); *The Interment at Ornans* (1850); *The Stone-Breakers* (1851); *Woman with a Parrot, and Deer at the Brook of Plaisirs-Fontaine, Doubs* (1866); *The Charity Beggar; Deer, Springtime* (1868); *The Stag-Whoop; Siesta in the Haying Season* (1869); *The Stormy Sea; The Beach at Étretat After a Storm* (1870). Of his works that have been purchased and come to the U.S. are *La Curée; Rocks on the Coast; Woman with a Parrot; Young Woman of the Seine;* and *Doe Run Down in the Snow.*

GUSTAVE COURBET.

COURBEVOIE, a town in the department of Seine, France, 5 m. N.W. of Paris. It has manufactures of wagons and awnings. Its port traffic in 1899 amounted to 88,074 tons. It has some attractive buildings. Pop. 1901, 23,765.

COURG OR CURG, a province of south India. See COORG, Vol. VI, p. 302.

COURLAN OR LIMPKIN, the common names of the rail-like birds of the family ARAMIDÆ; q.v., in these Supplements.

COURTHOPE, WILLIAM JOHN, man of letters; was born in Sussex, England, on July 17, 1842, the son of a country clergyman, and was

educated at Harrow and at New College, Oxford, from which latter he was graduated with double first honors, with also the Newdigate prize for poetry and the chancellor's prize for English essay. He became a civil service commissioner in 1887, and first civil service commissioner in 1892, an honorary fellow of New College in 1896, and professor of poetry in the University of Oxford in 1895–1901. He was for a time one of the editors of the *National Review*, and has contributed much to that and other leading English reviews. His bibliography is extended and notably varied, comprising light and brilliant humor and profound and philosophical criticism. It includes *The Tercentenary of Shakespeare* (Newdigate prize poem, 1864); *The Genius of Spenser* (chancellor's prize essay, 1868); *Ludibria Lunæ* (1869); *The Paradise of Birds* (1870); *Life of Addison* (English Men of Letters Series, 1882); a *History of English Poetry*, a monumental work, of which Vol. I appeared in 1895, Vol. II in 1897, and Vols. III and IV in 1903; *Life in Poetry, Law in Taste* (1901), and some minor works. He has edited the works of Alexander Pope and has written a biography of that poet. He has received the honorary degrees of Litt. D. from Durham and LL.D. from Edinburgh. W.F.J.

W. J. COURTHOPE.

COURT JESTER. See FOOL, Vol. IX, p. 320.

COURTLAND, a town of Lawrence County, northwestern Alabama, 45 miles W. of Huntsville, on the Memphis and Charleston railroad. It is the seat of two academies and contains a number of steam-mills. Population 1900, 488.

COURTNEY, LEONARD HENRY, a British statesman; born at Penzance, Cornwall, July 6, 1832; educated privately, and for a while was in a bank, but went to Cambridge and graduated at St. John's College in 1855, where he was a distinguished scholar and fellow. He was called to the bar at Lincoln's Inn in 1858, was appointed to the chair of political economy in University College, London, in 1872, and retired in 1876. He was elected to Parliament in 1876 for Liskeard, which constituency he continued to represent until 1892, and afterward sat for Bodmin, as a Liberal-Unionist. He was Under-Secretary for the Home Department in 1880 and for the Colonies in 1881, and Financial Secretary to the Treasury in 1882, succeeding Lord Frederick Cavendish. He contributed regularly to *The Times*, and extensively to the magazines and reviews. He was made a privy councilor in 1889. His pamphlet on *The Finances of the United States* (1861–67) was published in the *Journal of the Statistical Society*.

COURT OF PRIVATE LAND CLAIMS, a Federal tribunal, constituted by act of Congress on March 3, 1891, to exist until June 30, 1904, when it was to "cease and determine." Its jurisdiction was established over the claims to lands in the territory acquired by the United States from Mexico, the appeal from its decisions being to the Supreme Court of the United States. Its seat was at Santa Fé, New Mexico, and it was composed of a Chief Justice and four Associate Judges, who received salaries of $5,000 a year. Its members were appointed by the President, and approved by the Senate. W.F.J.

COURTS are such tribunals as are established by law for the public administration of justice. Courts are composed of one or more judges or justices, together with such other officers as the law prescribes. In the United States, courts may be classed as civil, or those courts where private rights may be enforced or private wrongs redressed; and criminal courts, or those established for the punishment of public offenses, as crimes and misdemeanors. Civil courts may again be divided into,—

1. Courts of general original jurisdiction, or those which have general power to enforce the laws of a certain municipality, as the United States, a state or a city. The courts of general jurisdiction of the United States are the United States circuit courts and the United States district courts. The state courts of general or final jurisdiction are usually called circuit or county courts.

2. Courts of appellate jurisdiction, or those which obtain jurisdiction only through appeal from some court where the matter has formerly been tried; as, the supreme court of the United States and the United States court of appeals. The state courts having only appellate jurisdiction are the supreme, and in some states an intermediate, court, called court of appeals or appellate court.

3. Courts of limited jurisdiction, or those courts which have jurisdiction over certain specified controversies only, such as justice of the peace courts, whose jurisdiction is limited to controversies of certain kinds, and where a small amount only is involved. Other courts of limited jurisdiction are the court of claims of the United States, where claims against the government are determined; admiralty courts, where maritime causes are heard; probate courts, which have jurisdiction over the estates of deceased persons; courts of chancery in some states, which have an equity jurisdiction; courts of inquiry and courts-martial, which have jurisdiction in military controversies, and other special courts of the various states. Courts may be courts of record, or those which keep a record of all proceedings independent of the magistrate presiding over them; or courts not of record, as where all proceedings need not be recorded.

COUSIN, JEAN, a French painter and sculptor; born 1501 at Soucy, near Jens. Among his most noted works are *The Last Judgment*, painted on glass for the church of St. Romain, and reproduced by him in oil for the town of Vincennes (now in the Louvre); *The Marriage in Cana*, now in the Museum of Rennes; *Christ Preaching in the Desert*, and the *Tiburtinic Sybil*. One of his most famous sculptures, the figure of Admiral de Chabis in a lying position, is now in the

Louvre. He wrote *Régles de l'Art de Perspective* (1560, new edition 1900), and *Livre de Portraiture* (1571). He died about 1590. G.A.S.

COUSIN, SAMUEL, engraver; was born on May 9, 1801, at Exeter, England, and studied under S. W. Reynolds, the mezzotint artist, in many of whose prints he had a hand, and of whose reputed prints after Sir Joshua Reynolds, fifty-five in number, Cousin was the real author. He also produced, early in his career, many admirable portraits in pencil. He began engraving in mezzotint on his own account in 1826, and soon won a great reputation with a series of fine plates after Reynolds, Lawrence, Landseer, Leslie, Millais, Leighton, and other painters. He considered his best work to be *Marie Antoinette in the Temple*, after the painting by E. M. Ward. He was elected engraver to the Royal Academy and he left to the academy a fund of $75,000 for the aid of poor artists. He died on May 7, 1887. W.F.J.

COUTRAS, a town of southwestern France, in the department of Gironde, situated on the west bank of the Dronne, 26 miles, N.E. of Bordeaux. Here, on Oct. 20, 1587, Henry of Navarre gained a bloody victory over the forces of the League. It has considerable trade in flour, and the district produces red wine. Population 1901, 2,427.

COUTURE, THOMAS, a French artist, born in Senlis, Dec. 21, 1815, who very early attracted attention and admiration, and whose famous painting, *La Décadence des Romains* (1847), now at the Luxembourg, inaugurated an era in the art of Paris. Influenced by the classicism of David, but still more by the new era that succeeded the return of the house of Orleans, Couture took a classic subject, and treated it with the glowing spirit, the free brush, and the unbridled license of a Rubens. What was ostensibly a moral lesson was in reality a seduction to the pure. His *Troubadours* (1844) realized 55,000 francs at the Gsell sale. Among his other works are *The Return of the Troops from the Crimea; The Baptism of the Prince Imperial;* and *Two Volunteers of the French Revolution*, which was exhibited at the Boston Art Museum. His *Idle Student* is in the Museum of Art, New York. He was a chevalier of the Legion of Honor, and died at Villiers-le-Bel, Seine-et-Oise, March 31, 1879.

COUVREUR, MARIE AUGUSTE, an English novelist; born at Highgate, London, of Dutch and French parentage; was taken to Tasmania in her infancy, where at an early age she commenced to write for the press, adopting the pseudonym of "Tasma." She became known as a public speaker, and made two trips to Europe, during the second of which she lectured before the Geographical Society of Paris, receiving therefrom the title of Officer of the Academy. She married M. Auguste Couvreur, the free-trader, and during her residence at Brussels was correspondent for the London *Times*. Her best-known novel is *Not Counting the Cost.* Among her works are *Uncle Piper of Piper's Hill* (1889); *In Her Earliest Youth* (1890); *A Sydney Sovereign* (1890); and *The Penance of Portia James* (1892). She has been called the Australian George Eliot.

COVENANT, in Biblical language, a compact or agreement between two parties. It more particularly refers to the covenants between God and man, as when God covenanted with Noah, after the flood, that a similar judgment should not again be inflicted. The principal Biblical covenants are: 1. The covenant of works—that is, the promise of God to save and bless men on a condition of their perfect obedience—which is called the old covenant, as contained in the Pentateuch (see PENTATEUCH, Vol. XVIII, p. 520); and 2. The covenant of grace—that is, God's promise to save and bless men through their faith in Christ — which is called the new covenant.

The federal system of theology was based on the analogy of such covenants. (See COCCEIUS, Vol. VI, p. 84; also THEOLOGY, Vol. XXIII, p. 287.)

The name is applied also to two Scottish historical agreements, the one called the National Covenant (q. v., COVENANTERS, Vol. VI, p. 470); and the other the Solemn League and Covenant (see HENDERSON, ALEXANDER, Vol. XI, p. 581; also SCOTLAND, Vol. XXI, p. 534).

COVENANT, in law, is an agreement between two or more persons, expressed in writing and under seal. It differs from an ordinary agreement, in that it must be under seal. Each specific undertaking or stipulation in an instrument under seal is also called a covenant. The term, in law, is used, also, to signify a form of action by which suit may be brought to recover damages for the breach of a contract.

COVENT GARDEN. See LONDON, Vol. XIV, p. 838; and in these Supplements.

COVENTRY, a rural town on the New England railway in Kent County, R. I. Pop. 1900, 5,279.

COVINGTON, a town of Georgia, capital of Newton County, about 40 miles E. of Atlanta. It has a Female College. Population 1900, 2,062.

COVINGTON, a city and the capital of Fountain County, northwestern Indiana, on the Wabash River, 72 miles W.N.W. of Indianapolis, on the Wabash and Erie canal, the Cleveland, Cincinnati, Chicago and St. Louis and the Wabash railroads. It has iron foundries, and ships coal, produce and live-stock. Population 1890, 1,823; 1900, 2,213.

COVINGTON, Kentucky, the seat of Kenton County, a northern city opposite Cincinnati, Ohio, with which it is connected by a fine suspension bridge, and in the trans-urban and interurban steam and electric railroad systems of which it shares, along with adjacent Kentucky towns and villages. Covington is a busy manufacturing city. Among recent buildings are a government court-house, post-office, and a handsome Roman Catholic Cathedral. See COVINGTON, Vol. VI, p. 471. Population, 1890, 37,371; 1900, 42,938. C.L.S.

COVINGTON, a town and the capital of St. Tammany Parish, eastern Louisiana, 36 miles N. of New Orleans, on the Bogue Falia River, and on the East Louisiana railroad. It is seven miles N. of Lake Pontchartrain, and is surrounded with pine forests. Population 1890, 976; 1900, 1,205.

COVINGTON, a town and the capital of Tipton County, southwestern Tennessee, 36 miles N.E. of Memphis, on the Chesapeake, Ohio and Western

railroad. It has saw-mills, fertilizer-works and cotton-compresses. Population 1900, 2,787.

COW-BIRD, the name of several species of conical-beaked, long-winged, polygamous birds of North and South America, the one most known in the United States being *Molothrus pecoris*. They gather in flocks among cattle, lighting upon their backs; and have the peculiarity of laying their eggs in other birds' nests. Most of the species are of a lustrous black color. R.W.C.

COWELL, Edward Byles, a Sanskrit scholar; born at Ipswich, in Suffolk, Jan. 26, 1826; he was from 1864–67 professor of Sanskrit at Calcutta, and from 1867 to the time of his death, Feb. 9, 1903, at Cambridge. His principal works are an edition and translation of *Vikramorvaçi;* of *Prâkrita-Prakâça;* of *Katha-Upanishad;* of *Maitri-Upanishad;* an introduction to *The Ordinary Prakrit of the Sanskrit Dramas*. Died Feb. 9, 1903. G.A.S.

COWEN, Frederic Hymen, an English composer and conductor; born at Kingston, Jamaica, Jan. 29, 1852; studied under Benedict and Goss, and at Leipsic and Berlin. He was from 1888–92 conductor of the London Philharmonic Concerts, and succeeded, in 1896, Charles Hallé as conductor of the Manchester and Liverpool Philharmonic and Bradford Concerts, and was in 1900 re-elected conductor of the London Philharmonic Concerts. He composed *The Corsair*, cantata (1876); *Language of Flowers*, suite (1880); *Scandinavian Symphony* (1880), his best work; *Welsh Symphony* (1884); *Thorgrim*, opera (1890); *Signa*, opera (1897); *Ode to the Passions* (1898). G.A.S.

COWEN, Joseph, eldest son of Sir Joseph Cowen, was born at Blayden Brows, Durham, England, in 1831, and educated at the University of Edinburgh. In early life he was the intimate friend of Mazzini, Garibaldi, Kossuth, Herzen and other political exiles. He became unceasing in his advocacy of the cause of the oppressed European nationalities. To aid their propaganda he established a private press, at which their revolutionary manifestos were printed and then smuggled into Italy, Hungary and Poland. He was identified intimately and actively with the different Garibaldian expeditions to establish a free and united Italy, and with Langiewicz's unsuccessful effort for Polish independence. He was elected to Parliament for Newcastle-on-Tyne in 1873 (on the death of his father), representing that constituency until 1886. He was one of the pioneers of co-operation, and in Parliament brought forward many progressive measures. The proprietor of the Newcastle *Daily Chronicle*, an influential organ in the north of England, to which he himself has contributed, he did not seek, after 1886, to re-enter Parliament, but devoted himself to political writing.

COWHAGE or COWITCH, a name primarily applied to the brittle barbed hairs that cover the pods of *Mucuna pruriens*, a West Indian leguminous plant. These hairs, suspended in syrup, are used as a vermifuge. The name has also been applied to other plants with hispid capsules, as *Acidoton urens*, of the family *Euphorbiaceæ*, and *Tragia volubilis*, of the same family, both West Indian plants.

COWLEY, Henry Richard Charles Wellesley, Earl., was born on June 17, 1804; a nephew of the Duke of Wellington. He was British ambassador to France from 1852 to 1867, a period of great difficulty, a British member of the Paris Congress of 1856, and with Cobden negotiated the Anglo-French commercial treaty of 1860. He died on July 14, 1884. W.F.J.

COW-PARSNIP, the common name of species of *Heracleum*, a genus of *Umbelliferæ*, and growing in the north temperate regions of both hemispheres. They are tall, strong-scented plants, with compound leaves, white or pinkish flowers (unusually large for the family) and flat-winged fruits. *H. lanatum* is the common species of the United States, a very stout plant, growing in damp, rich ground.

COWPENS, a historic village of Spartanburg County, South Carolina, in the northwestern part of that state. It lies in the valley of the Broad River, in a picturesque and salubrious region. It is remembered as the scene of an American victory in the Revolutionary War, on January 17, 1781, won by General Morgan over the hitherto invincible British general, Tarleton. Its population was only 349 in 1890, and 692 in 1900. W.F.J.

COW-PLANT (*Gymnema lactifera*), a perennial plant of the family *Asclepiadaceæ*, a native of Ceylon. The milky juice is said to be used as a substitute for milk by the Singhalese.

COWPOX INOCULATION. See Jenner, Vol. XIII, p. 634.

COWSLIP. See Primrose, Vol. XIX, p. 757.

COW'S MILK, in the United States. See Agriculture, in these Supplements.

COW TREE, a name given to a number of trees of different families, the juice of which is used instead of milk. The most famous of these is the Palo-de-Vaca (*Brosimum galactodendron*), of the Cordilleras and Caracas, a plant of the family *Urticaceæ*. The milk is obtained by piercing the bark of the trunk or branches. It has an agreeable taste, somewhat like that of cow's milk, and its nutritive value is considerable. It is much used by the negroes and Indians.

COW-WHEAT, the common name of *Melampyrum*, a genus of plants of the family *Scrophulariaceæ*, having an oblong two-celled capsule, with a few seeds somewhat resembling grains of wheat.

COX, Sir George William, an English clergyman and historian; born in 1827. He was ordained in 1850, and for several years was a curate. In 1860 he became assistant master in Cheltenham College. He has written several valuable histories and works on mythology, among which are *Tales of Ancient Greece; Mythology of the Aryan Nations; Lives of Greek Statesmen; Life of Bishop Colenso; History of Greece;* etc. He also contributed many articles to this Encyclopædia. He died in 1902.

COX, Isaac N., a merchant of Ellenville, New York; born in Tallsburg, New York, Aug. 1, 1846. He received an academic education. A Democrat,

he was elected a supervisor of his town in 1875 and 1883–86, being chairman of the board the latter year; was a member of the Democratic State Committee; in 1890 was elected a Representative from the seventeenth Congressional district of New York to the Congress of 1891–93.

COX, Jacob Dolson, an American soldier; born in Montreal, Canada, Oct. 27, 1828. He graduated at Oberlin in 1851; Ohio Senator, 1859–61; brigadier-general of Ohio militia, serving in Virginia, Sherman's march to the sea, and in the Franklin and Nashville campaigns, and major-general of volunteers in December, 1864. He was elected governor of Ohio in 1865; practised law in Cincinnati, 1866–67; was Secretary of the Interior, 1869–70; president of the Wabash Railroad, 1873; in the United States House of Representatives, 1877–79; president of the Cincinnati University, 1885, and dean of the Cincinnati Law School, 1881–97. He died in Cleveland, Ohio, Aug. 4, 1900. E.E.T.

COX, Kenyon, an American artist, son of the preceding; born at Warren, Ohio, Oct. 26, 1856; studied three years in Cincinnati; went to Philadelphia in 1876, and next year to Paris, where he was a student of Carolus Duran and of Cabanel and Gérôme at the École des Beaux Arts, where he remained three years, and then returned to America, locating his studio in New York City. He became a member of the American Society of Artists in 1882, and later its secretary, and won the second Hallgarten prize, National Academy of Design, in 1888. As an illustrator he is seen to advantage in his designs for Rossetti's *The Blessed Damozel.*

KENYON COX.

COX, Palmer, an American artist and author; born in Granby, Quebec, Canada, April 28, 1840. After graduating at the Granby Academy, he removed to San Francisco where from 1864 to 1875 he contributed to the *Golden Era* and *Alta-California.* In 1876 he removed to New York city, where he began to illustrate his own writings. He is best known by his "Brownie Books," a very popular series containing humorous pictures and verse for children. Other productions are *Hans von Petter's Trip to Gotham in Pen and Pencil* (1878); *How Columbus Found America* (1878); *That Stanley* (1878); *Queer People, Such as Goblins, Giants, Merry-Men and Monarchs, and Their Kweer Kapers* (1888); *Comic Yarns in Prose, Verse and Picture* (1889), and *Squibs, or Everyday Life Illustrated.* He is a member of various New York art clubs and since 1900 has made his home in Delaware. W.M.C.

COX, Samuel, an English Baptist minister; born at London, April 19, 1826. In 1851 he became pastor of the church in St. Paul's Square, Southsea, and in 1855 went to Ryde. After he had been at this last-named place about four years, his health failed him, and he virtually gave up preaching and devoted himself to authorship. In 1875 he founded the *Expositor*, which he edited till 1884. He also wrote numerous treatises and several books expounding the various books of the Bible. As a Bible expositor he had no superior. Among his publications are *The Secret of Life* (1866); *The Private Letters of St. Paul and St. John* (1867); *The Quest of the Chief Good* (1868); *The Resurrection* (1869); *An Expositor's Note-Book* (1872); *Biblical Expositions* (1874); *The Book of Ruth* (1876); *Salvator Mundi* (1877); *The Larger Hope*, a sequel to the preceding (1883); *Balaam* (1884); *Miracles* (1884); *The House and Its Builder* (1888). His best known work was *Salvator Mundi.* He died at Hastings, March 29, 1893.

COX, Samuel Hanson, an American clergyman and author; born in Rahway, New Jersey, August 25, 1793. He studied law for several years, then took up theology and was ordained by the New Jersey presbytery in 1817. In 1820 he became pastor of the Spring Street Presbyterian Church in New York city. He was pastor of the First Presbyterian Church in Brooklyn from 1837 to 1854, and was also professor of ecclesiastical history in Union Theological Seminary. He was a prominent member of the New School branch of Presbyterianism, and was a strong advocate of temperance reform. He published *Quakerism not Christianity* (1833); *Interviews, Memorable and Useful from Diary and Memory Reproduced* (1853); and edited Bower's *History of the Popes* (1847). He died in Bronxville, New York, October 2, 1881. W.M.C.

COX, Samuel Sullivan, an American statesman and author; born at Zanesville, Ohio, September 30, 1824. He was educated at the Ohio University, and at Brown University, Providence, Rhode Island, graduating at the latter institution in 1846. After leaving college he studied law and was admitted to the bar and began practice. In 1853 he became owner and editor of the *Columbus Statesman*, at Columbus, Ohio. In 1855 he was appointed Secretary of Legation to Peru. In 1865 he removed to New York city. He was elected to the Forty-first and Forty-second Congresses and was the candidate of the Democrats and Liberal Republicans for Representative-at-large to the Forty-third Congress, but was defeated. He was elected to the Forty-sixth Congress and re-elected to the Forty-seventh Congress as a Democrat. He was a popular lecturer and published *Eight Years in Congress* (1865); *Why We Laugh* (1876); *Diversions of a Diplomat in Turkey* (1887); *A Buckeye Abroad; Arctic Sunbeams; Orient Sunbeams; Search for Winter Sunbeams; Free Land and Free Trade*, and other books. He died in New York city, September 10, 1889. W.M.C.

COXALGIA. See Hip-Joint Disease, in these Supplements.

COXE, Arthur Cleveland, an American clergyman and Episcopal bishop; born in Mendham, New Jersey, May 10, 1818. He was a son

of Samuel Hanson Cox (q. v.), adopting an older spelling of his surname. He was educated at the General Theological Seminary of the Protestant Episcopal Church, received orders in 1841 and was made a priest in 1842. For a number of years he held rectorships at Hartford, Baltimore, and New York city and was consecrated bishop of western New York in 1865. He was a vigorous writer and his *Christian Ballads* (1840) became very popular. His other works include *Athanasion and Other Poems* (1842); *Saul, a Mystery and Other Poems* (1845); *Thoughts on the Services; Impressions of England* (1865); *The Criterion* (1866); *Apolos, or the Way of God* (1873); *Institutes of Christian History* (1887); *The Pascal*, a collection of Easter poems (1889), and other works. In 1885 he founded the Christian Literature Company, and for several years lectured at the University of Michigan and at Kenyon College. Died in Clifton Springs, New York, July 20, 1896. W.M.C.

BISHOP COXE.

COXE, JOHN REDMAN, an American physician; born in Trenton, New Jersey, in 1773. He was educated at the University of Pennsylvania and in Europe, and in 1796 began the practice of medicine in Philadelphia. He was physician to the Philadelphia Hospital for several years and also to the Philadelphia Dispensary. From 1809 to 1835 he was a professor at the University of Pennsylvania, holding the chairs of chemistry, pharmacy, and materia medica. He published a large number of medical works, including *The American Dispensatory* (1827). He died in Philadelphia, March 22, 1864. W.M.C.

COXE, TENCH, an American politician and political economist; born in Philadelphia, May 22, 1755. During the early part of the Revolution he sided with the Loyalists, and when Howe evacuated Philadelphia, Coxe was arrested, but was released on parole. Subsequently he became a Whig; was a commissioner to the Federal convention at Annapolis in 1786; delegate to the Continental Congress in 1788; assistant Secretary of the Treasury, 1790; revenue commissioner in 1792; and purveyor of public supplies from 1803 to 1812. He is prominent in the history of American industry by reason of his labors to introduce the cultivation of cotton and the Arkwright spinning-machine. He was the author of several important economic works, including *An Inquiry into the Principles of a Commercial System for the United States* (1787); *Thoughts on Naval Power and the Encouragement of Commerce and Manufactures* (1806); *Memoir on the Cultivation, Trade, and Manufacture of Cotton* (1807); etc. He died in Philadelphia, July 17, 1824. E.E.T.

COXEY, JACOB SECHLER, an American agitator, was born in Pennsylvania in 1854, and commenced life at the age of 13, in a rolling-mill. In 1881 he became owner of a sandstone-quarry at Massillon, Ohio, and extended his operations in 1889 by becoming a horse-breeder, purchasing a stock-farm near Lexington, Kentucky, afterward removing his stock to Massillon. He was formerly a Greenbacker in politics, but became a Populist, being present at the Populist convention in St. Louis in July, 1896, as a delegate. He claimed to be a "Christian Theosophist." Coxey adopted the advocacy of a scheme of the American Federation of Labor for the issue of five hundred million dollars in bonds (at the rate of twenty million dollars a month) by the Federal government, to be expended in constructing good roads, thus securing employment for those out of work. It was for the purpose of promoting this scheme that the "march to Washington" was designed. The "Commonweal Army," as it was called, started from Massillon, March 25, 1894, with 75 men, and increased as it marched, creating great interest, and Coxey, with his lieutenant, Carl Browne, made a peaceable entry into Washington at the head of 336 men, April 29th, and on May 1st paraded the streets of the capital. Coxey's purpose was to make a demonstration from the steps of the Capitol, which attempt was prevented, as illegal in the manner intended. He made an attempt to do so by trespassing on the grass to reach his desired goal. He was promptly arrested, fined and lodged in jail. The army melted away, though the movement was imitated in different parts of the country.

COXWELL, HENRY TRACEY, a famous English aëronaut, was born March 2, 1819, at Wouldham, near Rochester. He made his first ascent in 1844, and subsequent ascents with Hampton, Gypson and Gale. In 1848 he turned his attention to military aëronautics, and started from Brussels in a war-balloon to demonstrate a new plan for the dropping of torpedoes. About the time of the Crimean War he invented a system of signaling by semaphore arms. On Sept. 5, 1862, he made his famous ascent with James Glaisher, to make meteorological observations for the British association, the balloon attaining the unprecedented elevation of seven miles. In 1870 Mr. Coxwell was engaged in instructing the Prussians in the art of aëronautics for military purposes. His experiences of 28 years are contained in two volumes, which were published in London in 1889.

COYOTE OR PRAIRIE-WOLF. See PRAIRIE-WOLF, in these Supplements.

COYPU, a small aquatic rodent of South America, classified as *Myopotamus coipus* by Cuvier. It resembles the beaver in many respects, although it is smaller than that animal. R.W.C.

COZUMEL, Mexico, a low-lying, almost level island, 16 miles east of the coast of the Yucatan peninsula. It is about 25 miles long, with a maximum width of 7 miles, and is encircled by coral reefs. Bays on the northern and southwestern shores afford landing places. The island is used for grazing purposes. C.L.S.

CRAB-APPLE (*Pyrus malus*), a small wild, very sour species of apple, but the term is vaguely applied to any kind of sour and uncultivated

variety of apple. It grows wild in Upper India, the Caucasus and Armenia, and was introduced into Rome in the time of Appius Claudius (449 B. C.) and into Britain by the Romans. Pliny the Younger speaks of 22 varieties of apples, mentioning crabs as small and sour. W.R.B.

CRABRO, a sting-bearing, burrowing, hymenopterous insect commonly known as the wood-wasp, and classified by some as *Crabro vulgaris*. R.W.C.

CRADDOCK, CHARLES EGBERT. See MURFREE, MARY NOAILLES, in these Supplements.

CRAFTS, WILBUR FISK, an American clergyman; born in Freyburg, Maine, January 12, 1850. He was graduated from the Wesleyan University in 1869 and from the Boston University School of Theology in 1872. He preached eight years as a Methodist Episcopal minister, and in 1880 joined the Congregational Church. Later he became secretary of the American Sabbath Union and superintendent of the International Reform Bureau, an association formed to secure moral legislation in the United States and Canada by lectures and literature. He has written a large number of works including the *Sabbath for Man; Successful Men of To-day; Social Progress; The Ideal Sunday School; Practical Child Study; Practical Christian Sociology; New Testament Helps; The Bible and Sunday School; The Civil Sabbath; Talks with Boys and Girls about Jesus*, and *Must the New Testament Go?* At one time he was editor of the *Christian Statesman*. Since 1889 he has resided in Washington and is well known as a leader in various reform movements. W.M.C.

CRAG AND TAIL, a term used to designate a peculiar hill formation, in which a bold and precipitous front exists on one aspect of a hill, while the opposite is formed of a sloping declivity. It is believed to have been caused by moving ice.

CRAIG, WILLIS GREENE, an American clergyman; born in Danville, Kentucky, September 24, 1834. He was graduated from Center College in 1851 and from the Danville Theological Seminary in 1860. For twenty years he was pastor of the Westminster Presbyterian Church at Keokuk, Iowa. In 1882 he became professor of church history at the Chicago Theological Seminary, and in 1891 was appointed to the chair of didactics and polemic theology. In 1893 he was chosen moderator of the Presbyterian General Assembly. He has published several volumes of lectures and sermons. W.M.C.

CRAIGIE, MRS. MARY E., an American authoress; better known by her pseudonym, "John Oliver Hobbes." Among her works are *Once Upon a Time: Stories of Ancient Gods and Heroes* (1876); *Some Emotions and a Moral; A Study in Temptations* (1893); *A Bundle of Life* (1894; 2d. ed. 1895); *The Gods, Some Mortals and Lord Wickenham* (1895); and *The Herb-Moon* (1896). Died Aug. 13, 1906.

CRAIK, DINAH MARIA MULOCK, an English novelist; born at Stoke-upon-Trent in 1826. Her first novel, *The Ogilvies*, appeared in 1849, and received some favor, as did tales which immediately followed, particularly *Agatha's Husband* (1852); but it was not until the publication of *John Halifax, Gentleman*, in 1857, that she achieved a decided success. Her other works include *Mistress and Maid* (1863); *A Noble Life* (1866); *Hannah* (1871); etc. She also published a book of *Fugitive Poems* (1860). She received a pension in 1864, and married, in 1865, George Lillie Craik, nephew of the English historian. She died Oct. 12, 1887.

CRAIK, GEORGIANA MARION, an English novelist; born in 1831. In 1886 she married Mr. A. W. May. She wrote for various periodicals, and in 1857 appeared her first novel, *Riverston*, and afterward numerous other books, many of them for children. Among them are *Play-Room Stories* (1862); *Faith Unwin's Ordeal* (1865); *Cousin Trix and Her Tales* (1867); *The Cousin from India* (1871); *Without Kith or Kin* (1871); *Mark Dennison's Charge* (1880); *Twelve Old Friends* (1885); *A Daughter of the People* (1887); etc. Died in St. Leonard's, Nov. 1, 1895.

CRAIOVA OR KRAJOVA, a town in Rumania, the ancient capital of Little Wallachia and later the seat of the prefect of the district of Dolj. It is well supplied with churches and has an agricultural trade. Pop. 1900, 45,579. See KRAJOVA, XIV, 147.

CRAMBE, a genus of plants of the family *Cruciferæ*, natives of Europe and western Asia. They are used as a pot-herb, cooked like asparagus.

CRAMPTON'S GAP is a pass through the Blue Ridge Mountains, or that part of them known as South Mountains, in Frederick County, Maryland. It was the scene of a stubborn contest during the Civil War. W.F.J.

CRANBROOK, GATHORNE GATHORNE-HARDY, EARL OF, an English statesman; born in Bradford, October 1, 1814. His father was John Hardy, of Dunstall Hall. In 1856 he was elected to represent Leominster in Parliament. He had only been two years in the House when Lord Derby made him Under-Secretary for the Home Office. He then became Home Secretary, Secretary of State for India, and was Lord President of the Council from 1885 to 1892. He was created Earl of Cranbrook and Baron Medway in 1892. Died Oct. 30, 1906. W.M.C.

CRANCH, CHRISTOPHER PEARSE, author and artist, was born at Alexandria, Va., on March 8, 1813, and was educated at Columbia College and the Harvard Divinity School, being graduated from the latter in 1835. For some years he was a preacher and teacher, and in 1842 adopted the profession of a painter. He studied in Paris, had a studio in New York, and exhibited at the Paris Salon with much success. He was a member of the National Academy of Design. His best work as an artist was done in landscape painting and in Venetian scenes. As early as 1844 he published a volume of poems, and thereafter wrote much in poetry and prose. Among his best-known works are a translation of Virgil's *Æneid*, *The Bird and the Bell*, *Ariel and Caliban*, translations of Virgil's *Eclogues* and *Georgics*, of Horace's *Odes*, and of many of the poems of Schiller, and *Kobboltozo* and *The Last*

of the Huggermuggers, the last two being tales for children. He settled at Cambridge, Mass., in 1872, and spent the rest of his life there, dying on January 20, 1892. W.F.J.

CRANE, STEPHEN, an American novelist, son of Dr. J. T. Crane, a Princeton graduate and Methodist minister, descended from the first Stephen Crane of the family, who came to the United States in 1635. He was born in New York in 1872, and went to Syracuse University and Lafayette College, but studied only in a desultory manner, and drifted from college to newspaper life at the age of 16. At this he worked for several years, during which time he wrote and published, at his own expense, *Maggie, a Girl of the Streets*, which had no sale, but which came under the notice of some of the critics, who wrote of it in such a manner that it was republished after a time. It is a realistic novel of street and slum life. *The Red Badge of Courage* was written before the author had completed his majority, and was published originally by a newspaper syndicate, where it attracted no particular attention. Afterward, when issued by a house of standing, and reprinted in England, it came into notoriety. The story powerfully depicts the career of a raw recruit in battle from his first fear on confronting the foe, and nearing the whistle of shot and shell. This phase of a soldier's experience had never before been attempted by creators of character, and it has been done by Stephen Crane in an extraordinarily vivid manner. But this was not the only or whole charm of the author's work. He was able, besides, to describe the battle scenes and tactical evolutions in such a manner as to deceive the British critics, who declared that the descriptions referred to could only have been penned by a veteran scarred in war. The truth was, as the author declared, he had only imagined it all. It is such "imagination" that the reader wants more of. The author's career, which was one of great promise, was cut short by consumption; he died June 5, 1900.

STEPHEN CRANE.

CRANE, THOMAS FREDERICK, an American scholar and folk-lorist; born at New York City, July 12, 1844; graduated at the College of New Jersey in 1864, and received therefrom the honorary degree of Ph.D. in 1874; was professor of modern languages in Cornell University (1868); of Spanish and Italian in the same (1872); and of Romance languages there (1881). He was one of the founders of the American Folk-Lore Society. In the department of folk-lore he achieved success, his *Italian Popular Tales*, published in Boston and London in 1885, being at once recognized as the only English work to fully represent the folk-tales of Italy, which it does exhaustively. His *Exempla, or Illustrative Stories from the Sermones Vulgares of Jaques de Vitry*, was published in 1890 by the English Folk-Lore Society.

CRANE, WALTER, an English painter and decorative designer; born at Liverpool, England, Aug. 15, 1845; studied under W. J. Linton, the wood-engraver, and was appointed a member of the committee of the General Exhibition of Water-Color Drawings in 1879. He was elected a member of the Institutes of Painters in Water-Colors and Oils in 1882, but resigned in 1886. His principal pictures are *The Renaissance of Venus* (1877); *The Fate of Persephone* (1878); *The Sirens* (1879); *Truth and the Traveler* (1880); *Europa; The Laidley Worm* (1881); *The Roll of Fate* and *Dunstanborough Castle* (1882); *Diana and the Shepherd* (1883); *The Bridge of Life* (1884); *Freedom and Pandora* (1885); *The Chariots of the Hours* (1887); *Sunrise* (1888); *Flora* and *Pegasus* (1889); and *Neptune's Horses* (1892). Mr. Crane has written some attractive poetry, and has also made holiday books. He was instrumental in founding the Arts and Crafts Exhibition in 1888, and was its president. He delivered the Cantor lectures in 1889 on *The Decoration and Illustration of Books*, and was president of the section of applied art at the National Art Congress at Liverpool in the same year. He designed the seal for the London county council; and in 1892 was appointed director of designs at the Manchester Municipal School of Art. In 1892 an exhibition of his works was made in the United States, which he accompanied.

CRANE, WILLIAM HENRY, an American actor; born in Leicester, Massachusetts, in 1845. He joined an amateur theatrical organization, and made his first appearance on the stage at Utica, New York, July 13, 1863, in *The Child of the Regiment*. For eight years he played small parts with Harriet Holman's Company, and was four years with Oates Opera Company. In 1877 he appeared with Stuart Robson at the Park Theater, New York city, in *Our Boarding House*. This was followed by other successes, including *Our Bachelors; Forbidden Fruit; The Comedy of Errors*, and *The Merry Wives of Windsor*, ending with *The Henrietta*. His first starring tour after dissolving connection with Robson was undertaken in 1889, when he appeared in *The Senator; The American Minister; A Fool of Fortune; On Probation; Brother John; For Money; A Virginia Courtship*, and other plays. He played *David Harum* in 1900, and attained great popularity in that rôle. W.M.C.

CRANE, WINTHROP MURRAY, statesman, was born at Dalton, Mass., on April 23, 1853, and was educated in the public schools and at Williston Seminary. He became a paper manufacturer, and interested himself in various business enterprises. He also entered political life, and was lieutenant-governor of Massachusetts in 1897–99. In 1900 he was governor of Massachusetts, and he was re-elected for 1901 and 1902, displaying in that office a high quality of statesmanship and public service, and promoting the welfare of the Commonwealth. W.F.J.

CRANES. Traveling-cranes have come into very common use within the past twenty years, in large

factories and workshops, for moving heavy articles. Usually they are mounted on overhead railways, and driven by individual electric motors. In a large shipyard at Wallsend-on-Tyne, England, a complete structure of traveling-cranes has been built over one of the docks, and what is virtually a new system of ship-building has been introduced. A steel framework 500 feet long, 68 feet wide and 80 feet high is made to bear two longitudinal tracks, 22 feet apart, on which the cranes run, traveling back and forth at a speed of 300 feet a minute. They are all electrically driven, and can be run the length of the framework. The work of building or repairing ships in the dock below is rendered very much simpler with these means of handling the heavy girders, timbers, spars, etc. The cranes each weigh 14 tons, and carry jibs with hoisting-gear so protected by springs that by no accident can a crane be injured by lifting more than it is designed to sustain. Very large cranes for lifting one hundred to two hundred tons often are made with a hydraulic cylinder and piston, in place of tackle, to do the lifting. Of course this involves much greater height, but it saves the friction on the tackle, which is something enormous, where such large weights are handled. One of these hydraulic cranes, erected at Leeds, England, in 1894, lifted 320 tons at a radius of 75 feet. The base of this machine is a large rotating platform, on which is mounted a boiler-house and three steam-engines, which assist in the counterpoising of the jib.

C. H. Cochrane.

CRANESBILL. See Geranium, Vol. X, p. 395.

CRANEY ISLAND, a small island in Norfolk County, southeastern Virginia, W. of the mouth of the Elizabeth River. Government powder-magazines and a lighthouse are located here. Lat. 36° 53′ 28″ N., long. 76° 21′ W.

CRANSTON, Earl, an American clergyman, bishop of the M. E. Church; born in Athens, O., June 27, 1840. His education was obtained at the Ohio University, at Athens. He enlisted in the Union army, and rose to the rank of captain in the Sixtieth O. V. I. With the advent of Appomattox he exchanged the sword for the Bible, and for some time served pastorates in Ohio. His subsequent changes were at Evansville, Ind.; Jacksonville, Ill.; and Denver, Col., where he was presiding elder. In 1884 he was chosen to succeed Bishop Walden as one of the agents of the Western Methodist Book Concern, in Cincinnati. He held this position until May 18, 1896, when he was elected a bishop.

CRANSTON, a town in Providence county, Rhode Island. Population 1880, 5,940; 1900, 13,343.

CRATÆGUS. See Hawthorn, Vol. XI, p. 479.

CRATER LAKE is, as its name implies, a lake occupying the crater of an extinct volcano. It is in Klamath County, Oregon, in the southwestern part of that state, and on the very ridge and watershed of the Cascade Mountains. The level of the lake is about 6,240 feet above the sea, and its depth in places is fully 2,000 feet. Its area is about 25 square miles. It is not known to have any outlet. W.F.J.

CRAVEN, Alfred Wingate, an American civil engineer; born in Washington, District of Columbia, October 20, 1810. He was graduated from Columbia College in 1829, studied law for several years, finally adopting civil engineering as a profession. From 1849 to 1868 he was employed on public works in New York city, his most important work being in connection with the city's sewerage, the supply of Croton water, and the improvement of Fourth Avenue. From the organization of the Croton Water Board in 1849, until 1868, he was its engineer, and planned and supervised the construction of the great works of that period. He was a founder and a director for many years and president from 1869 to 1871 of the American Society of Civil Engineers. He was largely employed in his later years in railroad construction. He died at Chiswick, England, March 29, 1879. W.M.C.

CRAVEN, Elijah Richardson, clergyman, was born in Washington on March 28, 1824 and was graduated from Princeton in 1842 and from Princeton Theological Seminary in 1848. He was tutor in mathematics at Princeton in 1846–49, and then became a Presbyterian pastor, at Somerville, and at Newark, N. J. In 1878–84 he was chairman of the committee on revision of the Presbyterian Book of Discipline, and in 1885 he was moderator of the general assembly of that church. He has been a trustee of Princeton since 1859, a director of Princeton Theological Seminary since 1865, president of the directors of the German Theological Seminary, Newark, since 1889, and secretary of the Presbyterian Board of Publication since 1887. W.F.J.

CRAVEN, Thomas Tingey, an American naval officer; born in Washington, District of Columbia, December 30, 1808. He entered the navy in 1822, became a master in 1828, lieutenant in 1830 and was placed in command of the *Vincennes* in 1838. He subsequently commanded the *Ohio*, *Boxer*, *Fulton*, *Independence* and other vessels. He was promoted captain in June, 1861, and was given command of the *Brooklyn*, with which vessel he took part in the capture of New Orleans. In 1862 he was placed in command of the *Niagara*. He was promoted rear-admiral in October, 1866, and was retired in December, 1869, after having served as commander of the Mare Island Navy Yard. He died in Boston, Massachusetts, August 23, 1877. W.M.C.

CRAVEN, Tunis A. M., naval commander, brother of Alfred Wingate Craven and Thomas Tingey Craven, was born in New Hampshire, and entered the United States navy as a midshipman in February, 1829, at the age of about fifteen years, and became a lieutenant in 1841. He saw much active service in the suppression of the slave trade, before the Civil War. At the outbreak of the latter he was made a commander, and was attached to Farragut's squadron. At the great battle of Mobile Bay, on August 5, 1864, he was in command of the *Tecumseh* monitor, and with splendid gallantry sought an engagement with the huge Confederate ironclad ram *Tennessee*. While on this quest, in eagerness for the conflict, he had

the misfortune to run foul of a torpedo, which exploded and destroyed the *Tecumseh*. The latter sank quickly, with nearly all on board. The gallant Craven was lost, through his chivalry in insisting that others make their escape before him. W.F.J.

CRAWFISH OR CRAYFISH. See CRUSTACEA, Vol. VI, pp. 568, 569, 582.

CRAWFORD, FRANCIS MARION, an American novelist; a son of Thomas Crawford, the sculptor; born in Bagni di Lucca, Italy, August 2, 1854. His father died in 1857 in Italy, where his youth was spent. He studied under a French governess, and at 12 years of age was sent to America and went to Paul's School, Concord. Thereafter he studied in England, first with a clergyman in Hatfield Regis, and then at Trinity College, Cambridge. Then followed student days at Karlsruhe and Heidelberg from 1874 to 1876, then for two years at the University of Rome, where he had a tutor who taught him Sanskrit. Becoming interested, he went to India to learn more Sanskrit. He obtained an engagement on the *Allahabad Indian Herald*, an afternoon daily paper, of which he was editor. He acquired much about Buddhism and other Oriental lore, and at Simla met the original of Mr. Isaacs, a man whose name was Jacobs. In 1880 he returned to Italy and took passage for America early in 1881. He wrote book reviews, and articles on philosophical themes, and in 1882 wrote his first novel, *Mr. Isaacs*. His other books include *Dr. Claudius* (1883); *A Roman Singer* (1884); *An American Politician* (1884); *Zoroaster* (1885); *A Tale of a Lonely Parish* (1886); *Marzio's Crucifix* (1887); *Saracinesca* (1887); *Paul Patoff* (1887); *With the Immortals* (1888); *Griefenstein* (1889); *Sant Ilario* (1889); *A Cigarette-Maker's Romance* (1890); *The Witch of Prague* (1891); *Khaled* (1891); *The Three Fates* (1892); *The Children of the King* (1892); *Don Orsino* (1892); *Marion Darche* (1893); *Pietro Ghisleri* (1893); *The Novel; What Is It?* (1893); *Katherine Lauderdale* (1894); *Love in Idleness* (1894); *The Ralstons* (1895); *Constantinople* (1895); *Casa Braccio* (1895); *A Rose of Yesterday* (1897); *In the Palace of the King* (1898); *Via Crucis* (1899); *The Rulers of the South* (1900); *Marietta* (1901); *Cecelia* (1902); *Man Overboard* (1903). His work is marked by fine dramatic quality and imagination. W.M.C.

F. MARION CRAWFORD.

CRAWFORD, SAMUEL WYLIE, an American soldier; born in Franklin, Pennsylvania, November 8, 1829. He was graduated from the University of Pennsylvania in 1847, and five years later became an assistant surgeon in the army. At the outbreak of the Civil War he was stationed at Fort Sumter and was in command of a battery during the bombardment. In 1862 he was promoted to the rank of major and was assigned to the 13th New York Infantry. In 1863 he was made brigadier-general of volunteers and was promoted to brevet major-general in 1865. He was conspicuous at the battle of Cedar Mountain, Five Forks, the Wilderness, and other engagements, and was a prominent figure in the Shenandoah campaign. He was placed on the retired list in 1873 and died in Philadelphia, November 3, 1892. W.M.C.

CRAWFORD, WILLIAM HARRIS, an American statesman; born in Amherst County, Va., Feb. 24, 1772. He removed with his father to Columbia County, Ga., in 1783. In 1798 he was admitted to the bar, and in 1799 commenced practice in Lexington, Ga. He compiled the first digest of the laws of Georgia (published in 1802). He was a member of the State House of Representatives, 1803–07; and was United States senator, 1807–13, being elected president of the Senate, March 24, 1812. In this capacity he ultimately supported both the embargo and the War of 1812, and also supported Gallatin's measures for the renewal of the Bank charter. In 1813 he was appointed minister to France, and was influential in the negotiations for the Treaty of Ghent. In 1815 he was appointed Secretary of War, and in 1816 Secretary of the Treasury, which office he held till 1825, having been defeated for the Presidency the previous year. On account of illness he declined Pres. Adams's request that he remain Secretary, but returned to Georgia, and in 1827 was appointed judge of the northern circuit, holding the position till his death, which occurred in Elberton, Ga., Sept. 15, 1834. E.E.T.

CRAWFORDSVILLE, a thriving city and the capital of Montgomery County, western central Indiana, 43 miles W.N.W. of Indianapolis, on the Cleveland, Cincinnati, Chicago and St. Louis, the Louisville, New Albany and Chicago and the Terre Haute and Indianapolis railroads. Among its chief industries are the manufacture of buggies, of hubs and spokes, coffins, and elevators. It has also foundries and flour-mills. Pop. 1890, 6,089; 1900, 6,649.

CREAMERIES. See BUTTER, XXV, pp. 663–64.

CREASY, SIR EDWARD SHEPHERD, English historian; born at Bexley, Kent, Sept. 12, 1812. He studied at Eton and King's College, Cambridge, and in 1834 was elected a fellow. Called to the bar in 1837, he practiced on the home circuit for more than twenty years, was for several years assistant judge at the Westminster sessions court; and in 1860–73 was chief justice of Ceylon, and was knighted in 1860. He wrote *The Fifteen Decisive Battles of the World* (1851); *Invasions of England* (1852); *History of the Ottoman Turks* (1854–56); *History of England* (2 vols., 1869–70); etc. Died at Hampton Wick, Jan. 27, 1878.

CREATINE ($C^4H^9N^3O^2+H^2O$). This body was discovered by Chevreul in meat-broth. It exists ready-formed in the muscles, and passes into the extract of meat. It may be prepared by treating

the solution of this extract with basic acetate of lead, filtering, freeing the filtrate from excess of lead by hydrogen sulphide, and evaporating the solution at a gentle heat until it crystallizes. The crystals are separated from the mother liquor, and alcohol added to the latter precipitates a fresh quantity of creatine.

CREDENCE, in the Roman Catholic and Anglican churches, a small table beside the altar or communion-table, on which the bread and wine are laid before being consecrated. Sometimes the place of the credence is supplied by a niche in the sanctuary wall. The term was used also for a sideboard on which the food was placed to be tasted before serving, as a precaution against poison. Hence the origin of the word.

CRÉDIT MOBILIER SCANDAL, the name applied to a scandal in the United States in the year 1872, investigated by a Congressional inquiry, which developed a huge attempt at bribery and corruption. When the Union Pacific railroad was being constructed, it was found, in 1866, impossible to secure the requisite capital to complete the road. Oakes Ames, a wealthy Congressman from Massachusetts, finally was induced to undertake the work. Finding in Philadelphia a "Pennsylvania Fiscal Company," under whose charter the work might be prosecuted and the liabilities of the contracting parties limited, he purchased the charter and changed the name to the Crédit Mobilier of America. Under this name the construction company completed the road, some seven hundred miles, for the Union Pacific Railroad Company. To aid the company, Congressional grants and concessions were secured. When, however, in 1871, one of the stockholders of the Crédit Mobilier brought suit to compel the delivery of certain shares he alleged had been promised him, the trial developed the fact that Mr. Ames had a list containing the initials of many members of Congress, and that he had written a letter, stating that he had placed certain shares "where they would do the most good." The excitement aroused was intense, and led at once to an investigation by the House of Representatives. Mr. Ames vigorously defended himself, denying any breach of integrity, declaring that he had risked his fortune to accomplish what no one else would have done and to do a work of incalculable benefit to the government. In the course of debate it was charged that several leading advocates of the plan had been bribed by donations of large blocks of shares in return for their influence, among the culprits being Schuyler Colfax, the Vice-President of the United States and several Senators and Congressmen. As a result, resolutions of censure were passed in Congress against Ames and James Brooks of New York. Mr. Ames died soon after. Subsequent inquiry quite generally cleared his reputation of all charge of fraud. The scandal, after a time, died away.

CREEDE, one of the phenomenal mining towns of Colorado, the capital of Mineral County, in the southwestern portion of the state. It lies on the southerly slope of a spur of the San Juan Mountains, and its existence as a town dates from 1891, when the influx of miners began. The first mine (a silver mine) was located in 1889 by N. C. Creede. In 1893 the place had a population of 5,000, and during that year nearly the entire town was obliterated by fire, the loss aggregating $1,000,000. It was rapidly rebuilt, and notwithstanding the general depression in the silver-mining industry, is one of the most prosperous of the "silver" camps of Colorado. The place is upon a branch of the Denver and Rio Grande railroad, is lighted by electricity, and has many of the adjuncts of latter-day civilization. Besides mining, it has a considerable lumber-manufacturing industry. Population, 1900, 938.

CREEDMOOR, New York city, in the Borough of Queens, on the Long Island railroad, 12 miles east of Manhattan, is the site since 1871 of a state rifle-range, where international and other matches are held. C.L.S.

CREEPER, a small group of birds of the family *Certhiadæ*, so named because of their habit of rambling about trees in search of food. They are common in Europe and America.

CREEPING OF RAILS, the slight movement of railroad rails in the direction of the heavier traffic and on down grades. Heavily-loaded trains cause the rails to sag beneath the trucks, so that as the train passes along, the rails fall and rise in a wave-like motion. As the truck is always in the trough of one of these wave-like depressions of the rail, its forward movement constantly exerts a pressure against the slight rise, or incline, in front of it, and this tends to cause the rail to move forward. The greater the depth of the wave motion, that is, the more the rail sags, the steeper will be the incline in front of the wheel, and, consequently, the greater will be the forward pressure exerted against the rail. For this reason loosely-constructed road-beds, which "give" beneath the weight of the train, instead of presenting a rigid foundation, are a frequent cause of the creeping of rails. The fact that the rails are supported by ties some distance apart, instead of having a continuous support, also gives them a tendency to move forward, inasmuch as it helps to increase the wave-motion of the rails. Likewise, short rails have a greater tendency to "creep" than long ones. On a single-track road, where the traffic is in both directions, creeping is not noticeable except on steep grades, where gravity tends to aid the movement. Many kinds of "anti-creepers" are used, one device being a clamp that grips the rail by its lower flange and passes down the entire thickness of the tie, thus fastening the rail to the tie in such a way that the latter cannot turn in its place, but must move forward before any movement of the rail can take place. R.W.C.

CREEPS, a miner's term for the depression which takes place on the surface from the removal of beds of coal beneath. Masses of the coal-seam, like huge pillars, are left by the miners for the support of the superincumbent strata.

CREFELD, Prussia. Pop. 1905, 110,344. (VI, 500.)

CREIGHTON, MANDELL, an English historian, and bishop successively of Peterboro and London, was born at Carlisle in 1843, and died at London

Jan. 14, 1901. He was ordained in 1870. In 1884 he was elected professor of ecclesiastical history in Cambridge University, and next year became canon residentiary of Worcester Cathedral. He edited the *English Historical Review* from 1886, and received the degree of LL.D. from Harvard. He was the author of a useful series of historical manuals, etc., including *History of Rome* (1875); *The Age of Elizabeth* (1876); *The Tudors and the Reformation* (1876); *A History of the Papacy During the Reformation* (1882); and *Cardinal Wolsey* (1888).

CREMATION, the burning of the dead as a substitute for their burial. There has been a steady increase of interest in cremation in the United States since the first regular crematory went into operation in 1885. The United States Cremation Company of New York was among the first in the field. Its cinerator was designed by C. J. Eames and Dr. M. L. Davis. The retort for corpses is built of fire-brick. The body is placed in a chamber immediately over the fuel-chamber, which is heated through holes. The draft is so arranged, however, that no flames reach the body. The volatile matter runs out through highly heated chambers, and is dissipated in the atmosphere. The fuel used is coal. A temperature of 2000° to 2500° F. is maintained, and about two hours are required for the cremation of a corpse.

Dr. Davis has designed the cinerators for several other crematories, and has improved the original design. That at Lancaster, Pennsylvania, has double retorts and furnaces. The materials used are fire-brick, tiles of fire-clay, asbestos, sand and iron. The retorts are so set in the center of each furnace that the flames are made to pass around them three times. The doors are all packed air-tight with asbestos. The volatile matter from the bodies is carried off through flues, in which a temperature of 2500° F. is maintained. Forty-five to ninety minutes are required for the incineration of a body.

In Allegheny County, Pennsylvania, there has been constructed a combined crematory and columbarium, with one hundred niches for urns, to contain the ashes of the dead. The building is very tastefully and expensively designed and decorated. At the Pittsburg crematory the Davis cinerator is used, with natural gas as fuel. Its incinerating capacity is one hour to an hour and a quarter. The Buffalo, New York, crematory makes use of an Italian form of cinerator, designed by Engineer Joseph Venino, being the same used at Milan, Padua and Udine, in Italy, and in Troy, New York. Other United States crematories are located at Detroit, San Francisco, Philadelphia, Waterville (New York), etc., to the number of about twenty. See CREMATION, Vol. VI, p. 500. C. H. COCHRANE.

CRÉMIEUX, ISAAC ADOLPHE, was born of Jewish parents at Nîmes, France, on April 30, 1796, became a member of the bar of Paris, entered the Chamber of Deputies in 1842, and was a member of the provisional government in 1848. He was among those imprisoned under the *coup d'état*, and afterward eschewed politics until the fall of the empire in 1870, when he became a member of the Republican government. He became a senator of France in 1876, and died on Feb. 10, 1880. He was ever a loyal Jew, and founded the Alliance Israelite Universelle. W.F.J.

CRERAR, JOHN, a Chicago business man and philanthropist; born in New York City in 1827; died Oct. 19, 1889, and left $3,000,000 for charitable purposes, of which $2,000,000 was set apart for the founding of a free public library to bear his name. In 1895, after a long contest of the will had been defeated, the trustees of the library decided to devote it exclusively to works on the sciences.

CRESAP, MICHAEL, an American soldier, pioneer and Indian trader; born near Baltimore, Maryland, in 1742. He was one of the early pioneers to the Ohio country, and, in 1774, near Wheeling, West Virginia, led an attacking party, composed of colonists and soldiers, which won a decisive victory over a large body of hostile Indians. Another party of pioneers murdered the family of Logan, a friendly Indian chief, who accused Cresap of the act. In the same year he was made a captain of Virginia militia, and participated in the Dunmore expedition. He then was placed in command of a Maryland rifle company, and later was appointed to take command of the American forces in Massachusetts. He died in New York city, in 1776, while en route to his new post in Boston, and was buried in Trinity churchyard, New York. W.M.C.

CRESCENT, a decoration, sometimes called an order, in Turkey. According to ancient legend, when Philip of Macedon was besieging Byzantium, he began secretly to undermine the walls. But the light of a crescent moon discovered his design. The Byzantines, in gratitude, adopted the crescent as the emblem of state. In 1259, Sultan Othman, the founder of the Ottoman dynasty, adopted the crescent as his symbol, on account of a remarkable vision or dream. It has been the emblem of the sultanate ever since. In 1799, after the battle of Aboukir, the sultan, Selim III, testified his gratitude to Nelson by sending him a crescent richly adorned with diamonds. It was not intended as an order, but Nelson wore it on his coat; and Selim, flattered by the value attached to his gift, resolved that a similar decoration should be conferred on foreigners who had done service to the state. There was an old order of the Crescent instituted by Réné, Duke of Anjou, in 1464.

CRESCENT CITY, a city and county capital, on the southern side of Point St. George, in Del Norte County, northwestern California. Lumber is its greatest export. A lighthouse stands on this point, lat. 41° 44′ 34″ N., long. 124° 11′ 22″ W. Population 1890, 907; 1900, 699.

CRESCENTINO, Italy, a town in the province of Novara on the Po, 25 miles by rail northeast of Turin. It was an ancient Latin town, has interesting antiquities, and manufactures silk and other textiles. Population, 2,696. C.L.S.

CRESCO, a railroad village, the capital of Howard County, northeastern Iowa, on the Chicago, Milwaukee and St. Paul railroad, and on the Turkey

River, 40 miles N.E. of Charles City. It is a great shipping-point for wheat, and has foundries and other manufactories; also, a good union school and a Catholic parochial school. Population 1890, 2,018; 1900, 2,806.

CRESOLS (C^7H^8O), a product of coal-tar distillation. There are three cresols, two solid and one liquid. They may be formed by treating toluene with sulphuric acid. The liquid cresol was discovered by Fairlie, and extracted from wood-tar by Duclos. It is a colorless liquid, with an odor like that of phenol, and boils at 189–190°. See also TAR, Vol. XXIII, p. 63.

CRESSES, a popular name given to a number of low, usually annual, plants, mostly members of the mustard family (*Cruciferæ*), common throughout the temperate zones, and characterized by the pungent taste of their stems and leaves, which, when young, are valued for salads. They are also used for certain medicinal purposes, chiefly as a diaphoretic. The English water-cress (*Nasturtium officinale*) and the American water-cress (*Cardamine rotundifolia*) are those best known and of chief economic importance. *Lepidium sativum*, the common garden cress, a native of Russia, has been widely introduced in the United States. It is used in the preparation of a remedy efficient in the prevention of scurvy. See also *Cress* and *Nasturtium* under HORTICULTURE, Vol. XII, pp. 293 and 297.

CRESSON, a post village and summer resort of Cambria County, southwestern central Pennsylvania, situated on the top of the Alleghany Mountains, three hundred feet above the sea. It is 11 miles by rail E. of Ebensburg, and its fine scenery, pure air and the reputation of its magnesia springs attract many visitors. Pop. of township (1900), 1,572.

CRESTLINE, a city in Crawford County, northern central Ohio, 12 miles N.E. of Bucyrus, on the Pittsburg, Fort Wayne and Chicago railroad. The Pennsylvania railroad has repair-shops here; and among its industries are lock-works, furnace and stove factory, foundries, etc. Population 1900, 3,282.

CRESTON, a city of southern Iowa, about two hundred miles W. of Burlington, on the Chicago, Burlington and Quincy railroad. It is an important trade center, and is the northern terminus of a railroad extending to St. Joseph, Missouri. It contains a variety of manufactories, including large wagon factories and car-shops. Population 1900, 7,752.

CRESWELL, JOHN A. J., statesman, was born at Port Deposit, Md., on November 18, 1828, and was graduated from Dickinson College in 1848. He rose to leadership at the Maryland bar, was a Unionist in the Civil War, served in the Maryland legislature, was a representative in Congress in 1863 and a U. S. Senator in 1865. In 1869 he was made Postmaster-General, and in 1874 U. S. counsel to the Court of Alabama Claims. He died on December 23, 1891.

W.F.J.

CRETACEOUS PERIOD. See GEOLOGY, Vol. X, p. 317.

CRETE, Nebraska, a city of Saline County on the Big Blue River, and a junction of the Burlington & Missouri and the Missouri Pacific railroads, 20 miles southwest of Lincoln. Among its educational institutions is Doane (Congregational) College. It manufactures flour, dairy products, and beer. Pop., 1900, 2,199. C.L.S.

CRETIN, JOSEPH, clergyman, was born in France in 1800, and in 1838 came to America as a Roman Catholic Missionary. He settled in Iowa, and for twelve years was vicar-general at Dubuque. When the new diocese of St. Paul was created, for the territory of Minnesota, in May, 1849, he was nominated for the bishopric of it, and was duly consecrated in January, 1851. There he labored energetically, especially among the Indians, and founded numerous missions, churches, schools, and other institutions. In the one year 1856 he increased the Catholic population of Minnesota from 25,000 to 50,000. He founded the cathedral of St. Paul, and pushed it forward toward completion. But his strenuous labors broke down his health, and he died on February 22, 1857. W.F.J.

CRÉTINEAU-JOLY, JACQUES, a French theologian and historian; born in Fontenay, September 23, 1803. He studied theology, and prepared for the priesthood, but eventually devoted his attention to church history. His published works include *Le Pope Clement XIV* (1858); *History of the Jesuits* (6 volumes, 1854); *History of Louis Philippe* (1867). He died in Vincennes, January 1, 1875. W.M.C.

CRETINISM. See Vol. VI, pp. 506, 507; and PHYSIOLOGICAL CHEMISTRY, in these Supplements.

CREVAUX, JULES NICHOLAS, a French explorer; born in Lorquin, Lorraine, April 1, 1847. He became assistant surgeon in the French navy in 1868, and surgeon five years later; was awarded the cross of the Legion of Honor in 1876 for his devotion to the fever patients on the Salut Islands. Subsequently he explored the Tumuc-Humac Mountains, and descended the Yaru to the Amazon. He afterward explored the Yapoura, the Pilaya and the Pilcomayo rivers. On April 24, 1882, while prosecuting his explorations in the region of the Teyo, he was murdered by the Tapeti Indians.

CRÈVECŒUR, the name of a Dutch port in the province of North Brabant, southern Holland, on the left bank of the Meuse, 49 miles S.E. of the Hague. It figured prominently in the wars of the Dutch and Spaniards. Population, 2,129.

CREVILLENTE, a town of southeastern Spain, in the province of Alicante, 21 miles S.W. of Alicante. It has a population of about 10,000, chiefly engaged in agricultural pursuits and weaving.

CREWKERNE, a town in the southeast of Somersetshire, southern England, 15 miles S.E. of Taunton. It lies in a wooded, fertile vale, not far from the river Parret, has a fine church, and a grammar school founded by John de Coombe in 1449, and some manufactures of sailcloth, sacking, dowlas and stockings. Population, 4,226.

CRICHTON-BROWNE, JAMES, SIR, was born at Edinburgh, Scotland, in 1840, the son of an eminent physician, and was educated at Edinburgh, London and Paris. He has had a distinguished career as a physician, especially in the

treatment of nervous and mental disorders, and has written many treatises and essays on the physiology and pathology of nervous diseases, and diseases of the brain, and has lectured much upon those topics in many institutions. As medical superintendent of the West Riding, Yorkshire, Asylum for the Insane, with 1,500 patients under his professional care, he made that institution a model of good management and a monument of success in the curing of mental disorders, and also made it one of the chief medical schools of the kingdom. In his laboratory there, many important investigations were conducted and discoveries were made. He has also paid much attention to the welfare of school children, especially in protesting against overpressure of studies and the need of better physical nourishment. W.F.J.

CRILLON, Louis des Balbes de Berton de, a French knight, named "Le Brave"; born March 5, 1543, in the Provence; became early a Knight of Malta. In the religious wars of the French Court with the Huguenots he fought with distinction on the side of the former at Dreux, Jarnac, Moncontour, and Lepanto (1571), and in the siege of La Rochelle (1573). Peace declared, he retired to Avignon, where he died, Dec. 2, 1615. G.A.S.

CRIMEAN WAR. See England, Vol. VIII, p. 388; and France, Vol. IX, p. 549.

CRIME OF 1873, The. A phrase first used by a Western Senator, and subsequently popular with the advocates of free and unlimited coinage of silver in the Presidential campaign of 1896, wherewith to describe the alleged surreptitious passage of an act of Congress at this date. Considerable interest centers in this enactment, not only because the Free Silver party regard it as a great crime to "demonetize" silver, but because its more fervid advocates have claimed that the statute went through the halls of Congress "like the silent tread of a cat." The first requisite of a proper understanding of the subject is a consideration of the statute itself. No codification of the mint laws had been made since 1837, and a complete revision of all technical matters of assaying and coinage was commenced in 1870. The Treasury authorities were desirous of obtaining as nearly a perfect system as possible, and with this object in view, sent out the new provisions to scores of experts for suggestions and criticism. Many and varied were the replies. They can be found printed in the House of Representatives Executive Document, No. 307, Second Session, XLIst Congress. In this draft-bill for criticism, a silver dollar of 384 grains standard weight (i.e., 345.6 grains pure silver) was proposed as one just equal to the dollar's value of subsidiary coins issued since 1853. The intention of the bill to cease coining the old silver dollar piece was open and clear. The bill was submitted to Congress by the Secretary of the Treasury, April 25, 1870, and, after having been printed thirteen times, became a law, Feb. 12, 1873. The discussions of its provisions in Congress fill 144 columns of the *Congressional Globe*. The statute as finally passed is as follows, so far as it is of interest and affects the question of the demonetization of silver:

Sec. 14. That the gold coins of the United States shall be a one-dollar piece, which, at the standard weight of 25.8 grains, shall be the unit of value. [Then follow directions as to the other gold coins.]

Sec. 15. That the silver coins of the United States shall be a trade dollar, a half-dollar or fifty-cent piece, a quarter-dollar or twenty-five-cent piece, a dime or ten-cent piece; and the weight of the trade dollar shall be 420 grains troy, the weight of the half-dollar shall be twelve grams and one half of a gram; the quarter-dollar and the dime shall be, respectively, one half and one fifth of the weight of said half-dollar; and said coins shall be a legal tender at their nominal value for any amount not exceeding five dollars in any one payment,

Sec. 17. That no coins, either of gold, silver or minor coinage, shall hereafter be issued from the mint other than those of the denominations, standards and weights herein set forth.

This is the whole of the act of 1873 which deals with the "demonetization" of silver. In the discussions in Congress no opposition was manifested to the omission of the 412½-grain silver dollar, because it was alleged to have been out of circulation since 1840. The omission attracted no attention, for the reason that no such coins were in use.

The procedure as to the act of 1873, when tabulated, reads as follows:

Procedure.	Senate.	House.
Submitted by Secretary of the Treasury	April 25, 1870	
Referred to Senate Finance Committee	April 28, 1870	
Five hundred copies printed	May 2, 1870	
Submitted to House	----------	June 25, 1870
Reported, amended and ordered printed	Dec. 19, 1870	
Debated	Jan. 9, 1871	
Passed by vote of 36 to 14	Jan. 10, 1871	
Senate bill ordered printed	----------	Jan. 13, 1871
Bill reported with substitute and recommitted	----------	Feb. 25, 1871
Original bill reintroduced and printed	----------	Mar. 9, 1871
Reported and debated	----------	Jan. 9, 1872
Recommitted	----------	Jan. 10, 1872
Reported back, amended and printed.	----------	Feb. 13, 1872
Debated	----------	April 9, 1872
Amended and passed by vote of 110 to 13	----------	May 27, 1872
Printed in Senate	May 29, 1872	
Reported, amended and printed.	Dec. 16, 1872	
Reported, amended and printed.	Jan. 7, 1873	
Passed Senate	Jan. 17, 1873	
Printed with amendments; conference committee appointed	----------	Jan. 21, 1872
Became a law, Feb. 12, 1873		

The literature on the subject has been learned, fervid and voluminous. Senator John Sherman's *Recollections;* Prof. J. L. Laughlin's *Facts About Money;* J. K. Upton's *Coin Catechism;* and J. F. Cargill's *Freak in Finance*, may be relied on for the sound-money side of the argument. The free-silver argument can be found in Coin's *Financial School* and several similar works.

CRIMES ACT, Ireland. See Home Rule, in these Supplements.

CRIMINALITY, or the state or quality of being

criminal, in its bearings on social questions and the eventual improvement or advancement of the race, is now one of the most serious considerations of thinkers and those who are necessarily engaged in the study of the criminal classes from a detective, preventive or scientific standpoint. The study of crime has indeed been advanced to the dignity of a science called criminology. Criminologists are inclined to believe that a criminal is a hereditary resultant; hence such an individual may be styled criminaloid, or with a criminal taint. Dr. S. A. K. Strahan holds that the criminal belongs actually to a decaying race, being in fact only one of the many signs of family decay, and is only found in families whose other members show signs of degeneration. Besides being hereditary, he thinks criminality is interchangeable with other degenerate conditions, such as idiocy, epilepsy, suicide, insanity, scrofula, etc.; and it is not certain, or it is a "chance," whether the insanity or drunkenness, for instance, of the parent will appear as such in the child or be transferred in transmission to one or other of the alternate degenerate conditions. As to the treatment of the criminal, or criminaloid, for the purpose of effectually eradicating the stock from the human element, no system has been, or can be yet, heroically adopted. The time is not ready for the evident measures necessary. Herbert Spencer has declared that not only have artificial punishments failed to produce reformation, but they have in many cases increased criminality. Ruskin has said that reformation depends on the establishment of institutions for the active employment of the individuals while their criminality is still unripe. The present system, Dr. Strahan declares, has proved a disastrous failure. Short periods of punishment can have no effect, either curative or deterrent. Everything points in the direction of prolonged or indefinite confinement in industrial penitentiaries. It is certainly upon such lines that the treatment of the criminal will eventually have to proceed; but the question arises, if the criminaloid is a hereditary resultant, he cannot be regarded as responsible; therefore his treatment should not be conducted upon the idea of inflicting punishment, but on the principle of isolation and the securing the prevention, through him, of the further transmission and continuity of the taint that has developed in his hereditary line. The taint must be drained out of the stream of continuity—of hereditary forces—by simply securing, in such individual, an obliteration of such lineal tendency.

CRIMINALS, Identification of. While various systems have been in use from time immemorial, for the identification of persons charged with crime, it remained for Alphonse Bertillon of Paris to perfect, in 1882, a system that was adopted by the French government, affording a positive means of immediately recognizing and identifying a person who had ever, at any time, been examined according to the rules laid down in the code established by him. The measurements as established are applicable to individuals, tribes or races. The list embraces height; length and width of head; length of left middle and little fingers, forearm and foot, full stretch of arms; and length and breadth of right ear. All marks and scars are fully described and recorded, and exact position noted; all peculiarities of the eyes and hair are given. In defining a scar, its precise location is noted as being either on the right or left of the vertebral column, as well as above or below the plane of the seventh vertebra. For scars on the face the localities and measurements are reckoned from the nostrils, the bridge of the nose, the corners of the mouth, chin, cheek, eyebrows; on the breast, the median line, the nipples, the sternum, are taken as bases; for the arm, the measurements are reckoned from the shoulder, elbow, wrist; for the fingers, the phalanges and articulations. It was found that in the measurements of 130,000 individuals by the police in Paris, no two cases were alike, and it was very seldom that the same kind of scar or mark was on two different persons in the same position. In the practical working of the system, three divisions are made: tall, medium and short. This is designated as the first classification. Each of these classes is further subdivided under head-measurement, followed in turn by other classifications and divisions until the whole number is divided into groups of about ten persons each. As an example of the speed and accuracy with which a criminal can be identified when he refuses to give his name, it is necessary to take, first, his height, thereby locating him in one of the grand divisions, tall, medium, or short, and thereby locating the series of compartments or drawers where his recorded measurement and photograph are to be found. The measurement of the length of the head brings still nearer; the color of the eyes, the length of the outstretched arms, and the length of the foot will bring the searcher to the exact spot where the full description and pictures identify the culprit beyond a doubt. Two photographs are usually taken, one with a profile view, the second a three-quarter face.

The plan adopted by the police of the United States is regarded as an improvement and simplification of the methods as given in the foregoing description. The method in vogue for many years has been to take the height and weight; note the complexion; the color and any other peculiarity of the hair; the teeth, eyes, nose, etc. In the matter of the nose, care is taken to describe it as either regular, irregular, Roman, pug or Grecian. All scars are located and described; birth-marks and India-ink marks, with all deformities, and evidences of accidents are recorded. The measurements can be taken by one policeman, but for rapid work two are usually required,—one for the measuring and one for the recording. The instruments used are calipers, compasses and graduated rules, which, although inexpensive, are so exact that the diameters of the head and the length of the fingers can be given to within one millimeter. The entire system of measurement has recently been exhaustively treated in Alphonse Bertillon's *Signaletic Instructions* (1896), edited by Maj. R. W. McClaughry, the well-known penologist.

CRINOIDEA. See Echinodermata, Vol. VII, p. 550.

CRIPPLE CREEK, perhaps the most remark-

able of all the recent mining towns of the West, is situated on the southwesterly slope of the foothills of Pike's Peak, in El Paso County, and about 30 miles W.S.W. from Colorado Springs. It has two railroads, the Midland Terminal and the Florence and Cripple Creek. Gold was first discovered here about 1885 or 1886; but although the first "prospects" were located upon ground which has since been demonstrated to be of vast richness, they were not, at that time, prosecuted far enough to demonstrate their worth. The first large strike occurred in 1891, and in 1896 a very large surrounding area of territory has been turned into the production of gold upon a profitable scale. Cripple Creek has been to gold-production what Leadville was to the silver-mining industry. They both marked new departures, or virtually new eras, in the mining of the respective metals, inasmuch as they demonstrated that metals lay hidden in and richly impregnated hitherto unsuspected rock-formations; those at Leadville being the lead carbonates, while at Cripple Creek the gold was found in conjunction with dikes ascending through fissures in the earlier volcanic formation. Cripple Creek has had its vicissitudes. In 1894 the town was the scene of great turmoil and uproar on account of the miners' strike, which paralyzed all industry, caused the destruction of much property and the loss of many lives, and involved the whole state and surrounding country. This trouble being finally settled, the town entered upon a new era of growth. New mines were opened and older ones developed; the influx of population was unprecedented, and, notwithstanding a fire during the early part of 1896, which virtually wiped the town out of existence, it soon had all the adjuncts of modern life and a population in 1900 (12th U. S. census) of 10,147, and an increasing output of gold. In 1895 the production exceeded $8,000,000.

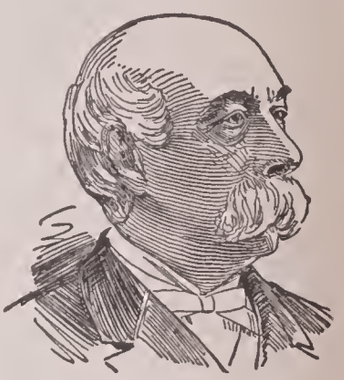
CRISAFULLI, Henri, dramatist; was born of French and Italian parentage at Naples in 1827, and was educated in Paris at the College of Charlemagne. He was a prolific and successful playwriter, working sometimes alone and sometimes in collaboration with Edouard Devicque. Among his works were *Cesar Borgia; Marie Stuart; Girofle-Girofla; Les Loups et les Agneaux; M. et Mme. Fermel; L'Idole; Lord Harrington; Les Deux Faubouriens; Le Démon du Jeu; Le Passé de M. Jouanne; Les Postillons de Fougerolles; Le Bonnet le Coton; Une Pierle*, etc. He also collaborated with Gustave Amard, in writing a series of romances under the title *Les Invisibles de Paris*.

W.F.J.

CHARLES F. CRISP.

CRISP, Charles Frederick, an American jurist and statesman; born of American parentage in Sheffield, Eng., Jan. 24, 1845. He received a common school education at Americus, Georgia, where, at the outbreak of the Civil War, he joined the Confederate army. He was promoted lieutenant, and in 1864 was captured by the Union troops. He was exchanged a few months later. After the war he studied law, and in 1866 was admitted to the bar of Georgia. From 1872 to 1877 he was solicitor-general of Georgia, and from 1877 to 1882 was judge of the state supreme court. He resigned his judgeship to accept the nomination for Congress in 1882. In 1891 he was chosen Speaker of the House of Representatives, and was again selected for the same office in 1893. He was one of the ablest parliamentarians of the day and became a prominent member of Congress, attaining a national reputation as speaker. He died in Atlanta, Georgia, October 23, 1896. W.M.C.

CRISPI, Francesco, an Italian statesman; born at Ribera, Sicily, Oct. 4, 1819. He was an early and ardent promoter of Italy's unification in 1848 in Sicily; in 1859 in Piedmont, and in 1860 again in Sicily under Garibaldi. Since 1865 a member, and in 1876, president of the Chamber of Deputies, he ranged first with the Radicals, but became gradually an adherent and defender of a constitutional monarchy. He was minister of the interior from 1877–87, and from 1893–96, and premier from 1887–91, and as such a stanch supporter of the Dreibund. He died Aug. 11, 1901, at Naples. G.A.S.



FRANCESCO CRISPI.

CRITICISM, Higher, a name given to that criticism of books, and especially of the Bible, which is concerned with their origin, form and value. It is distinguished from the lower criticism, which is concerned with their text.

Traces of the higher criticism of the Bible are found during all the Christian centuries. But systematic work in this field is exclusively modern. It began with Jean Astruc, in his book entitled *Conjectures Concerning the Original Memoirs Used by Moses in Composing the Book of Genesis*, which appeared at Brussels in 1753. This book was intended as a defense of the Pentateuch against Spinoza. Astruc pointed to the fact that the names *Jehovah* and *Elohim* are used in alternate passages in the early chapters of Genesis, and that if the passages containing either of these names be put together, they form a connected narrative. He therefore inferred that Moses made use of two earlier documents, in one of which God was uniformly called Jehovah, and in the other Elohim. The theory of Astruc excited great attention, and Eichhorn, who wrote thirty years later, affirmed that the sections of Genesis in which the names of Jehovah and Elohim, respectively, are used are also characterized by other differences of style. Eichhorn gave to this method of study the name of higher criticism, a designation which it has borne ever since.

The conjectures of Astruc and Eichhorn are

called "the document theory." Still later, De Wette published his "supplement theory"; and still later, Ewald his "crystallization theory." Without defining these later theories, it may be sufficient to say that the general tendency of the critical labors which they represent was to extend the document theory to a larger number of Biblical books, to find a larger number of original documents, and to analyze the early books of the Bible more minutely. In our own times the movement of the higher criticism has reached what is called the "Grafian phase," represented by Graf, by Kuenen, by Wellhausen, and by many others. The results presented by this, the now reigning school of higher critics, are stated thus by Zenas, in his excellent book on the higher criticism:

"The credible recorded history of Israel dates from the days of Samuel. With this prophet begins, also, the crystallization of the religion of Israel into its present form. The process thus begun continues through centuries. The Hexateuch is a composite work, whose origin and history may be traced in four distinct stages: 1. A writer designated as J, Jahvist, or Jehovist, or Judean prophetic historian, composed a history of the people of Israel about 800 B.C. 2. A writer designated as E, Elohist, or Ephraemite prophetic historian, wrote a similar work some fifty years later, or about 750 B.C. These two were used separately for a time, but were fused together into JE by a redactor, at the end of the seventh century. 3. A writer of a different character wrote a book constituting the main portion of our present Deuteronomy during the reign of Josiah, or a short time before 621 B.C. This writer is designated as D. To this work were added an introduction and appendix, and with those accretions it was united with JE by a second redactor, constituting JED. 4. Contemporaneously with Ezekiel the ritual law began to be reduced to writing. It first appeared in three parallel forms. These were codified by Ezra not much earlier or later than 444 B.C., and between that date and 280 B.C. it was joined with JED by a final redactor. This general view, always allowing modifications in final details, has been accepted by a large number of European and American scholars, and may be said to be the dominant view at the present time. In America these views have been accepted by C. H. Toy, C. A. Briggs, H. P. Smith and B. W. Bacon."

Many advocates of this view on the continent of Europe have been aided to accept them by preconceptions against the supernatural in the Bible and in the religious history of the world; but in England and America this has not usually been the case. No objection can be made to the higher criticism as a method of study in any field of literature; but the higher criticism of the Bible is to be judged not only by the method of those who pursue it, but also by the conclusions they reach. The unsettling of early Biblical history is so extensive, and the analysis of the Hexateuch presented to us by the higher critics so minute and teasing, that these results can be accepted only when accompanied by overwhelming proofs. But the arguments submitted to us seem often unreal, and if such arguments were applied to the mixed plays of Shakespeare, they would not lead us to a conviction of the value of the dramatist's works.

The literature of the subject is almost boundless, but a fair and complete discussion will be found in *The Elements of the Higher Criticism*, by A. C. Zenas, New York.

F. JOHNSON.

CRITTENDEN, GEORGE BIBB, soldier, was born at Russellville, Ky., on March 20, 1812, and was graduated from West Point in 1832. He served in operations against Mexican raiders, was captured and narrowly escaped death, on one occasion offering his own life to save that of a comrade. He fought with distinction through the Mexican War, becoming a major in 1848 for gallant conduct at Contreras and Churubusco. In the Civil War he was a major-general in the Confederate army, and was badly defeated by General Thomas at Mill Springs, for which he was censured and put under arrest. After the war he was state librarian of Kentucky. He died on November 27, 1880. W.F.J.

CRITTENDEN, JOHN JORDAN, an American statesman; born near Versailles, Woodford County, Kentucky, September 10, 1787. He was graduated from William and Mary College in 1807, studied law and was admitted to the bar. In 1809 he was appointed attorney-general of the territory of Illinois. He was elected a member of the Kentucky state legislature in 1816, and in 1817 was elected to the United States Senate. From 1819 to 1835 he continued in the practice of his profession, as one of the first lawyers of Kentucky, residing principally at Frankfort, and occasionally representing his county in the state legislature. In 1835 he was again elected to the United States Senate, and continued to serve in that body until March, 1841, when he was appointed Attorney-General by President Harrison. On the outbreak of the Whigs with John Tyler, in September, 1841, Mr. Crittenden resigned with the other members of the Cabinet except Mr. Webster, and retired to private life, from which, however, he was soon called by the Legislature to again take his seat in the United States Senate, in 1842. In the Senate he warmly supported the war with Mexico, but objected to the annexation of Texas. He was also elected Senator for another term of six years, from March, 1843, but, in 1848, having received the Whig nomination for governor of Kentucky, he retired from the Senate, and was elected by a large majority to that office, which he held till his appointment of United States Attorney-General in the Cabinet of President Fillmore. In 1855 he was again elected to the United States Senate. In 1860 during the pro-slavery agitation in Congress he proposed constitutional amendments to the states. His bill was widely known as the "Crittenden Compromise." After a long discussion the bill was defeated. In 1861 he was defeated for the Senate, but was sent to the House of Representatives. While in Congress he objected strongly to the

formation of the new state of West Virginia. He was, perhaps, the most popular man in Kentucky during his time and it was owing to his influence that the state remained loyal to the Union in the Civil War. He bitterly opposed the enlistment of negroes in the United States army. He died near Frankfort, Kentucky, July 26, 1863.

W.M.C.

CRITTENDEN, Thomas Leonidas, soldier, son of John Jordan Crittenden and brother of George Bibb Crittenden (q. v.), was born at Russellville, Ky., on May 15, 1819, and was educated for the bar. In 1842 he was elected district attorney, but at the opening of the Mexican War he entered the army as lieutenant-colonel of Kentucky volunteers, and for a time was a member of General Taylor's staff. After the war he was consul at Liverpool for four years, then practiced law again, and engaged in mercantile pursuits. At the opening of the Civil War he entered the Union army and was made a brigadier-general of volunteers, and in July, 1862, major-general of volunteers. He did fine service at Shiloh, at Stone River, and at Chickamauga, and later with the army of the Potomac. In December, 1864, he resigned his commission, but two years later was reappointed to the regular army as colonel and brevet brigadier-general. He died on October 23, 1893.

W.F.J.

CROCKETT, a thriving city, the capital of Houston County, central eastern Texas. It is on the International and Great Northern railroad, 38 miles S.E. of Palestine. It has two seminaries. It lies in the center of a fertile agricultural district. Population 1890, 1,445; 1900, 2,612.

CROCKETT, David, an American pioneer and politician; born in Greene County, Tenn., Aug. 17, 1786. He had little education, not learning the alphabet till he was 18, but he acquired a knowledge of men and things through hard times and rough adventures. He married early, and soon afterward went to live in the wildest portions of the State, where he supported himself and his wife in the usual frontier manner. In the Creek campaign of 1813–14 he commanded a battalion of mounted riflemen under Gen. Jackson. He was a noted hunter, and his skill with the rifle and his companionable nature made him a favorite among his neighbors. He was thus appointed a local magistrate, and later was sent to the State legislature for two terms; was elected to the United States House of Representatives, in which he served from 1827 to 1831, and again from 1833 to 1835. He next went to Texas, then in her revolutionary struggle against Mexico, and in the heroic defense of Fort Alamo, at San Antonio de Bexar, was among those treacherously murdered by order of Santa Añna. He had a great facility for telling amusing stories, and in Washington he obtained general notoriety by his eccentricities of manner and language, and was regarded as a gifted and genial specimen of the "half horse and half alligator." He wrote an *Autobiography* which was published in 1834. Other books have been attributed to him, but probably erroneously. His death occurred March 6, 1836.

DAVID CROCKETT.

E.E.T.

CROCKETT, Samuel Rutherford, a Scotch novelist; born at Little Duchrae, in Galloway, in 1859, the son of a crofter. In 1869 his parents removed to Castle Douglas, where the lad had the advantage of a discriminating teacher, who discovered marks of ability in his pupil and encouraged him, so that in 1876 the boy was able to gain a bursary of $100, and proceed to the University of Edinburgh, where he graduated in the arts department four years later. During his college career he did some journalistic work, and later was recommended by Dr. Jowett of Oxford University to a position as traveling tutor. In this capacity he traveled all over Europe, as well as parts of Asia and Africa. This gave him an opportunity rarely experienced by novelists, and he has utilized the scenes and incidents of these travels in his writings. During this period he contributed fugitive pieces of verse to the Scottish journals, which afterward were collected in a volume entitled *Dulce Cor: The Poems of Ford Bereton*. On returning to Scotland, he commenced his theological training at the Free Church New College, Edinburgh, and, on completing his course, went to occupy the Free Church pulpit at Penicuik, in Midlothian. In 1891 he had written his first prose work, *The Stickit Minister*, for the principal character in which he has stated that a cousin was the model. The book appeared in 1893, and ran through six editions in twelve months, and immediately established the author's reputation as a delineator of local character. Following his first success were *The Raiders* (1894); *The Men of the Moss Hags* (1894); *Mad Sir Uchtred* (1894); *The Lilac Sunbonnet* (1894); *Bog, Myrtle, and Peat* (1895); *The Play Actress* (1895); *The Red Axe* (1898); *The Black Douglas* (1898). He has been styled "the Covenanting Novelist," from the subject of his *Men of the Moss Hags*.

CROCODILE-BIRD. See Crocodile, Vol. VI, p. 525.

CROCUS, a flowering plant. See Horticulture, Vol. XII, p. 262; and Saffron, Vol. XXI, p. 153.

CROCUS OF ANTIMONY, a double sulphide of sodium and antimony formed in the manufacture of the metal. Crocus of Mars is the finely divided red oxide of iron.

CROES, John, clergyman, was born at Elizabeth, N. J., on June 1, 1762, and from 1778 to 1781 served in the American army in the Revolution. He then taught school, and entered the Protestant Episcopal ministry in 1790. In 1801 he was settled at New Brunswick, N. J., and was rector of Christ Church and head of a boys' school which afterward was developed into Rutgers College. He was in June, 1815, elected bishop of the diocese of Connecticut, whereupon his fellow-clergymen in New Jersey almost unan-

imously petitioned him to decline it and to remain among them. He acceded to their request and declined the Connecticut bishopric, whereupon in the following August he was elected, and in November consecrated, first bishop of the diocese of New Jersey. He died on July 30, 1832. W.F.J.

CROFFUT, William Augustus, an American journalist and poet; born in Redding, Connecticut, January 29, 1835. He received a common school education and entered journalism in New Haven. In the Civil War he served as a private, being promoted to corporal. He then resumed his career as a journalist, being engaged upon the New Haven *Palladium*, the Rochester *Democrat*, St. Paul *Times*, the Minneapolis *Tribune*, the Chicago *Post*, the New York *Graphic*, *Tribune*, and *World*, and the Washington *Post*. He twice visited Europe and traveled through Mexico, Yucatan, Cuba, and Nova Scotia and was a voluminous correspondent for the newspapers. He wrote the libretto of a comic opera entitled *Deseret*, which was produced in New York in 1882, and for which Dudley Buck composed the music. The motive for this opera was drawn from life among the Mormons. From 1888 to 1891 he was editorial director of the United States Geological Survey. His books include *A Helping Hand* (1861); *The History of Connecticut in the Rebellion* (1867); *Bourbon Ballads*, a popular series of political rhymes (1880); *A Midsummer Lark* (1882); *The Vanderbilts* (1886); *The Folks Next Door* (1892); *Labor's Riddle Guessed At*, and *The Lord's Day or Man's* (1894). He has also published two volumes of *Poems*. W.M.C.

CROFTERS, tenants of small holdings of land, living chiefly in the Highlands and western islands of Scotland. Those dwelling on the islands, or near the coast, gain their livelihood by farming and fishing, and those living in the interior, chiefly by the cultivation of their holdings. They and the conditions under which they live are descendants of the clansmen and the feudal system that prevailed previous to 1746; and their historic claim is "that the fertile land in the Highland glens and the pastures on the hillsides were the common property of the clan under the chief, and that, even though the chief may have been, in the eye of the law, the absolute owner of the land, still, in point of fact and immemorial custom, the clansmen shared his possessions, and had an undisputed and undisturbed right to their crofts and their pastures or grazings, on payment of a small rent, or on condition that they served under their chief, as they were only too ready to do, in time of war." Consequently, the policy of eviction maintained by the landlords has always been resented and the payment of exorbitant rents sometimes resisted by the crofters; and the poverty and hardship of their lives, similar in many respects to the sufferings of the Irish peasantry, have many times been the topic of general discussion and sometimes of political action.

A Royal Commission, appointed in 1883 to inquire into the condition of the crofters, reported that a "security of tenure founded on the old usage of the country could not now be seriously entertained, as the clan system no longer exists, and the property has, in many cases, changed hands." But the commission added that "it must not be forgotten that the authority of chieftainship has been reasserted, and the obligations of vassalage have been avowed in a new form and for a new cause, almost within the memory of men living. It is difficult to deny that a Macdonald, a Macleod, a Mackenzie, a Mackay, or a Cameron, who gave a son to his landlord (to fight under him) eighty years ago, did morally acquire a tenure to his holding more sacred than the stipulations of a written covenant."

In accordance with the spirit of the report of this commission, and under the inspiration and persuasion of Mr. Gladstone, the Crofters' Holdings Act was passed by Parliament in 1886. This law aimed to perpetuate the Highland village communities by establishing "crofting parishes" within which the act was to be applicable; it secured the crofter in the tenure of his holding; provided for the determining and establishment of fair rents; granted the tenant the right to renounce his holding; and ensured him adequate compensation for any improvements he might make on the property. The act was applicable only to crofting parishes within the counties of Argyll, Inverness, Ross and Cromarty, Sutherland, Caithness, and Orkney and Shetland; for although there are many crofter tenancies in other counties, particularly in Aberdeenshire and Perthshire, they exist under such favorable and different circumstances, that it was deemed wise not to extend to them the privileges of special legislation.

The Crofters' Holdings Act has been vigorously assailed as an unwarrantable encroachment upon the rights of the landlords — especially in that it cancelled much arrearage in rent — and on the ground that it encouraged shiftlessness. The following summing-up of the effects of the law is given by *The Scottish Review*:

> "As direct and intended results, the crofter has received two distinct benefits, (first) reduction of rent, and (second) security of tenure, which enables him to resist the regulations of his landlord formerly enforced by eviction. As indirect results, (first) by the prevention of monopoly the proprietors are discouraged from the expenditure of capital in developing the resources of outlying districts by the establishment of stores, fishing stations, or the like; (second) they are deprived of all control of their property so far as consisting of scattalds (open grounds for pasture or fuel), and the crofters are left to dispute among themselves how the stock on each scattald is to be regulated; (third) the burden of building and maintaining dwelling houses, etc., has been thrown exclusively on the crofters; and (fourth) the settlement of all local disputes has been taken from the proprietor and left to the decision of the Courts of Law."

See Scotland, Vol. XXI, p. 556; also Vol. XXII, Skye, p. 134; and Sutherland, p. 763. R.C.A.

CROFTON, Sir Walter Frederick, an English prison reformer; born in 1815. In 1833 he entered the Royal Artillery, retiring in 1844 as

captain. Subsequently he became interested in the improvement of prisons and reformatories. He has done much to advance the merits of refuges and reformatories throughout the civilized world. He was knighted in 1862, received the companionship of the Bath, and was made a privy councillor in Ireland.

CROGHAN, George, an American soldier; born near Louisville, Ky., Nov. 15, 1791. He graduated at William and Mary College; was aide-de-camp in the battle of Tippecanoe, in 1811; captain in 1812; and major, March 30, 1813. He took part in the defense of Fort Meigs, May 5, 1813; and on Aug. 1 and 2 he successfully defended Fort Stephenson (now Fremont), Ohio, against a vastly superior force. He was made inspector-general with rank of colonel, Dec. 21, 1825, and in that capacity served with General Taylor in Mexico. He died in New Orleans, Jan. 8, 1849.

E.E.T.

CROKE, Thomas William, Roman Catholic archbishop of Cashel, Ireland, was born in Mallow, County Cork, May 19, 1828. He studied in Paris and Rome, taking his degree of D.D. at the Roman University in 1847. After various appointments in Ireland and New Zealand, he became archbishop, June 25, 1875, and was identified prominently with the Irish Land League and other national and patriotic movements. He died in July, 1902.

CROLL, James, physicist; was born in Perthshire, Scotland, in 1821, received a common school education, and was entirely self-taught in science. He was a millwright, an insurance agent, and keeper of the museum of Anderson's College, Glasgow. Finally in 1867 he joined the Geological Survey of Scotland, and remained connected with it until 1881. He was the author and advocate of an interesting theory of climatology, to the effect that, contrary to the opinions of most scientists, the great changes in the climate of the earth, including the glacial period, etc., have been due to the secular variations in the eccentricity of the earth's orbit and the consequent changes arising therefrom, such as the deflection of the ocean currents. Croll supported this theory with much power and ingenuity, and also concerned himself with the general themes of cosmology and theology. His books included *The Philosophy of Theism* (1857); *Climate and Time* (1875); *Discussions on Climate and Cosmology* (1886); *Stellar Evolution* (1889); *The Philosophical Basis of Evolution* (1891), and an *Autobiography* (1896). He was a fellow of the Royal Society, and an LL.D. of St. Andrew's. He died on December 15, 1890.

W.F.J.

CROLY, David Goodman, journalist; was born in Ireland on November 3, 1829, came to America in boyhood, and was educated at New York University. His life was devoted to newspaper work, as a reporter for the New York *Herald* and *Evening Post*, editor of the *News* at Rockford, Illinois, city and managing editor of the New York *World* in 1860–72, and managing editor of the New York *Daily Graphic* in 1872–78. He was the author of *The Modern Thinker*, *The Positivist Catechism*, and *Glimpses of the Future*. He was one of the founders of the Lotus Club of New York. He was married in 1857 to Jennie Cunningham, whom see, below. Mr. Croly died in New York on April 29, 1889.

W.F.J.

CROLY, Jane Cunningham, an American writer; born in Market Harborough, England, Dec. 19, 1829. She came to America with her family at ten years of age, and settled at Poughkeepsie, N. Y. In 1856 she married David G. Croly, a journalist (see preceding paragraph). She held editorial positions on newspapers and magazines — including Demorest's (1860–87) and Godey's Lady's magazines — for over forty years; started the duplicate system of correspondence which ultimately led to the modern syndicate; was the first woman on the staff of any daily newspaper in New York; and was the first regular woman correspondent of several papers. She called the first Woman's Congress in New York in 1856, and the second in 1869; founded Sorosis in 1868, and was its president, 1868–70 and 1876–86. She founded the *Woman's Cycle* in 1889, and was the author of *Talks on Women's Topics; For Better or Worse;* etc. She died in New York, Dec. 23, 1901.

E.E.T.

CROMARTY FIRTH, a deep incision into the northeastern coast of Scotland, in Ross County, extending some twenty miles into the land in a southwesterly direction. It is from three to five miles wide, and forms an excellent harbor.

CROMDALE, a place in southern Elginshire, northeastern Scotland, on the right bank of the Spey, 5 miles N.E. of Grantown. Here, May 1, 1690, eight hundred Jacobite Highlanders were surprised and routed by a body of King William's dragoons.

CROMER, a small town and parish, a favorite watering-place in Norfolk, England, 21 miles N. of Norwich. The town has two stations, one on the Great Eastern railway and one on the Midland, and Great Northern Joint railway. The heavy sea has prevented the formation of a harbor, and vessels are compelled to load and unload on the beach. So strong have the encroachments of the sea been that nearly all of the original town, called Shipdon, as well as the parish church, has been swept away. The principal occupation of the inhabitants is crab and lobster fishing in season, and the collection of jet and amber in the winter. The Norfolk and Norwich Hospital maintains a convalescent home of considerable size. The location of the town is so much above sea-level that the lighthouse is visible for 23 miles. The population is about 2,500.

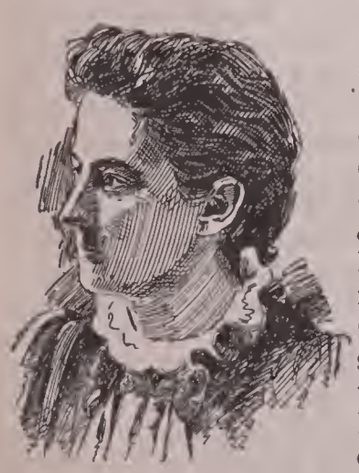
CROMER, Evelyn, Lord, an English financier and diplomat, cousin to the Earl of Northbrook; born Feb. 26, 1841. As Sir Evelyn Baring he was a European commissioner of the public debt in Egypt, and was one of the comptrollers-general representing England and France in 1879, when Tewfik Pasha became ruler in Egypt. He occupied this position until 1880, when he accepted the office of Finance Minister of India under the

Marquis of Ripon, in which capacity he framed and carried three budgets. In 1883 he succeeded Sir Edward Malet at Cairo, with the status of minister. He was created a peer in 1892, with the title of Baron Cromer. He is "the maker of modern Egypt."

CROMWELL, RICHARD, a son of Oliver Cromwell, Lord Protector of England; born at Huntingdon, Oct. 4, 1626. He studied law at Lincoln's Inn. When Oliver attained the dignity of Lord Protector, he called his son from the obscurity of a country house to have him elected to Parliament for the counties of Monmouth and Southampton, appointed him First Lord of Trade and Navigation, and made him chancellor of Oxford and a Privy Councillor. In none of these capacities did Richard Cromwell exhibit any aptitude; and his failure as Protector, to which high office he succeeded in September, 1658, on the death of his father, was still more conspicuous. The result was his demission, a little more than seven months after he had assumed the headship of the commonwealth. He retired to Hampton Court, and after a sojourn of twenty years in France he returned to England and died there, July 12, 1712.

CRONJE, GENERAL P. A., a noted Boer commander, born 1835. In 1881 he was in command at the siege of Potchefstroom, against the British. It was to him also that Dr. Jameson, the raider, surrendered with his fellow Uitlanders, Jan. 1, 1896. In the war of 1899–1900 General Cronje commanded the Boers in the early part of the investment of Kimberley. Later on he commanded the burgher forces at the Modder River, at Magersfontein and at Paardeberg, where he surrendered, together with 4,000 men, to Lord Roberts. Was exiled to St. Helena as a prisoner of war in April, 1900, and released in August, 1902. On his return home he found some of his property confiscated and the rest he gave to help his friends. To partly retrieve his losses, he joined the Boer-War spectacle which exhibited in the United States, 1904–5.

CRONWRIGHT-SCHREINER, OLIVE, better known as Olive Schreiner, the South African novelist; born about 1863, in Cape Town, the daughter of a Lutheran clergyman. When she was twenty years of age she went to London with the manuscript of a novel, *The Story of an African Farm*, which had the good fortune of receiving the approval of George Meredith. The story was published under the pseudonym of "Ralph Iron," and was a great success. It ran through many editions. The book dealt with the spiritual liberation of an idealist temperament from the ultra-Calvinism of the Dutch profession. In 1891 she published *Dreams*, a collection of parables; and in 1893, *Dream Life and Real Life*. She was married Feb. 24, 1894, to Mr. Cronwright, a young colonist, upon which occasion she chose to be known as Olive Cronwright-Schreiner, Mr. Cronwright at the same time adopting his wife's name. In 1895 he delivered a lecture at Kimberley, South Africa, on *The Political Situation*, which, with the assistance of his wife, has been elaborated into a book, which the authors describe as dealing with "the retrogressive movement in South Africa, and the manner in which it may be stayed." In 1897 she published *Trooper Peter Halket of Mashonaland*.



OLIVE SCHREINER.

CROOK, GEORGE, soldier; was born near Dayton, O., on Sept. 8, 1828, and was graduated at West Point in 1852. Until the Civil War he served on the western frontier, but in 1861 was assigned to duty in West Virginia, where he soon distinguished himself. He was in the battles of Lewisburg, South Mountain, Antietam, Tullahoma, Chickamauga, Cloyd Mountain, Opequan, Fisher's Hill, and Cedar Creek. Just before the end of the war he was captured by guerrillas, but was exchanged, and was at the surrender of Lee at Appomattox. After the war he was soon sent back to the western frontier, where he conducted several notable campaigns against the Pi Utes, Apaches, Chiricahnas, and other hostile Indians and made for himself the reputation of being one of the greatest Indian fighters in our history. He was made a brigadier-general in 1873. He introduced many reforms into the management of the Indian Department, and did much for the civilization and welfare of the red men. In 1888 he became a major-general of the United States army, and he died on March 21, 1890. W. F. J.

GENERAL CROOK.

CROOK, ISAAC, clergyman, was born in Ohio and was educated at the Ohio Wesleyan University. He entered the ministry of the Methodist Episcopal Church in 1860 and filled several important charges. He was for a time president of the University of the Pacific, in California, chancellor of the Nebraska Wesleyan University, and president of the Ohio University. In 1898 he returned to the work of the ministry. He has written a number of biographical and philosophical works. W. F. J.

CROOK, JAMES KING, physician, was born in Alabama on February 25, 1859, and was graduated in 1880 from the Medical College of New York University, since which time he has been engaged in the practice of his profession in New York City. He has been connected with the various city hospitals, St. Stephen's Home, Mount Sinai Hospital, the Post-Graduate Medical School and Hospital, and various other institutions. He was a delegate to the second Pan-American Medical Congress in 1896, and to the British Medical Association in 1897. W. F. J.

CROOKED ISLAND, one of the Bahamas, valu-

able chiefly for its salt, of which it produces about 12,000 bushels annually. Its area is about 160 square miles, Lat. 22° 15′ N., long. 74° W.

CROOKED LAKE. See KEUKA LAKE, in these Supplements.

CROOKES, SIR WILLIAM, physicist and chemist; was born in London on June 17, 1832, and studied at the Royal College of Chemistry, where he was first a pupil and then an assistant of Hofmann. Thence he went to Oxford as superintendent of the Radcliffe Observatory, and later became a lecturer and instructor in the Science College at Chester. He founded the *Chemical News* in 1859, and in 1864 became editor of the *Journal of Science*. As early as 1851 he published a paper *On the Seleno-Cyanides*, and ten years later, through the use of spectrum analysis and chemical reactions he discovered the metal thallium, for which achievement he was in 1863 elected a fellow of the Royal Society. In 1865 he invented the process of reducing gold and silver ores through sodium amalgamation. During a series of experiments to ascertain the atomic weight of thallium he was led, in 1872, to investigate the subject of repulsion resulting from radiation, and thus invented the radiometer, which he afterwards improved and modified in the otheoscope. Meantime he also paid much attention to the physical phenomena of so-called spiritualism, and published the result of his investigations in 1874 in *Researches in the Phenomena of Spiritualism*. Next came the investigations and inventions with which perhaps his name is most identified, namely those in relation to the properties of matter in a vacuum. He produced exceptionally perfect vacua, and vacuum tubes which have since been known by his name and which have greatly advanced the art of electrical lighting and the world's knowledge of electrical phenomena. He claimed to have discovered a fourth state of matter, in which molecules were not in contact as in a solid, a liquid or a gas, but isolated. Some of the results of these investigations were published in his *Molecular Physics in High Vacua* (1879). In recognition of these investigations the French Academy of Sciences gave him in 1880 a prize of $600 and a gold medal. His vacuum tubes also served an important end in leading to the invention of the Roentgen ray apparatus, commonly known as the X-rays. (See ELECTRICITY, in this volume, pp. 538–541.) Other researches of his of great practical value were in sanitation, especially the disposal of city sewage, and in beet sugar, calico printing and other departments of industrial chemistry. He conducted a series of experiments in disinfectants for the suppression of the cattle plague, and made a valuable report thereon to the British government in 1866. He has been president of the British Association, of the Chemical Society and of the Institution of Electrical Engineers, Royal medalist, Davy medalist, and three times Bakerian lecturer of the Royal Society, and was knighted in 1897. In addition to the works already named he has written *Select Methods in Chemical Analysis*; *Dyeing and Tissue Printing*; *The Wheat Problem*, etc., and has translated and edited Kerl's *Treatise on Metallurgy*; Wagner's *Chemical Technology*; Auerbach's *Anthracen and Its Derivatives*, and Ville's *Artificial Manures*. W.F.J.

CROOKES'S TUBE. See ELECTRICITY, § 95, in these Supplements.

CROOKS, GEORGE RICHARD, clergyman and educator, was born in Philadelphia, Penn., on February 3, 1822, and before reaching his majority became a minister in the Methodist Episcopal Church. For a time he was instructor in Dickinson College, Carlisle, Penn. In 1860 he was appointed to be the first editor of *The Methodist*, and he conducted that journal for fifteen years. He published a number of text-books, including a *Latin-English Lexicon*, the latter produced in co-operation with Professor Schem. Other works were lives of Bishop Simpson and Dr. John McClintock, and a *Theological Encyclopædia*, prepared in co-operation with Bishop John F. Hurst. In 1880 Dr. Crooks was appointed professor of historical theology in the Drew Theological Seminary, at Madison, N. J., and in that place spent the remainder of his life. He died on February 20, 1897. W.F.J.

CROPSEY, JASPER FRANCIS, artist, was born at Westfield, Staten Island, N. Y., on February 18, 1823, and as early as 1837 won a prize from the American Institute Fair for a model of a house. Thereafter he studied architecture and water-color painting, but was almost entirely self-educated in art. In 1844 he exhibited a painting of *Greenwood Lake* which won for him election as an associate of the National Academy. In 1851 he was elected an academician, and later he became a member of the American Water-Color Society. From 1847 to 1863 he lived chiefly in England, exhibiting regularly at the Royal Academy and elsewhere. In 1876 he exhibited pictures and won a medal at the Centennial Exposition at Philadelphia. He resumed his architectural practice long enough to design the elevated railroad station on Sixth Avenue in New York. He died in 1900. W.F.J.

CROSBY, FANNY, hymn writer, was born at Southeast, New York, on March 24, 1820, and at six months old became blind. She was educated at the Institute for the Blind in New York, and was a teacher there. She has written more than three thousand hymns, including some of the most familiar and beloved in current use. Her married name is Van Alstyne. W.F.J.

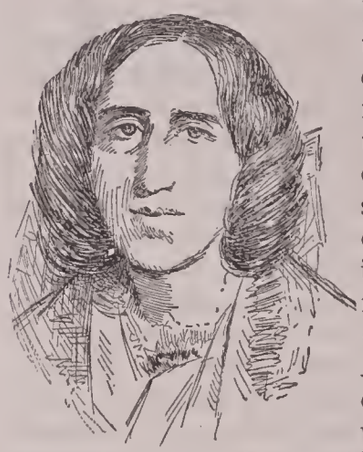
CROSBY, HOWARD, an American clergyman and author; born in New York city, February 27, 1826. He was graduated from the University of the City of New York in 1844 and in 1850 became professor of Greek at that institution. In 1863 he was made pastor of the Fourth Avenue Presbyterian Church in New York and for many years was a delegate to the Presbyterian General Assembly and was once its moderator. He was chancellor of the University of New York from

1870 to 1881 and was a member of the American committee of revisers of the New Testament. He was one of the founders and at one time president of the American Society for the Prevention of Crime. In 1873 he was a delegate to the First Presbyterian General Council, held in Edinburgh, Scotland. He was well known as a writer of religious works and was long a contributor to the magazines and periodicals. His published writings include *Lands of the Moslem* (1850); an edition of the *Œdipus Tyrannus* (1851); *Life of Jesus* (1871); *Commentary on the New Testament* (1885); *Bible View of the Jewish Church* (1888); *The Seven Churches of Asia* (1890). He was given the degree of D.D. by Harvard College in 1859, and that of LL.D. by Columbia University in 1871. He died in New York city, March 29, 1891. W.M.C.

CROSBY, Peirce, naval commander, was born at Chester, Penn., on January 16, 1823, and became a midshipman in the U. S. navy in 1838, on the *Ohio*, the flagship of Isaac Hull. He served in the Mediterranean, in home waters, and in the Mexican War, where he took part in the capture of Tuxpan and Tobasco. Thereafter he was in active service at sea most of the time until 1861. At the outbreak of the Civil War he was on duty at Havre de Grace, at Hampton Roads and in the Chesapeake, keeping open lines of communication. Next he went with General Butler's expedition to Hatteras Inlet, took off from the forts the officers and men who surrendered, and captured four blockade runners. Later he was with Farragut at the Mississippi forts, at New Orleans, and at Vicksburg. In the last part of the war he was on blockade duty. During the war between Brazil and Paraguay he escorted the U. S. minister to Paraguay, and compelled the Brazilian admiral to let him pass through the blockade. In 1882 he was made rear-admiral, and commanded on the South Atlantic and Asiatic stations. He was retired in 1893, and died on June 15, 1899. W.F.J.

CROSS, Mrs. Mary Ann (or Marian Evans), a celebrated English novelist, better known by her pen-name of "George Eliot," was born at Arbury Farm, Warwickshire, England, Nov. 22, 1820. Her father, Robert Evans, a land-steward on an estate in the vicinity, was a man of strongly marked character, whose portrait, under a partial disguise, is sketched in Adam Bede and Caleb Garth, while some features of her mother's personality may be recognized in Mrs. Poyser, personages who figure in two of George Eliot's most popular novels. Miss Evans attended school for a short time in Nuneaton, and afterward in Coventry, but her education was in the main self-acquired, for from her earliest years she was distinguished by a passionate love of study and had a richly endowed nature, which subsequently enabled her to attain the highest place in imaginative literature. After the death of her mother, she removed in 1841 to Coventry, where she lived alone with her father, pursuing her studies and making the acquaintance of a family of Unitarians, under whose influence her powerful mind received its bent toward rationalism. The first-fruits of this association was her translation from the German of Strauss's *Leben Jesu*. The death of her father in 1849 gave her the opportunity of passing a winter in Switzerland; and on her return to England she established herself in London, where she began to write for the *Westminster Review*, then under the editorship of her friend, Dr. Chapman. To the radical quarterly she made a number of contributions, as well as assisting in the editing of it, and she added to her translations from the German, Feuerbach's *Das Wesen des Christenthums*, or *Essence of Christianity*. Her work for the *Westminster* brought her to the notice of Herbert Spencer, John Stuart Mill and George Henry Lewes, the biographer of Goethe, and a brilliant philosophic essayist. With the latter she formed an irregular union, at variance with the conventional moral sense of society. Lewes had been deserted by his wife, and her offense condoned, so that a divorce was unattainable, and the couple had finally separated.

The alliance with Mr. Lewes, which remained unbroken until his death in 1878, withdrew George Eliot from the conventions of society, and his discernment provided the needed stimulus for undertaking the work of a novelist. At his suggestion, she began those powerful creations which, from the issue of the first installment of the *Scenes of Clerical Life* to *Daniel Deronda*, centered the eyes of the English-speaking world on her work. In 1857 the three sketches which constitute the work first mentioned appeared in *Blackwood's Magazine*. These were followed in 1859 by *Adam Bede*, a powerful novel of real life, revealing a masterly insight into character and a remarkable knowledge of human nature, combined with admirable powers of description. The broader canvas of this work, which remains to-day the most popular of George Eliot's writings, gave fuller scope to its author's powers, a fact which the appearance of the *Mill on the Floss* (1860) emphasizes, for from the publication of the latter novel may be dated the author's assured position as a writer of fiction. In this, and in *Silas Marner* (1861), a less ambitious though very charming story, we begin to see the author's subtle insight into the workings of the human mind, and her fondness for the analytic dissection of her characters. Both deal with the scenes and characters of the rural and manufacturing districts, in which George Eliot's early life had been spent.



GEORGE ELIOT.

With the publication, in 1863, of *Romola*, a historical novel of the period of the Italian Renaissance, George Eliot not only broke new ground, but adopted a more elaborate and pseudo-scientific style, which alienated many admirers, who could not appreciate the erudition which the work manifests, or

its somewhat artificial and labored utterance. Nor did *Felix Holt, the Radical*, which appeared in 1866, and dealt with political and religious questions among the lower classes of English society, do much to restore her lost *clientèle*. This, happily, was recovered by the publication, in 1871–72, of *Middlemarch*, a study of English provincial life, which exhibits its author's powers in the maturity of their development. Though inferior, as a story, to *Adam Bede*, there is, in *Middlemarch*, more "delicacy of detail and completeness of finish," as well as greater breadth of life. The work, as the prelude to it hints, is an arraignment of modern society "for the crippling conditions it imposes on men and women, especially women of high ideal enthusiasm." It describes, and with a note of pessimism born of an openly confessed skepticism, "a life of mistakes, the offspring of a certain spiritual grandeur, ill matched with the meanness of opportunity." But, in spite of this, *Middlemarch* is a great though somewhat cheerless novel, relieved by the doings and sayings of an exceptionally noble and high-minded heroine, and by her creator's love of a high moral ideal, made human by a keen sense of humor.

With *Daniel Deronda* (1876) a reaction again set in, owing partly to the increased artificiality of the author's style, and partly to lack of public sympathy with her enthusiasm over certain modern phases of Jewish life and character. There is, of course, in the story, no lack of labor and art, and, occasionally, there are gleams of a fine humor; but the work, as a whole, is heavy and lifeless, and is marred by a too erudite and grandiose manner. Her prose work after the publication of *Daniel Deronda* was limited to a series of essays on various topics, which appeared, in 1879, under the title of *The Impressions of Theophrastus Such*. Besides this, she published some verse, which, if we except the hymn, *O, May I Join the Choir Invisible*, was too heavy and ornate for popular acceptance, though it is distinguished by an occasional subtle thought, and by not a few artistic felicities of expression. The poetical work embraces *The Spanish Gypsy* (1868), a romantic drama; *Agatha* (1869); *The Legend of Jubal* (1874); and *How Lisa Loved the King* (posthumous, in 1883). The poetic side of George Eliot's genius is, however, best seen in the imaginative creations and the delicate finish of her novels. In moral tone, the latter are without a blemish, save for the depressive, skeptical note which mars some of the author's best work. In 1880 George Eliot married John Walter Cross, a London stock-broker and intimate friend, who, after the novelist's death, which occurred in London, Dec. 22, 1880, published a voluminous biography, entitled *George Eliot's Life as Related in Her Letters and Journals*. The work gives a delightful human picture of her quiet domestic life.

G. Mercer Adam.

CROSS, Southern, the most conspicuous constellation of the southern hemisphere. It consists of four bright stars in the shape of a cross. The two brilliant stars which mark the summit and foot of the cross have nearly the same right ascension. The constellation, therefore, is almost perpendicular when passing the meridian, and these two stars act as pointers to the antartic pole.

CROSS. Sir Richard Assheton, Viscount, an English statesman; born in Red-Scar, near Preston, May 20, 1832; studied at Rugby and Cambridge. After having practiced law for several years, he entered Parliament in 1857. In 1868 he defeated Gladstone in a contest for southwest Lancashire, which district he represented permanently. He became home secretary under Disraeli in 1874, which post he held till 1880. Under Salisbury he was appointed to the same office in 1885, and was from 1886–92 secretary for India. In the third Cabinet of Salisbury he served as lord privy seal. He published *Acts Relating to the Settlement and Removal of the Poor*, and *The General and Quarter Sessions of the Peace*. G.A.S.

CROSSBOW. See Arms and Armour, Vol. II, p. 488.

CROSSE, Andrew, electrician; was born at Fyne Court, Somersetshire, England, on June 17, 1784, and was educated at Brasenose College, Oxford. He became interested in electricity, especially in the action of electrical currents upon organic and inorganic substances, and conducted some valuable experiments in the artificial formation of minerals by electrical deposition, and the use of electrical currents in the making and improving of wines and cider. In 1837 he announced that by means of an electrical current he had caused the appearance of living organisms of the genus *Acarus* in solutions of inorganic substances. This announcement was incorrectly interpreted as a declaration that he had actually created living beings out of dead matter, and much ridicule was thereby brought upon him. His actual claim, that he had caused the living things to appear, was correct; but it was of no especial significance. He died on July 6, 1855, and a memoir of him was published in 1857. W.F.J.

CROSSED CHECK, a term peculiar to British banking, signifying a check or draft, across the face of which two parallel lines are drawn, stamped or printed. Sometimes the phrase "& Co." is inserted between them, with room before it for the name of a banking company. When a check is thus crossed, the name of the payee's bankers must be written between the lines, and then the check can be cashed at the bank upon which it is drawn only when presented by or through the banking house whose name is written across it. This system is generally practiced in England, for the sake of security, to prevent the cashing of checks by persons who may have acquired them dishonestly, and it is customary for business concerns, in their advertisements, etc., in giving directions for the remitting of money to them, to direct that checks be "crossed to Messrs. So and So," indicating the bankers through which their business is transacted. The system is not used in America. W.F.J.

CROSS-EXAMINATION is the examination of a witness by the person on the opposite side of the

case from the party who produced the witness, upon the matters concerning which he has testified in his direct examination. In cross-examination the witness may be asked leading questions, and much latitude is permitted to the counsel in asking questions in a manner to suggest the answer expected or desired, especially where the witness appears to be unwilling to disclose anything against the interests of the person calling him. The liberality allowed in cross-examination makes it difficult for a witness to conceal material facts or tell a plausible untruth when examined by a skillful cross-examiner. See EVIDENCE, Vol. VIII, p. 651.

CROSS OF ST. ANDREW. See ANDREW, in these Supplements.

CROTALARIA, a genus of plants of the family *Leguminosæ*, containing numerous species, all natives of warm climates, but cultivated in hot-houses. Many of them have long, straight, slender stems and branches, and some yield valuable fiber, particularly *C. juncea*, the sunn-hemp of India, the fiber of which is now an important article of commerce. *C. sagittalis*, or rattle-box, is a common species of the eastern United States.

CROTON, a large genus of the family *Euphorbiaceæ*, chiefly natives of the tropics, but represented by several species in the United States. Many of the species are valuable on account of their various products, found in the latex and seeds; e.g., *C. Eluteria* of the Bahamas, which yields cascarilla-bark, and *C. tiglium*, of tropical Asia. from whose seeds croton-oil is obtained.

CROTON AQUEDUCT AND DAM. This great work is 38.12 miles long, from Croton Lake to the reservoir in Central Park, New York, 4 miles below the Harlem high bridge; 29.63 miles have been cut through solid rock, or occasionally loose soil; 2.37 miles are pipe-line underground, and 1.12 miles are open trench. The site of the new dam is also on the Croton River, and is built partly of masonry and partly of earthwork. It is 1,200 feet long, 680 feet of which are masonry, and about 160 feet high at the highest portion of the masonry section, the foundation extending about 80 feet below the river bed. The base of the dam reaches a thickness of 185 feet, and the crest 20 feet. The highest portion of the earthwork section is 120 feet above the present ground-level, with an apex 30 feet wide, carrying a roadway 18 feet wide. The excavation for the base of the dam is carried down 125 feet. Water in the Croton River is thus raised 36 feet above the top of the older Croton Dam, and thirty-four billion gallons of water can be stored. The new aqueduct, finished in 1890, is a tunnel of about 14 feet in diameter and over 30 miles in length. It is carried through solid rock at an average depth of 500 feet below the surface. It delivers over three hundred million gallons of water in twenty-four hours. The total cost was over twenty-five million dollars. The water is carried under Harlem River by gravity and siphons. It leads, also, to the reservoir in Central Park, which has a capacity of ten million gallons daily. The cost was over twenty-two million dollars. See AQUEDUCT, Vol. II, p. 194.

CROTON RIVER, New York, about 48 miles long, flows southward from several pure spring-fed lakes in Putnam County, and the south of Dutchess County, and enters the Hudson River at Croton Landing, 36 miles above New York city. Engineering works utilize the river for the metropolitan water supply. C.L.S.

CROUCH, FREDERICK WILLIAM NICHOLLS, an American composer; born in London, England, July 31, 1808. He began his professional career at the Royal Coburg Theatre and later became a violoncellist in the Drury Lane Theatre Orchestra and a member of the Queen's Private Orchestra. In 1840 he removed to the United States and directed musical organizations in New York, Boston, Portland, Washington and Richmond. During the Civil War while living in Charleston he joined the Confederate army and saw active service with the Richmond Grays. His compositions include *Kathleen Mavourneen; O'Donnell's Farewell*, and the *Emigrant's Lament*. In 1896 he composed *Green and Gold* in honor of Robert Emmet's birth. He died in Portland, Maine, August 19, 1896. W.M.C.

CROW–BLACKBIRD. See GRACKLE, Vol. XI, pp. 24, 25.

CROW INDIANS. See INDIANS, AMERICAN, Vol. XII, pp. 871, 874.

CROWE, MRS. CATHERINE (STEVENS), an English authoress; born in Borough Green, Kent, England, in 1800; died in 1876. In 1822 she married Lieutenant-Colonel Crowe of the Royal Army. They made their home in Edinburgh. In 1841 appeared Susan Hopley; in 1843 she published *Men and Women*. These were followed by *Lillie Dawson*, her best novel, (1847); *Night Side of Nature* (1848); *Uncle Tom's Cabin Adapted for Young Persons* (1853); *Irving Lockwood* (1854); *Ghosts and Family Legends* (1858); *Spiritualism and the Age we Live In* (1859); *The Adventures of a Monkey* (1861), etc. Her mind was morbid and despondent, and at one time she had a violent but brief attack of insanity. She wrote supernatural stories, tragedies, juvenile books, and novels.

CROWE, JOSEPH ARCHER, SIR, historian and writer upon art; was born in London, England, on October 30, 1825. He traveled in Italy, met Giovanni Battista Cavalcaselle, returned with him in his exile to London, and wrote in collaboration with him *Early Flemish Painters*; a *History of Painting in Italy*; *Titian*, and *Raphael*. He was a newspaper correspondent in the Crimean War, in the Indian Mutiny, and in the Franco-Austrian War, and for two years, 1857–59, was director of an art school at Bombay. In 1860 he was made British consul at Leipsic, and, in 1882, commercial *attaché* to the British embassy in Paris. Later he rendered various diplomatic services, in Berlin in connection with Samoan affairs, and in Africa. He was made a knight of the Order of the Bath (C. B.) for his services. He died on September 6, 1896. W.F.J.

CROWFOOT, a common name of species of *Ranunculus*, or buttercups, and sometimes extended to the whole family *Ranunculaceæ*. The name refers to the fact that the leaves of many species are

three to five cleft. The flowers are commonly yellow, and more or less showy.

CROWN DEBTS. It is a prerogative of the crown to take precedence of all other creditors, and, in England, to recover its debts by a summary process called *extent*. The rule in Scotland, however, is limited to movable or personal property, and the crown has no privilege over a subject in a competition for heritage.

CROWN LANDS, the demesne lands of the English crown. They are now contracted within narrow limits, having been almost entirely granted to subjects. The superintendence of such property as still belongs to the crown is now vested in commissioners appointed for the purpose, called the commissioners of woods, forests and land revenues.

CROWN PIECE, an English silver coin of the value of five shillings, introduced by Henry VIII. It has a standard weight of 436.56 grains, and in United States money is worth about $1.25. The name *crown* is also used as the translation of the French *écu*, which varied in value from six to three francs.

CROWN POINT, Indiana, the seat of Lake Co., a farming and manufacturing town, 15 miles S. of Lake Michigan, and 38 miles S.E. of Chicago, at a junction of the Chicago & Erie, and the Pennsylvania railroads. Pop., 1900, 2,336. C.L.S.

CROWN POINT, New York, a town of Essex County, on the southern reach of Lake Champlain, and on the Delaware & Hudson railroad, 106 miles N.E. of Albany. Iron and lime deposits are worked in the vicinity. On a projecting point in the lake marked by a lighthouse, are the ruins of Old Crownpoint Fort celebrated in the French and Revolutionary wars. Pop., 1900, 2,112. C.L.S.

CROWN-WORK, in fortification, is formed to strengthen a weak front, or to occupy ground which might facilitate the enemy's operations. See FORTIFICATION, Vol. IX, p. 388.

CROWTHER, SAMUEL ADJAI, the first negro Anglican bishop of Africa; born in Yoruba in 1812. His original name was Adjai. He was captured by Mohammedan slave-traders in 1819, and after having been exchanged and disposed of several times, was freed by a British man-of-war and landed at Sierra Leone in 1822. He was transferred to Bathurst, on the west coast of Africa, capital of British Gambia, where he was converted to Christianity in 1825, and took the name of an English vicar who adopted him. After acting as a missionary he accompanied the first Niger expedition in 1841, and was then sent to the Church Missionary College, London, in 1842; was ordained by the bishop of London, and returned to Africa. He accompanied the second Niger expedition (1854). He entered enthusiastically into his missionary work in the different West African possessions of Britain. He was consecrated bishop of Niger territory, in Canterbury Cathedral, June 29, 1864, in which year he was given the honorary degree of doctor of divinity by Oxford University. In 1880 he was presented, on account of his contributions to geographical knowledge, with a gold watch by the Royal Geographical Society of London. He contributed to the study of African languages by publishing *The Grammar and Vocabulary of the Yoruba Language* (1852); *Iscama-Ibe Primer* (1857); *Nupe Primer* (1860); *A Grammar and Vocabulary of the Nupe Language* (1864). He also wrote a *Journal of an Expedition up the Niger and Tshadda Rivers in 1854* (1855); also mission reports and translations of portions of the Scriptures into the languages of West Africa. Died in Africa Dec. 31, 1891. The life of this remarkable man can be studied in detail in *Good out of Evil: An Authentic Biography of the Rev. S. Crowther* (London, 1852); and *The Slave-Boy Who Became Bishop of the Niger* (London, 1888).

CROZER THEOLOGICAL SEMINARY, THE, a Baptist educational institution, at Upland, Pennsylvania, founded in 1868 by John Price Crozer, a Philadelphia manufacturer and capitalist. It has an endowment fund of $400,000 and is one of the leading seminaries of the Baptist Church in America. There were 11 professors and 63 students at the institution in 1904. W.M.C.

CROZET ISLANDS, several uninhabited islets of volcanic origin in the Indian Ocean southeast of the Cape of Good Hope and midway between Prince Edward Islands and Kerguelen. The largest are Possession, Penguin, East, and Hog the westernmost. The islands are named after a member of the French expedition commanded by Captain Marion which discovered them in 1772. C.L.S.

CRUCIAN CARP (*Cyprinus carassius*), a name applied to the German carp, native of Europe and Asia. It is an excellent food-fish, and is often reared in artificial ponds in the United States.

CRUCIBLES, vessels made of materials capable of being exposed to high temperatures without alteration, and used for fusing substances together, such as the materials for glass-making or metallic ores, with various fluxes to obtain the several metals they yield. Crucibles are generally made of fireclay, porcelain, graphite, iron, platinum, and, for some special operations, of silver.

CRUCIBLE STEEL. See IRON, Vol. XIII, pp. 351–353; and IRON AND STEEL, in these Supplements.

CRUCIFERÆ, an important family of dicotyledonous plants found in all countries. The flowers have a calyx of four sepals, which fall off after flowering; a corolla of four petals, which are placed in the form of a cross, whence the name; usually six unequal (*tetradynamous*) stamens and a simple pod with a false partition. The order includes many important vegetables, as the turnip, cabbage, radish, mustard, cress, etc. It also includes many fragrant flowering and ornamental plants, as the sweet alyssum, candytuft, rocket, etc.

CRUELTY TO ANIMALS, THE AMERICAN SOCIETY FOR THE PREVENTION OF, was organized and incorporated April 10, 1866, being the first society organized in America for the protection of animals, its founder and first president being Henry Bergh (q.v., in these Supplements), to whose noble self-sacrifices and untiring energies the cause of animal protection in this country owes its origin. The

history of the society, therefore, is practically an account of the inception and development of his work of animal protection in America.

In 1862 Mr. Bergh was appointed secretary of legation at St. Petersburg. While in Russia he found himself on several occasions constrained to interfere in cases of atrocious cruelty, and but for his official position he would have been exposed to personal violence. His attention thus was directed to the subject of humanity to the brute creation, and while in London, on his way home in 1865, he made the acquaintance of the Earl of Harrowby, then president of the English Royal Society for the Prevention of Cruelty to Animals, who gave him much valuable information concerning the operations of that society in England. On Mr. Bergh's arrival at home, he found that no similar society existed in this country, and he immediately devoted himself to the establishment of one for the United States. At the outset the proposition met with little encouragement, and without the assistance of the press it probably would have failed. On Feb. 8, 1866, Mr. Bergh delivered a lecture in Clinton Hall, in which he pleaded his cause with such force of argument and such warmth of eloquent conviction that expressions of sympathy and offers of assistance were freely made by persons in attendance. The press lent its powerful aid; the lecture was published, in whole or in part, in all the great cities of the country; public sentiment in favor of Mr. Bergh's movement was aroused, and on April 10, 1866, "The American Society for the Prevention of Cruelty to Animals" was incorporated by the legislature of the state of New York. Among the original charter members of the society were many of the most eminent citizens of the city and state of New York.

On the 19th of April, in the same year, Mr. Bergh secured the passage by the legislature of New York of the first law ever enacted in America for the protection of animals. Within twelve months another "act for the more effectual prevention of cruelty to animals" was passed by the legislature of the same state, and, from time to time, additions have been made to it. The legal definition of the word *animal* now includes every living creature except members of the human race, and the words *torture* and *cruelty* include every act, omission or neglect whereby unjustifiable physical pain, suffering or death is caused or permitted. It is worthy of remark that, in his crusade against the established tolerance of everyday abuses, Mr. Bergh was subjected to unabated opposition, being long the object of contumely and reproach on the part of those whose fancied or actual interests were so unexpectedly invaded. But he had the courage of his convictions and fearlessly adhered to his purpose.

The organization and influence of the American society soon led to the establishment of local societies in all parts of the Union and in other countries, on the American continent and elsewhere. The number of local societies in the United States is now 158, and in other American nations 21 societies have been established since 1866, making a total of 179.

The prevention of cruelty to animals has been the beginning of many other humane organizations. Thus in 1874, the society appeared as prosecutor in a case of cruelty to children, and it then appeared to be advisable to organize a separate society for the prevention of cruelty to children. See CHILDREN, in these Supplements.

The establishment of these and other organizations has found a practical expression in the legislation of nearly every state in the Union. There is now hardly a single state in which cruelty of any kind is not forbidden by the law, under stringent penalties for disobedience.

The practical work is not neglected. The officers of the society are clothed with ample police powers. They wear a distinctive uniform, and patrol the streets by day and by night. They have full power to arrest and prosecute offenders against the laws relating to animals. In addition to the uniformed police, the society has over three hundred special agents in different parts of the state, clothed with the same authority and engaged in enforcing the laws for the prevention of cruelty. In the city of New York the society has ambulances for the removal of injured, sick and disabled animals; appliances for the rescue of drowning animals, and animals which have fallen into excavations, and a patrol-wagon which carries with it the necessary apparatus and medicines for rendering aid to injured animals in the streets.

The official organ of the society is *Our Animal Friends*, a monthly magazine which is devoted to the cause of humanity to all living creatures, and which has an extensive and growing circulation.

The headquarters of the New York society are at 10 East Twenty-second Street, New York.

Similar organizations have sprung up, and are as well conducted, in every American city.

The value of the New York society's work may be gauged by the following table of its operations:

SUMMARY OF OPERATIONS FOR NINE YEARS, 1887–1895.

	1887	1888	1889	1890	1891	1892	1893	1894	1895
Cases prosecuted in the courts	797	991	949	986	1,071	1,080	980	1,010	952
Disabled animals temporarily suspended from labor	3,456	1,749	2,357	4,180	5,725	4,868	3,779	3,596	3,403
Horses, mules and other large animals, disabled past recovery, humanely destroyed	2,546	2,455	2,812	2,284	2,620	3,365	3,384	2,929	2,987
Small animals, homeless or disabled past recovery, humanely destroyed	1,202	1,281	705	1,347	2,212	3,060	4,794	24,275	46,898
Disabled horses and other large animals removed from streets in ambulances	522	495	407	520	578	618	607	513	576
Complaints received and investigated	3,773	3,052	2,793	3,609	6,891	7,301	7,599	13,603	21,690

CRUIKSHANK, GEORGE, one of the most gifted of English pictorial satirists; born in London, Sept. 27, 1792. A publication *The Scourge* (1811–16) afforded scope for the display of his satiric genius, and from that time forth he continued to pursue with remarkable success this, his true vein. But in the exquisite series of colored etchings contributed to the *Humorist* (1819–21), and in the etchings to the *Points of Humor* (1823–24), his true artistic power began to be visible. This second, and in many ways finest, period of his art, represented by these works, culminated in the etchings to *Peter Schlemihl* (1823), and to Grimm's *German Popular Stories* (1824–26), which, in the simple directness and effectiveness of their execution, and in their fertile and unencumbered fancy, rank as the artist's masterpieces. Clark's *Three Courses and a Dessert* (1830) and the plates to Scott's *Demonology and Witchcraft* (1830) may be regarded as the last examples of his earlier and simpler method as an etcher. His numerous plates in *Bentley's Miscellany* mark a third period of his art, in which he aimed at greater elaboration and completeness, introducing more complex effects of chiaroscuro, and frequently attaining great power of tragic design. The finest of these are the great series of plates to Dickens's *Oliver Twist* and Ainsworth's *Jack Sheppard* and *The Tower of London* in *Ainsworth's Magazine.* Among the best productions of his later years are the large and elaborate etchings to Brough's *Life of Sir John Falstaff,* published in 1858. His last illustration was the frontispiece to Mrs. Blewitt's *The Rose and the Lily* (1877), "Designed and etched by George Cruikshank, aged 83, 1875." As a water-colorist, he left work marked by considerable skill and delicacy. In his later years he devoted himself to oil-painting. His most important picture was *Worship of Bacchus* (1862), which has been engraved partly by his own hand, a vigorous and earnest protest against the evils of drunkenness; and to the cause of temperance he also devoted many of his designs, especially the tragic and powerful series of *The Bottle* (1847), which, reproduced by glyphography, attained an immense circulation. Died Feb. 1, 1878.

GEORGE CRUIKSHANK.

CRUISERS. See NAVY, in these Supplements.

CRUMMELL, ALEXANDER, clergyman; was born in New York city about 1820, the son of a negro slave who was the son of a native chief of Timanee, near Sierra Leone. He was educated at an academy in New Hampshire, from which he and other colored students were driven by a mob, and then at Oneida Institute, New York. Afterward he was a student at Cambridge University, England. He sought entrance to the Protestant Episcopal priesthood for some time in vain, the ecclesiastical authorities being unwilling to receive a negro, but finally was ordained a deacon by Bishop Griswold, of New York, and a presbyter by Bishop Lee, of Delaware, the first negro to be thus ordained. He was a missionary to Liberia, and a professor in the university of that republic. Returning to America, he was for more than a third of a century rector of St. Luke's Protestant Episcopal Church in Washington, D. C., and wrote several books, including compilations of sermons and a study of Liberia. He died in Washington on Sept. 10, 1898. W.F.J.

CRUTCHED FRIARS, a monastic order of the Roman Catholic Church, the members of which each carry a staff, upon the top of which is a cross. This staff was called a "crosier," from the French *croix*, a cross, and this name was in turn corrupted into "crutch," whence the common name of the order. W.F.J.

CRUYS OR KRUYS, CORNELIS, naval commander, was of Norwegian ancestry and was born in Holland about 1656. He was an admiral in the Dutch navy, and thus became acquainted with Peter the Great of Russia when the latter was learning naval architecture in Holland, and was by him made one of the chief commanders of the Russian navy. He did much for the naval interests of Russia, but was most ungratefully treated by the Czar at the instigation of jealous Russian officers, and retired to Finland, where he spent the closing years of his life. The blue cross in Russian naval flags is said to have been adopted in his honor. He died in 1727. W.F.J.

CRYOPHORUS. See EVAPORATION, Vol. VIII, p. 641.

CRYPTOGAMS, seedless plants; all forms below the *Spermaphytes*, or "flowering plants." See BOTANY, Vol. IV, pp. 82, 126, 143.

CRYPTOPROCTA, a large fierce carnivorous animal of Madagascar, forming a genus and species by itself—*Cryptoprocta ferox*. It is related to the cats. R.W.C.

CRYPTOSCOPE is the name given (Feb. 8, 1896) by Professor Salvioni of Perugia, Italy, to an instrument for the purpose of more directly examining the effects of the Roentgen rays on opaque bodies. The instrument consists of a cylinder of cardboard, the inner surface of which is coated with a material such as platino-cyanide of barium, which becomes fluorescent under the action of the rays, the lens being at the end of the cylinder. The object to be examined is placed, with its coverings, between a Crookes tube and the cylinder. The outline or shadow of the concealed object is thrown upon the interior fluorescent surface, and thus becomes apparent to the eye of the observer looking through the lens. The device was simultaneously announced on both sides of the Atlantic, slight modifications occurring in the descriptions. E. P. Thompson of New York City invented a similar appliance, which he called the "kinetoskotoscope," its purpose being intended to render visible, motions occurring within the interior of bodies. But the most efficient of all devices of this kind is Thomas A. Edison's FLUOROSCOPE; q.v., in these Supplements.

CRYSTAL FALLS, a village and the capital of Iron County, Michigan, in the central part of the

northern peninsula; on the Mequacumeciemecum River, and on the Chicago and Northwestern railroad. Chief industry, iron mining and working. Population 1900, 3,231.

CRYSTAL FALLS, a series of cascades in Cascade Creek, Montana, which, together, measure 129 feet. They are one mile from the mouth of the creek, where it flows into the Yellowstone River.

CRYSTALLINE ROCKS, a name given to all rocks having a crystalline structure. The crystalline texture may be either original or superinduced. Thus, most crystalline rocks, such as certain calcareous masses, owe their origin to chemical precipitation from water, while others, again, such as lavas, have been consolidated from a state of igneous fusion. There is another large class of crystalline rocks, the crystalline granules, some of which present a remarkable foliate character—that is, they are arranged in more or less parallel layers. This peculiar structure appears to have been superinduced—the original rocks having been either fragmental or crystalline, or both—and the result of great heat and pressure.

CRYSTALLOMANCY, a mode of divination by means of transparent bodies, at one time very popular. A precious stone, crystal globe, or other transparent object, was employed; but a beryl was deemed most effective. In using it, the operator first muttered over it certain formulas of prayer, and then gave it into the hands of a youth or virgin, who beheld in it the information required.

CSABA OR BEKES-CSABA, Hungary, a town of modern growth in Bekes County, 38 miles by rail northwest of Arad. In a productive plain region, it has a large agricultural trade and some manufactures. Population, 37,547. C.L.S.

CSANAD, a town of eastern Hungary, capital of the county of Csanad, 44 miles N. of Temesvar, on the Maros. It is the see of a bishop. Population, about 5,710. The county, which has an area of about 700 square miles, has a population of over 140,000.

CSAT OR CSATH, a town of central Hungary, in the county of Borsod, 13 miles from Miskolez. Population, 5,000.

CSONGRAD, a town of central Hungary, in the county of the same name, at the confluence of the Theiss and the Koros, 70 miles S.E. of Budapest. Population, 29,298. The county of Csongrad is mostly marshy plain, unhealthful, but very fertile. Grain, hemp, fruits and tobacco are the chief products. Area of county, 1,313 square miles; population, 132,053.

CTENOID FISHES, an order of fishes, recognized by Agassiz, which were characterized by scales notched in a comb-like fashion. The name now is used to designate this form of scale, but the order is obsolete.

CTENOPHORA. See ACTINOZOA, Vol. I, pp. 120, 121.

CUANZA, COANZA, KUANZA OR KWANZA, Portuguese West Africa, a navigable river of Angola (q. v.) flowing into the Atlantic S. of St. Paul de Loando after a N.W. course of 800 miles from Lake Mussumbo. C.L.S.

CUAUHTEMOTZIN, the thirteenth and last Mexican king; born in 1495, ascended the Mexican throne in 1521, and surrendered, with the City of Mexico, to Cortes, in August of the same year. He was subjected to torture in a vain attempt to induce him to disclose the hiding-place of his treasures, and, after being kept in confinement three years, was executed. An elaborate monument surmounted by his statue was erected to his memory in the City of Mexico in 1887. See CORTES, Vol. VI, p. 391.

CUAUTLA, Mexico, a town of the state of Morelos, 46 miles S.E. of Mexico City, on the Interoceanic railway. CUAUTLA-AMILPAS, a southeastern suburb, was renamed CIUDAD MORELOS in honor of its successful defence by General Morelos (q. v.). Population, 6,296. C.L.S.

*CUBA, one of the West India islands, late a crown colony of Spain. For its general history, description, products, and industries, see CUBA, Vol. VI, p. 599. The island is under a governor-general, assisted by a council of administration representing the United States, which is in military occupation of the island.

As a result of the revolutionary struggle in the island, all industrial and commercial activity has been temporarily paralyzed. The island ("Pearl of the Antilles") is one of the best endowed by nature. Ten per cent of the area has been under cultivation, about seven per cent is unreclaimed, and four per cent under forest. The population in 1900 was 1,572,797. The foreign whites number 142,218. They are of mixed race. Slavery was abolished absolutely by law in 1886. Education was made obligatory in 1880.

Finances.—The total revenue for the year 1907–8 was $25,466,325, and the expenditure $23,309,539. The customs receipts were $23,046,000. The imports of 1906 were $99,539,661, and the exports $108,909,667. The imports into the United States amounted in 1907 to $97,441,690, and the exports to Cuba $49,305,274.

The value of the 90,000 landed estates, in 1892, was 220,000,000 pesos, and the rental 17,000,000 pesos. The live-stock consisted of nearly 600,000 horses and mules, nearly 2,500,000 cattle, 78,000 sheep and 570,000 pigs. The annual yield of sugar averaged nearly 1,000,000 tons, of which the greater part is exported to the United States. More than 240,000 bales of tobacco were exported, and the number of cigars exported exceeded 1,500,000, the number of cigarettes exported being almost 40,000,000 packages. Two thirds of the tobacco and one half of the cigars were exported to the United States. Other exports are rum, mahogany, honey, wax and fruits. The value of the total exports was upward of 89,000,000 pesos, the imports being 56,000,000 pesos, chiefly from Spain, the United States and Great Britain. The chief imports are rice, jerked beef and flour.

The mines are located chiefly in the district of Santiago de Cuba, their extent being 13,727 hectares. In Cuba (1906) there were 1,774 miles of railway and 3,450 miles of telegraph lines.

The reciprocity treaty entered into between the

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United States and Spanish governments in regard to the latter's late colony of Cuba and the former was cancelled by Spain, Sept. 3, 1894.

This island, called the "Pearl of the Antilles," and also the "Ever-Faithful Island," commanded universal attention on account of its struggle for independence. Discontent was long rife under the oppressive and exacting rule of the Spanish government, which was accused of enforcing the payment of exorbitant taxes to replenish a depleted treasury at home. The struggle of the Cuban insurgents was conducted stubbornly. Before it commenced, there were three parties in the island. One of these was the constitutional party, consisting chiefly of Spanish residents, who favored Spanish monopoly; another party was the autonomists, mostly of native Cuban extraction, who advocated home rule, which party was favored by the Spanish Minister for the Colonies, Señor Maura; the other party was the separatists, who declared for entire independence. This last party, then in the minority, attracted to its side and to the standard of "Free Cuba" the most enlightened Cubans in the island and in America. The practical people of the United States were not slow to express their sympathy with the insurgents. The matter was discussed for three months, from January to April, 1896, in Congress, by both Houses. Sympathy for the Cubans was strong. The result of these debates was, that, April 6, 1896, both Houses adopted the original resolution of the Senate, of February 28th, recommending the recognition of the belligerency of the Cubans, and that the friendly offices of the President should be offered to Spain for the recognition of the independence of Cuba. The resolution had a demonstrative effect in Spain. Popular indignation took the form of riots and of attacks on United States legations. The Spanish government did all in its power to counteract these unruly proceedings, and took no official notice of the resolutions of the American Congress. They waited for a communication from the President. It was stated in Madrid, however, that on the recognition of Cuban belligerency by the United States a memorandum of formal protest would be prepared and sent to all the European powers. President Cleveland, however, declined to take action on the joint resolution, but on April 18, 1896, he sent to the Spanish minister at Washington a message making a friendly offer of mediation on the basis of the granting of reforms and some measure of autonomy. On July 30, 1896, he issued a proclamation warning citizens against violating the neutrality laws.

Public recognition of the Cuban question also occurred at the national political conventions of the Republicans and Democrats, at St. Louis and Chicago, in June and July, 1896. At the former a recommendation was incorporated, expressing sympathy with the Cubans, hopes for their success, and a belief that the United States government "should actively use its influence and good offices to restore peace and give independence to the island." The Democrats extended their sympathy for the insurgents "in their heroic struggle."

The history of the present revolutionary movement in Cuba dates previously to 1893, but in that year the first premonitory symptoms of the present struggle appeared. Rumors of filibustering were rife, and from April to May an incipient revolt was made, and a state of martial law was proclaimed; but the revolt was "snuffed out," the leaders, the Sartorius brothers, surrendering. In the meantime the home government seemed to have come to the conclusion that some concession to the Cubans was necessary, and a scheme of home rule was considered in December, 1894. The "home rule" was to consist of a council, with its seat in Havana, to be composed of twenty-seven members, twelve to be chosen by the government and other government officials, and fifteen by the people. This body was to have control of the budget and to deal with local affairs generally. While this measure was pending in the Spanish Cortes, the revolt received a fresh impetus in the island. In February, 1895, Captain-General Calleja proclaimed martial law in Santiago and Matanzas provinces; and on April 13th the arrival was hailed of José Julián Martí, nominated by the revolutionary junta as secretary-general of the provisional government, and of General Maximo Gomez, who was to take chief command of the revolutionary forces.

The government forces in the island consisted of 9,000 regulars, most of whom were stationed in the western military district, that is, Havana; and the remainder in the eastern district, Santiago. Reinforcements of 4,200 recruits speedily arrived. The civil and military authorities soon reported to the home government that the trouble was at an end, and they kept on so reporting, while the home government was compelled to send constant reinforcements and also to change generals. Marshal Martinez de Campos, in the Senate, March, 1895, reported all danger as past, but recommended that reinforcements be forwarded, as demanded, direct to Santiago, to take the field at once on arrival. It was decided, early in the same month, to send General Campos with strong reinforcements to Cuba; and he speedily embarked with 12,000 additional troops; while two gunboats and a cruiser were also ordered to proceed to the distressful island. The marshal took with him 10,000,000 pesetas in his military chest. The cause of this decision was the defeat of the Spanish troops at Campochulos, which was followed by the resignation of Captain-General Calleja, March 28th. Three days later Antonio and José Maceo, Flor Crombet, Valdes, Dr. Frank Agramonte, and 20 other officers arrived from Costa Rica with an expedition equipped with rifles and cannon, and landed at Duaba, near the eastern extremity of the island. The rebel forces were reported to consist of 7,000 men.

Engagements took place between the Spanish and insurgents, with varying success. April 10th. at Palmarito, Flor Crombet, Cobrero, and Borona, insurgent leaders, were killed. Maceo, who com-

manded the insurgents, escaped through the woods. The insurgents were not dismayed, but proceeded to declare the independence of the island, and to frame a new constitution, April 11, 1895.

Marshal Campos landed at Guantanamo, April 16th, and reports of Spanish victories followed, but these were denied stoutly by insurgent sympathizers. In the middle of April, General Maximo Gomez, with other insurgent leaders, effected a landing in Cuba, being provided with $50,000 in American gold coin. April 14th, the official Spanish report of the battle of Palmarito announced the death of General José Maceo, which was untrue. In the mean time reinforcements were constantly being forwarded from Spain. The troops sent out were mostly young men of about twenty years of age, and raw and unsuitable for such rough warfare.

In May the insurgents determined to extend their operations westward, from Santiago as a base. May 7th, they had more men, more arms and more supplies of every kind than they had had at any time previously. May 12th, there was reported a battle at Jovito, near Guantanamo, in which Colonel Bosch, the Spanish commander, was killed. The insurgents were under the leadership of Maceo. May 20th, another severe engagement took place near Dos Rios, in which José Marti was killed and Gomez wounded. The town of Cristo had been captured and looted by the Cubans, May 16th.

In June, Campos, was compelled to ask for more men and munitions. The home government immediately authorized the raising of 600,000,000 pesetas in case of need, and, if required, the dispatch of 40,000 men, in addition to the 10,000 already in the island.

During June the revolt spread rapidly; loyalist guerrilla bands went over to the Cubans; Canasima, a town near Matanzas, was fired June 10th, and the city of Cienfuegos, in the administrative district of Santa Clara, and the town of Soledad, in the province of Puerto Principe, were, June 22d, in a state of revolt. The insurgent troops numbered, according to Spanish figures, over 20,000 men. At a meeting of the Spanish Cabinet, held at Madrid, June 27th, Señor Canovas del Castillo, Prime Minister, read a dispatch from General Campos, requesting 14,000 fresh troops. The number of troops in the island at the outbreak of the war, including the reinforcements which had subsequently been sent, amounted to 50,000, or, as the Spanish figures admit, over 40,000. The expense to the Spanish government of the war from March 1 to July 1, 1895, was $9,000,000; and after that date it was not less than $4,000,000 a month.

An instance of the inability of the Spanish generals to cope with the Cubans occurred at the battle of Bayamo, July 13th, in which General Santocildes was killed and General Campos narrowly escaped capture by General Maceo. This was a bloody and fierce battle, in which the Cubans showed themselves worthy of the cause of liberty for which they fought. The memory of the battle will survive in their annals as a heroic and desperate, but successful, combat against the traditionary might from which they were determined to be free. By August, Marshal Campos had again to seek fresh men. He received 30,000 more, making the total number of men sent to Cuba over 84,000.

In the beginning of Aug., 1895, General Bartolomé Masso was proclaimed President by the revolutionary forces of the eastern and central provinces, in succession to José Marti, slain May 20th at Dos Rios. The meeting of delegates at Najasas proclaimed a Cuban republic, consisting of five states, and drafted a provisional constitution. General Antonio Masso was designated commander-in-chief of the Cuban army; Señor Gonzalo de Quesada, Secretary of Foreign Relations, with residence in the United States; and the Marquis de Santa Lucia, Minister of the Interior.

General Lopez was appointed by the Spanish government governor-general of Cuba, in order to relieve General Campos from this administrative burden. At the close of August the insurrection was spreading, and the insurgent chiefs were levying taxes on the planters. On the last day of August the insurgents inflicted a severe defeat on the Spanish troops near Ramon de las Yaguas, José Maceo commanding. Each force was about equal as to numbers.

Early in Sept., 1895, 13,000 additional troops were landed in the island. A petition was presented about this time, through General Campos, to the Spanish government, praying for self-government to be granted to Cuba, and representing that this would cause most of the insurgents to submit at once. In the beginning of October the insurgent army amounted to 30,000 men, and was in two divisions, the western occupying the province of Puerto Principe, under General Gomez, the eastern being under General Maceo. The total available troops under the Spanish general, out of 70,000, were only about the same number, 30,000. In Oct., 1895, the Spanish government was negotiating a loan of 75,000,000 francs in Paris.

The Cubans appointed, early in October, a permanent government, and adopted a constitution. The President was Salvador Cisneros; Secretary of War, Carlos Roloff; general-in-chief, Maximo Gomez, and his lieutenant-general, Antonio Maceo. The constitution authorized the vesting of the executive and deliberative functions in the President and the Cabinet. The Cabinet was to consist of four secretaries, who, with the President and Vice-President, were to constitute the ministerial council. No provision as yet was made for a representative government; the judicial department was to be kept apart from the other divisions of government.

In this month the insurgents used dynamite to bombard railroad trains, etc., and continued its use. Baracoa, an important port on the northern extremity of the island, was blown up by the Cubans, October 10th. On Nov. 18–19, 1895, a bloody battle was fought at Taguasco, province of Santa Clara, in which the Spaniards, under General Campos, were defeated by the Cubans, under Generals Gomez and Maceo. As a result of this, 30,000 new troops were dispatched from Cadiz, under General Pando, a former governor of the island, who became lieutenant to General Campos. Pando was known to the Cubans as a harsh ruler. In Dec.,

1895, the Cubans, though at first unsuccessful, at length inflicted a series of defeats on the Spanish troops. During that month the insurgents had invaded the province of Havana; but their projected attack on the capital was prevented. However, in the beginning of 1896 they had fixed the center of their operations at Guanajay, within 45 miles of Havana itself, and Marshal Campos declared martial law in the province. At this time more than half the island, including the provinces of Santiago de Cuba, Puerto Principe and half of Santa Ciara, was in possession of the Cubans. The Cubans now carried out the order of July 10th for the destruction of the sugar crop, which the Spanish government proposed to give as security to the French for the new loan.

To secure the coast from the chance of the landing of filibusters and supplies, the naval strength was increased materially. By the middle of January it was estimated that one third of the cane crop had been burned, and grinding ceased. The tobacco crop shared the same fate. Railway traffic was stopped by destroying the cars and engines in the province of Havana. On Jan. 17, 1896, General Campos was recalled to Spain, at his own request, and his place was taken by General Valeriano Weyler, whose reputation for ferocity was a by-word in Cuba. He arrived at Havana, Feb. 10, 1896, and on Feb. 17th issued a proclamation establishing martial law of the sternest sort.

General Weyler's presence in Cuba was evidenced by the reports that reached the United States, and his stringent treatment of American citizens and journalists, which went as far as arrest and imprisonment, provoked the protest of the United States consul, General Ramon O. Williams. In March, Gomez was heard of as ravaging the province of Havana, close to the capital. March 8th, 18,000 additional troops arrived from Spain. The regular insurgent army was estimated to be about 60,000 at this time, of which 43,000 were in the field. About two thirds were well mounted, and about half well armed; the others had shotguns, revolvers, or only the machete, and the latter weapon achieved a fame of its own in this war. It is the implement used by the sugar-planters for cutting the cane. It deals a terrible wound, and the Cubans used it most effectively. The great difficulty with the Cubans is their lack of ammunition. They are able to meet the enemy with only six or eight rounds, hence they have to do their effective work at once, and then retire. Telegraph wire cut in small pieces and wound into balls is used in place of bullets. The only artillery is that captured from the Spanish troops. The chief arm of the Cubans is their splendid cavalry, mounted by seasoned horsemen, whose chief weapon is the terrible machete.

On March 22d, Gomez captured the city of Santa Clara, which he refrained from plundering, but took a large amount of military supplies. He held it only long enough to effect this purpose.

Early in the summer, reports came of the ravages of yellow fever, which made havoc among the susceptible Spanish troops. The result was that the latter deserted in numbers, while the officers petitioned to return home. Under such conditions it is impossible for Spain to subdue the revolt. The insurgents have possession of those sections of the country impenetrable and unknown to the Spanish surveyors.

About April 1, 1896, General Gomez camped between two Spanish columns, and sent a message to each of the Spanish generals that he was there to fight him. He then quietly slipped away; and the two columns, advancing, opened fire upon each other, and did not discover their mistake until some on both sides had been killed.

One of the bloodiest encounters of the war occurred April 14th, at La Chuza, in Pinar del Rio province, 15 miles W. of the trocha (the fortified line of 22 miles crossing the island near Havana). As usual the accounts differed as to the numbers engaged, killed and wounded on either side, but the Spanish troops were driven to the coast, where they were relieved by a warship, which opened fire upon the insurgents. In the beginning of May the Cubans were attacked at one of Maceo's forts, in Pinar del Rio, at Cacarajicara, by General Suarez Ynclan, who had to retreat with considerable loss. On May 6th, the town of Punta Brava, near Havana, fell into the hands of the Cubans after a ten minutes' fight. In the early part of June, Maceo, with a force of 2,500 men, broke through the trocha. It was alleged that in this force were four companies of Cuban women, who, furious to revenge the wrongs they had suffered from the Spaniards, could hardly be restrained from rushing relentlessly upon their wounded foes. Operations then generally ceased on account of the season.

Up to April 15, 1896, the loss occasioned by the burning of sugar plantations was estimated at $4,500,000, and of tobacco (in bales) at $1,000,000. The exportation of leaf tobacco was prohibited, except so far as existing contracts were concerned.

The *Competitor*, a swift schooner, with a cargo of munitions for the Cubans, and with some Cubans and other passengers on board, was captured, April 25th, by a Spanish gunboat, off the northern coast of Pinar del Rio. On board were two Americans and an Englishman, and on May 9th, it was announced that among others they had been condemned to death. Such a storm of indignation and remonstrance arose in the United States and Britain over this affair that a new trial for the prisoners was ordered from Madrid. Other filibustering expeditions included the *Laurada*, *The Three Friends*, *City of Richmond*, *Bermuda* and *Horsa*. The *Laurada* landed her cargo, and *The Three Friends* was successful in her first trip in May, but was captured by the United States cutter *Winona* in June, the latter at the same time capturing the *City of Richmond*. The resulting examinations freed the captain and passengers of both. A similar result was reached in regard to the *Bermuda;* but in the case of the *Horsa* it was decided that she had violated the neutrality laws and the captain was sentenced to an imprisonment of 16 months. On April 13 General Fitzhugh Lee was appointed by President Cleveland United States consul at Havana, in succession to Ramon O. Williams.

In May, 1896, two New York journalists were expelled from the island; and on June 3d an artist of *Harper's Weekly* was imprisoned in Morro Castle, but was released on the American consul producing evidence of the prisoner's American citizenship. Rev. A. J. Diaz was also expelled for alleged abetment of the rebellion, a charge that was not believed by those who were acquainted with the missionary.

On September 15th Colonel Aguelera, with a few followers, while retreating from an insurgent band, attacked a household containing 25 persons, mostly women and children, the latter between one and ten years old. "The children were first pierced with the end of the bayonet, then finished with the machete." Nineteen were butchered and six made their escape. It is said that the colonel and his soldiers boasted of what they had done. Again, near Cuzzo, the same officer came to a house where were three children. The parents were absent, gathering wood for a fire to make breakfast. The colonel ordered the children, between 10 and 14 years of age, to be locked up in the house, after which he ordered his men to set fire to the house. The soldiers at first refused, but under threats of the colonel they were forced to obey. The Spanish papers have been full of "the brave deeds" of this officer, and he was recommended for "suitable recognition." On September 22d news reached the United States of the intended deporting from Havana of 93 political prisoners to the Isle of Pines. On their way to Batabano they were all shot down in a palm grove near Bejucale. Their bodies were afterward horribly mutilated with machetes.

The Cuban forces continued active operations, and harassed the Spanish troops, without, however, achieving decisive results. In July, indeed, small bands reached the outskirts of Havana and created great consternation among its residents. Conflicting claims by both sides made it difficult to decide with whom success lay in the various skirmishes, and charges and countercharges of barbarities in warfare were made by Spaniards and Cubans alike. The nature of the war between the Spanish troops and the insurgents is well set forth by President Cleveland, in his message to Congress of Dec. 7, 1896. In this document he says:

"The insurrection in Cuba still continues with all its perplexities. It is difficult to perceive that any progress has thus far been made toward the pacification of the island. . . . If Spain still holds Havana and the seaports and all the considerable towns, the insurgents still roam at will over at least two-thirds of the inland country." [With the exception of Spanish government] "in the large towns and their immediate suburbs . . . the entire country is either given over to anarchy or is subject to the military occupation of one or the other party. . . . Were the Spanish armies able to meet their antagonists in the open, or in pitched battle, prompt and decisive results might be looked for, and the immense superiority of the Spanish forces in numbers, discipline, and equipment could hardly fail to tell greatly to their advantage. But they are called on to face a foe that shuns general engagements, that can choose and does choose its own ground, that from the nature of the country is visible or invisible at pleasure, and that fights only from ambuscade and when all the advantages of position and numbers are on its side. In a country where all that is indispensable to life, in the way of food, clothing, and shelter, is so easily obtainable, especially by those born and bred on the soil, it is obvious that there is hardly a limit to the time during which hostilities of this sort may be prolonged. Meanwhile, as in all cases of protracted civil strife, the passions of the combatants grow more and more inflamed, and excesses on both sides become more frequent and more deplorable. They are also participated in by bands of marauders, who, now in the name of one party and now in the name of the other, as may best suit the occasion, harry the country at will, and plunder its wretched inhabitants for their own advantage. . . . The Spanish government . . . is acting upon the same theory as the insurgents, namely, that the exigencies of the contest require the wholesale annihilation of property, that it may not prove of use and advantage to the enemy."

In July and September the *Three Friends* succeeded in landing important cargoes of war material for the insurgents, but several members of the expedition were captured by the Spaniards and shot. On July 30th President Cleveland issued a proclamation warning American citizens against breaches of neutrality. Daring and successful attacks by Generals Antonio Maceo and Calixto Garcia so exasperated the Spaniards, both in Cuba and in Spain, that General Weyler was driven to make a show of personal activity, and he took the field; but his so-called campaign resulted in nothing. The Cubans made a raid into Guanabacoa, two miles from Havana, on December 1st, and it seemed as though their boldness might be crowned with success, but the killing of Antonio Maceo (who was ambushed), on Dec. 7th, was a great blow to the insurgent cause. Filibustering still continued, and United States cruisers were occupied in watching and chasing suspected vessels, carrying out the government's principles of fidelity to its declared neutrality with an activity which was more laudable than it was welcome to American sympathizers with the Cuban cause.

Meanwhile, the condition of the island grew rapidly worse, trade being practically annihilated, and the people steeped in misery. In the United States popular feeling against Spanish misrule and the destruction of American interests grew apace, and the government of Spain became anxious concerning the prospects of American intervention. The annual message of President Cleveland in December carefully discussed the situation, and presented for consideration by Congress the difficulties attending the recognition of belligerency or independence, and the questions of armed intervention or the purchase of the island. It also suggested a policy of home rule for Cuba, supported by a guarantee by the United States to the insurgents of the good faith of Spain in carrying out such a scheme. Congress eagerly took up the questions, but practical results were somewhat hindered by side issues of conflict of authority between the President and Congress.

The year 1897 opened with continued Cuban activity and some successes, notably the destruction of

Map of
CUBA,
With General Map of
THE WEST INDIES.
Submarine Telegraph Lines:
Railroads:
SCALE OF MILES
KILOMETERS
Longitude West from Greenwich
GULF OF MEXICO
Straits of Florida
ATLANTIC OCEAN
CARIBBEAN SEA
Havana (La Habana)
Matanzas
Cardenas
Pinar del Rio
Isle of Pines (Isla de Pinos)
Cienfuegos
Santa Clara
Trinidad
Puerto Principe
Holguin
Manzanillo
Santiago de Cuba
Guantanamo
Baracoa
Cabo Maisi
Cabo Cruz
Golfo de Guacanabo
Canal Viejo de Bahama
Nicholas Channel
Santarem Channel
Sal Cay Bank
JAMAICA (British)
Kingston
Spanish Town
Montego Bay
Port Antonio
General Map of the
WEST INDIES.
SCALE OF MILES.
KILOMETERS.
GREATER ANTILLES
LESSER ANTILLES
HAITI
SANTO DOMINGO
PORTO RICO (To U.S.)
San Juan
SOUTH AMERICA
CENTRAL AMERICA
HONDURAS
NICARAGUA
COSTA RICA
COLOMBIA
VENEZUELA
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the Spanish gunboat *Relampago*, by a torpedo in the Rio Cauto. In January General Weyler narrowly escaped capture, through the failure of a well-laid plan to entrap him; but in March the Cuban general, Juan Ruis Rivera, was surprised, wounded, and taken prisoner. The use of dynamite by the insurgents wrought much destruction, and caused great demoralization among the Spanish troops.

On the 4th of February the queen regent promulgated, and on the 20th of April decreed, a scheme of reform for the government of Cuba, granting many features of home rule, but reserving much arbitrary power in the hands of the governor-general and the home government. On the prospect of a demand by the United States government for the release of Julio Sanguily, an American citizen charged with conspiracy and sentenced to imprisonment for life, the Spanish authorities granted his discharge on his waiver of the right of appeal.

Despite repeated successes of the insurgents, and the fact that they were in virtual control of a large part of the island, General Weyler reported to his home government that he had effected a pacification of the island. But his idea of pacification was simply the substitution of starvation for military force,—a policy which he proceeded to carry out by means of his infamous order of "reconcentration." This scheme involved the massing of the country people within certain defined areas, where close guard could be kept upon them. The *pacificos* thus affected were gathered into huge camps; their lands were laid waste, and their property was destroyed, so that no sustenance should be left in the country for the insurgents. Thus shut up, with scant supplies and no resources, these peaceful inhabitants were left to rot by starvation and disease until the horrors became too much for even Spanish ears to bear. In the United States the reports from consuls and others aroused public feeling to a high tension, and the proposition in Congress (suggested by the President) to appropriate a relief fund for the alleviation of this suffering led to urgent calls for intervention in any practicable form.

On the 20th of May the United States Senate passed a resolution recognizing the belligerency of the insurgents; but the measure was never acted on by the House of Representatives. Watchful activity in both Houses for American interests continued, and the country manifested its keen interest in the Cuban situation, and a growing impatience.

The capture of the town of Victoria de las Tunas by General Garcia in the early autumn was marked by heavy slaughter of the defeated Spaniards, especially of the guerrilla troops, and public resentment against General Weyler was so aroused in Spain for his loss of a place reported by him to be impregnable that the Spanish government recalled him, and appointed Marshal Blanco to fill the vacancy. The scheme of Cuban autonomy was also put in force about this time; but the insurgent provisional government pursued its own course, and held an election of a president and cabinet for the inchoate Cuban Republic. The plan of autonomy met with little success; the Cubans, now so near their goal of independence, manifesting no interest in its adoption, and even making a formal protest against its establishment.

Meanwhile want and disease ravaged the island, sparing neither the wretched *reconcentrados* nor the raw and unacclimated Spanish levies. Marshal Blanco took steps to ameliorate the condition of the *pacificos*, and issued a proclamation of amnesty to those charged with rebellion. The aid of the International Red Cross Society was invoked for the relief of the suffering, and the accumulating stories of misery aroused not only American generosity, but also a longing to put an end, once for all, to such horrors.

On the 21st of November an adventurous band of Cubans raided Casa Blanca, opposite Havana, and actually saluted the new governor-general in his palace with a volley of rifle-balls.

The year 1898 found the Cubans still bent on gaining their independence by force of arms, despite Governor Blanco's friendly overtures. A Spanish colonel, Joaquin Ruiz, going on a mission to his personal friend, Gen. Nestor Aranguren, of the Cuban army, to attempt to win him to the cause of home rule, was executed by Aranguren, in pursuance of strict military orders and of an oath to put to death all who ventured to broach the subject of autonomy to the patriots. A month later Aranguren was himself entrapped and slain by a Spanish force sent for the special purpose of avenging the death of Ruiz.

With a view to ascertaining whether the reported horrors of reconcentration were facts or merely sensational stories, Senators Proctor, Gallinger, and Thurston visited the island and personally investigated the camps of the *pacificos*. On their return to the United States they addressed the Senate in powerful language and recounted stories of horror that still further keyed up the American people to a high pitch of nervous and wrathful excitement, which found partial vent in an outpouring of pecuniary and substantial aid for the victims of Weyler's inhuman policy. This aid was distributed by the Red Cross Society and other agencies, despite vexatious obstacles thrown in their way by Spanish officials.

Senator Proctor may be quoted in part as follows: "Outside Havana all . . . is disolation and distress, misery and starvation. Every town and village is surrounded by a trocha, a sort of rifle-pit, with a barbed-wire fence on the outer side of the trench, and at frequent intervals small blockhouses . . . loopholed for musketry, and with a guard of from two to ten soldiers in each. Their huts, usually crowded together, have no floor and no furniture." The people "wear but little clothing; . . . the commonest sanitary provisions are impossible. . . . Torn from their homes, with foul earth, foul air, foul water, and foul food or none, what wonder that one-half have died, and that one-quarter of the living are so diseased that they cannot be saved. A form of dropsy is a common disorder. . . . Little children are still walking about with arms and chest terribly emaciated, eyes swollen, and abdomen bloated to three times the natural size. . . . These cases are hopeless."

In Havana much irritation against Americans was manifested by the turbulent Volunteers, and it became necessary for Gov. Blanco to guard the United States consulate. With the avowed object of reëstab-

lishing friendly and social relations between the two governments, the United States battleship *Maine* was ordered to Havana, and she proceeded thither on the 24th of January. On the 15th of February a terrific explosion blew the ship into fragments, and 266 of her crew were killed. (For particulars of this incident and its far-reaching results, see the articles, HAVANA; "MAINE" (THE); UNITED STATES, in these Supplements.)

On the 9th of April Consul-General Lee quitted Havana, and American residents and others sought refuge in the United States and elsewhere from the coming storm of battle. American relief for the reconcentrados was still distributed among the sufferers, but on the 22d of April the blockade of Cuban ports by American ships was begun, and the island was virtually sealed up. The war which followed (see UNITED STATES, in these Supplements), resulted in the relinquishment by Spain of all claim of sovereignty over the island of Cuba, with a provision for its occupation by the United States pending the pacification of the island and the establishment of a stable government. A commission, consisting of Generals James F. Wade and Matthew C. Butler, and Admiral W. T. Sampson, was appointed by the President, on August 16, to arrange the details of evacution with a similar Spanish commission. At noon on the 1st of January, 1899, the Spanish flag was hauled down at Havana and was replaced by the Stars and Stripes, formal possession being given to the American authorities by the representatives of the former great Power that had held the island of Cuba almost uninterruptedly for over four hundred years.

In anticipation of the cession of the island according to treaty, the President, on the 13th of Dec., 1898, appointed Maj.-Gen. John R. Brooke governor-general of Cuba, a position similar in its scope to that of the former captains-general. The island had been divided into seven military departments each under command of an army officer, responsible to the governor-general of the island. General Brooke was assisted by a cabinet of four members, the incumbents of which were Cubans. In the autumn of 1899 Major-General J. R. Brooke retired from the governor-generalship of the island and was succeeded by Major-General Leonard Wood.

During the American occupation of Cuba, order was restored, important public enterprises were carried on, taxation reduced, the death rate lessened by sanitary precautions and the people admitted, as far as practicable, to a share in the local government.

In June, 1900, the Cubans elected delegates to a convention at Havana (Nov. 9), to frame a constitution for self-government. After a session of eight months, the Republic of Cuba was inaugurated, May 20, 1902, the American governor-general Wood retiring that day.

The officers of the new republic were as follows: President, Tomas Estrada Palma; Vice-President, Luis Estevezy Romero.

CABINET: Secretary of State and Justice, Carlos De Zaldo; Secretary of the Interior, Luis Yero Buduen; Secretary of Public Instruction, Leopoldo Cancio; Secretary of Public Works and Acting Secretary of Agriculture, Luciano Diaz; Secretary of the Treasury, Jose M. Garcia Montes. By the treaty of July 2, 1903 Cuba ceded to the United States coaling stations in the Bay of Guantánama and Bahia Honda, and December 27, 1903, entered a reciprocal commercial agreement.

In 1906, an insurrection broke out against President Palma who resigned on September 28. In order to restore order and to protect the life and property of American citizens, President Roosevelt sent 6,000 troops to Cuba, and also Secretary of War, Mr. W. Taft, as Peace Commissioner. He was succeeded on October 13, by C. Magoon. The latter will be at the head of the provisional Government till a regular Cuban government is formed again.

The estimated population in 1907 was 1,955,884. Havana had (1902) 262,395 inhabitants.

CUCUTA OR SAN JOSÉ DE CUCUTA, a city of northwestern Colombia, in the department of Santander, lat. 7° 50′ N., near the Venezuelan boundary. In the neighborhood are raised great quantities of sugar, panelu, cacao, tobacco and rice. Pop. 10,000.

CUDBEAR. See ARCHIL, Vol. II, p. 381.

CUDLIP, MRS. PENDER HODGE, better known by her maiden name of Annie Thomas; was born at Aldborough, Suffolk, England, and was married in 1867 to the Rev. P. H. Cudlip. Among her best known works are *Theo Leigh; A Passion in Tatters; He Cometh Not, She Said*, and *Allerton Towers*. She has written more than 100 novels and stories. W.F.J.

CUDWEED, a popular name of many species of plants belonging to the natural order *Compositæ*, whose stems and leaves are more or less covered with a whitish, cottony down. They may be kept a long time without undergoing much apparent change, and may therefore be reckoned among everlasting flowers. The common cudweeds of the United States are species of *Gnaphalium*.

CUERNAVACA, Mexico, the capital of the state of Morelos, on the Mexico railroad, 36 miles S.W. of Mexico City. It was the native Cuanhuahuac, and is picturesquely built on the mountain slopes of a valley; in the vicinity are Aztec remains, and the court-house was the winter palace of Cortez. Sugar raising is the chief industry. Pop., 9,584. C.L.S.

CUERO, a city of southeastern Texas, capital of De Witt County, situated on the Guadalupe River, and on the San Antonio and Aransas Pass and Southern Pacific railroads, 80 miles E. of San Antonio. It contains a number of large cotton-gins and a variety of manufactories. Population 1900, 3,422.

CUEVAS DE VERA, a town of southeastern Spain, 42 miles N.E. of Almeria, situated on the Almanzora, about twenty miles from its entrance into the Mediterranean. It has a fine old Moorish castle, and in the neighborhood are rich old silver-mines, still steadily producing. It has manufactories of hardware, earthenware, wine and oil. Population, 20,350.

CUFFEE, Paul, an American negro philanthropist; born in Westport, Massachusetts, in 1759. His father was an African-born slave, who purchased his freedom and bought a farm of 10 acres in Massachusetts. His mother was a Nantucket Indian. In 1775 he was a sailor on a whaling vessel, and in 30 years owned landed property, houses, stores, a ship, two brigs, and several smaller craft. He built a schoolhouse, employed a teacher, and opened at his own expense the only public school in his native town. In 1811 he sailed for Sierre Leone in his ship, the *Traveler*, with a colored crew, and instituted the Friendly Society of Sierra Leone. When he visited London he was warmly received by Wilberforce and Clarkson, and commissioned by the African institution to carry goods to Sierra Leone. He died September 7, 1818, while arranging for the colonization of that country.

W.M.C.

CUFIC WRITING. See Inscriptions, Vol. XIII, p. 123.

CUICHUNCHULLI, the Peruvian *Ionidium parviflorum*, a plant of the violet family, possessing very active emetic and purgative properties, and an alleged remedy for elephantiasis.

W.R.B.

CUIRASSIERS, the name given heavy cavalry who wear the "cuirass" and helmet. They are the modern representatives of the troopers of the 16th and 17th centuries who were similarly accoutred. The German Army has 12 regiments of cuirassiers, the cuirass being of white metal with a brass plate. Russia has 4 regiments of cuirassiers, whose cuirass is of iron, covered with a thin layer of copper and weighs 30 lbs.; that is, twice as much as those of other armies. The French have 12 regiments of cuirassiers, whose cuirass is of steel with brass plate. Napoleon at one time had a body-guard of cuirassiers called "Centgardes," whose cuirass was of aluminum much lighter than steel ones, but like theirs not proof against a rifle-bullet striking them squarely. The only C. in the British army are the Life Guards and Horse Guards. W.R.B.

CULENBORG or KUILENBURG, a fortified town of the Netherlands, situated on the river Leck, 10 miles N.W. of Thiel. It has manufactories of arms, silk fabrics and twist. Population, 7,655.

CULIACAN, a town of Mexico, 90 miles S.E. of Cuialoa, in a fertile tract on the river Culiacan, and the capital of the state of Sinaloa. It is a depot for goods passing between Guaymas and Mazatlan. Much of its wealth is derived from the rich silver-mines in the neighboring mountains. The principal structure in the city is the mint. Pop., 10,380.

CULILAWAN BARK or "CLOVE BARK," the medicinal aromatic bark of the *Cinnamomum culilawan*, a tree allied to the cinnamon tree, growing in the Molucca Islands. It is fibrous and has an odor of nutmeg. W.R.B.

CULLEN, a fishing-town of Banffshire, on the Moray Firth, northeastern Scotland, 67 miles N.W. of Aberdeen by railway. It has a cruciform parish church, founded by Robert Bruce, whose second queen died here, and which in 1543 was made collegiate. Cullen has been a royal burgh since about 1200, and unites with Elgin and five other places to return one member to Parliament. Population, 2,100.

CULLEN, Paul, clergyman; was born in County Kildare, Ireland, on April 27, 1803, and became a Roman Catholic priest in 1829. He was, in 1850, made archbishop of Armagh and primate of all Ireland, and in 1866 he was made a cardinal, being the first Irishman to attain that rank. He was a close friend of Pope Pius IX. He died on October 24, 1878. W.F.J.

CULLMAN, a town and the capital of Cullman County, northern central Alabama, 45 miles N. of Birmingham, on the Louisville and Nashville railroad. It has furniture and wagon factories, but it is principally engaged in fruit-handling, especially grapes. Population 1890, 1,017; 1900, 1,255.

CULLOM, Shelby Moore, an American statesman; born in Wayne County, Ky., Nov. 22, 1829. His family removed to Tazewell County, Ill., in 1830. He went to Springfield, Ill., in 1853; studied law; settled in that city, and there began practice, which he continued until 1865, being also city attorney. He was Presidential elector on the Fillmore ticket in 1856; member of the Illinois House of Representatives, 1856, 1860 (Speaker, 1861), 1872 (Speaker, 1873), and 1874; member of the United States House of Representatives, 1865–71; delegate to the Republican national conventions in 1872 and 1884; governor of Illinois, 1877–83; and was elected member of the United States Senate in 1883, in which position he still remains. In July, 1898, he was appointed one of the commissioners to establish government in Hawaii.

SHELBY M. CULLOM.

E.E.T.

CULLUM, George W., soldier, was born in New York City on February 25, 1809, and was graduated from West Point in 1833. He entered the engineer corps and was engaged in the construction of Fort Adams, and afterward Forts Warren, Trumbull, Winthrop, Sumter, and others. In the Mexican War he had charge of mining, sapping and pontoon works. He was for some years an instructor at West Point, and in 1861 was on the staff of General Scott. For the next two years he was a brigadier-general and a member of Halleck's staff. In 1864 he became superintendent of the West Point Academy, and was brevetted a major-general. He retired from West Point in 1866 and was engaged for eight years in engineering works in and about New York. In 1874 he was retired under the law for age, and devoted himself to literary and scientific work. He compiled a *Biographical Register of the Graduates of the U. S. Military Academy*, and trans-

lated Dupracq's *Elements of Military Life and History*. He married the widow of General Halleck, inherited at her death her large fortune, continued her charitable works, and gave $290,000 for the Memorial Hall at West Point, $100,000 to the New York Geographical Society, and other large gifts. He died in New York on February 28, 1892. W.F.J.

CULMINATION, the attainment of the highest point of its greatest altitude; the act of reaching the meridian. Thus the sun at midday is at his culmination, and the culmination of a mountain chain is its highest peak. W.R.B.

CULPEPER, Virginia, the seat of Culpeper County, 62 miles southwest of Washington, on the Southern and the Chesapeake & Ohio railroads. Its industries include farming, stock-raising, lumbering, flour-milling, cement, and other manufactures. Population, 1900, 1,618. C.L.S.

CULPEPER, THOMAS, also spelled CULPEPPER and COLEPEPER, colonial governor of Virginia; was born in England, about 1635, the son of John, first Lord Culpeper. He succeeded to his father's title in 1660, became governor of the Isle of Wight in 1661, and in 1675 was appointed governor of Virginia for life. He came to America in 1680 for a time, but persisted in returning to England and spending so much time there, and in accepting or extorting presents corruptly from the Virginia Assembly, that in 1683 his commission as governor was declared forfeited. Thereafter no more governors were appointed for life. Culpeper appears to have been an able man, but covetous and unscrupulous. In the Isle of Wight he was arbitrary and tyrannical to such a degree that the people were moved to petition for his removal from office. In Virginia, despite the impoverished condition of the colony, he enriched himself by the device of purchasing Spanish coins at five shillings each and then, by proclamation, declaring them to be legal tender for six shillings each. The best features of his administration were his procurement of acts pardoning all who had taken part in Bacon's Rebellion and forbidding the frequent assemblage of slaves, the latter being intended to prevent a servile insurrection. He died in England in 1719. W.F.J.

CULROSS, a seaport town in the southern section of Perthshire, central eastern Scotland, on the Forth River, 22 miles W.N.W. of Edinburgh. It is of interest because it has the remains of Culross Abbey, founded by the Bruces of Carnock and Kinlose, about the end of the sixteenth century. Toward the end of the eighteenth century it was occupied by Lord Dundonald.

CULVERIN. See ARTILLERY, Vol. II, p. 573.

CUMBERLAND, a city of Maryland and county seat of Alleghany County, located on the north bank of the Potomac River, at the mouth of Wells Creek, at the western terminus of the Chesapeake and Ohio canal, and at the southeastern terminus of the Pittsburg, Washington and Baltimore railroad. A bridge crosses the Potomac River at this point. The city contains five public schools and one academy. Its principal public buildings are the court-house, city hall and jail. Bituminous coal is mined in the vicinity, and large quantities are shipped from this point. Population, 1890, 12,729; 1900, 17,128. See CUMBERLAND, Vol. VI, p. 618.

CUMBERLAND, a town in Providence County, R. I., situated on Blackstone River. Pop., 1900, 8,925.

CUMBERLAND GAP, a pass 1,675 feet above sea-level in the Cumberland Mountains, at the northeastern corner of Tennessee and the converging point of Kentucky and Virginia. The gap is narrow, cuts through hills about 500 feet high, and since 1891 has been traversed by the Louisville & Nashville, and the Southern railroads. The gap was fortified by the Confederates during the Civil War and witnessed evacuation and possession by both sides, being finally assaulted and captured Sept. 9, 1863, by General Burnside, commanding the Union forces. The railway village of CUMBERLAND GAP is in Claiborne County, Tennessee. Pop., 500. C.L.S.

CUMBERLAND ISLAND, an island of Baffin Land, the most eastern part of that land and separated from the mainland by a narrow strait at its northeastern end.

CUMBERLAND MOUNTAINS, a ridge of the Cumberland Plateau, in the western Appalachians, extending southeastward from Bigstone Gap in Virginia along the Kentucky boundary into Tennessee. Its peaks rise from six to eight hundred feet above the Plateau, which is 2,000 feet above sea-level. The Louisville & Nashville railroad skirts the southern base of the ridge, and facilitates the distribution of the coal, slate, and valuable lumber, obtained from its slopes. C.L.S.

CUMBERLAND PRESBYTERIAN CHURCH, a flourishing offshoot of the Presbyterian Church, the outgrowth of the Cumberland Presbytery in Tennessee, which came into existence in 1810. The movement can be traced to the revival of 1800, in which the Rev. James McGready's very pointed discourses created dissensions among the members of the Transylvania Presbytery, of which the members of Cumberland County were still a part. Two parties thus were formed in the Presbytery, the revivalists and antirevivalists. The former held the distinctive views which were the cause of the separation from the mother church. Meantime the pressing needs for preachers were so apparent that the Transylvania Presbytery, after a severe struggle, agreed to allow probationers to preach, who had not acquired a complete classical education. In 1802 the Synod of Kentucky divided the Transylvania Presbytery, forming a new one; the Cumberland Presbytery, embracing the county of that name. The Cumberland Presbytery, now having the power to choose its own preachers, licensed and ordained them, with the allowance to "except the idea of fatality." This was the rock upon which the church split. This exception was termed "adopting the confession with reservations" by the opponents of the Cumberland Presbytery, and the matter was brought before the Synod of Kentucky in 1804, at which all the members of the Cumberland

Presbytery were cited to appear, but they did not do so. The following year, a "commission, with synodical powers," met with the Cumberland Presbytery, and proposed to re-examine members already so ordained, but the Presbytery would not submit to this. The Synod in 1806 suspended some of the members of the Cumberland Presbytery for refusing to submit its young men for re-examination, dissolved Cumberland Presbytery, and attached some of its members to Transylvania Presbytery. The ministers and probationers thus cut off from the Synod formed themselves into a council for the purpose of securing the redress of their grievances. Four years passed in fruitless effort in this direction. Feb. 4, 1810, an independent presbytery was formed, to which the name of Cumberland was given, the new presbytery meeting for the first time, March 10th. At this meeting the confession and discipline of the Presbyterian Church was adopted, with the exception of the "idea of fatality," and provisions were made as to the scholarship of licentiates. In 1813 the first Synod was formed, the name of Cumberland being also given to it. It also formulated a doctrinal statement, giving the points of dissent from the Westminster Confession, the statement including the following: "1. That there are no eternal reprobates; 2. That Christ died, not for a part only, but for all mankind; 3. That all infants dying in infancy are saved through Christ and the sanctification of the Spirit; 4. That the Spirit of God operates on the world, or as co-extensively as Christ has made the atonement, in such a manner as to leave all men inexcusable."

The Synod continued until 1828, when it was decided to form a General Assembly, the first General Assembly being held at Princeton, Kentucky, May 19, 1829. The church then consisted of four synods and eighteen presbyteries. The church was now upon a foundation of security. In 1827 a college was organized at Princeton, Kentucky, for the benefit of its clerical students. In 1845 Cumberland University was founded at Lebanon, Tennessee, the activity of which, interrupted during the Civil War, has been extensive, its law school being recognized as the first in the South. Other educational institutions are in existence; the church being besides well organized in all other directions.

CUMBERLAND RIVER, 600 miles long, rises in Tennessee in the Cumberland Mountains, and after a winding W. by N. course through Kentucky and Tennessee, re-enters Kentucky, and joins the Ohio at Smithland, 11 miles above the mouth of the Tennessee River. C.L.S.

CUMBRE, La (Sp. "top" or "height"), one of the principal passes across the Andes, on the main road between Santiago, in Chile, and Mendoza, in the Argentine Republic. Its crest is 12,454 feet high.

CUMBRIAN MOUNTAINS, England, a granitic range extending over parts of the counties of Lancashire, Westmoreland, and Cumberland, and embracing the celebrated "Lake District" immortalized by Wordsworth, Coleridge and Southey, which is annually visited by thousands of tourists. The mountains cover an area about 40 miles long and 36 miles wide, attaining a maximum altitude of 3,216 feet in Scaw Fell, Cumberland. C.L.S.

CUMIANA, a town of western Piedmont, northwestern Italy, in the province of Turin, seven miles N. of Pinerolo, near the right bank of the Cisola. Population, 6,358.

CUMMING, Constance Frederica Gordon-, Scottish author and traveler; born at Altyre House, Morayshire, May 26, 1837, the daughter of Sir William Gordon Gordon-Cumming, second baronet, and Eliza Campbell of Islay, granddaughter of Elizabeth Gunning, one of the beautiful "Gunning sisters," who married John, fifth duke of Argyll. Her brother, Roualeyn George, was the African "lion hunter." In 1867, invited to visit a married sister in India, she developed a passion for travel. She penetrated beyond the Himalayas and explored Chinese Tartary, and during the next twelve years visited various Eastern countries and Pacific islands. Her travels are recorded in her works which include *In the Hebrides; In the Himalayas; Via Cornwall to Egypt; At Home in Fiji; A Lady's Cruise in a French Man-of-War; Fire Mountains of Hawaii; Granite Crags of California; Wanderings in China; The Inventor of the Numeral Type*, a system for the use of illiterate Chinese both blind and seeing being described therein; and has devoted her energies lately to the development of the same.

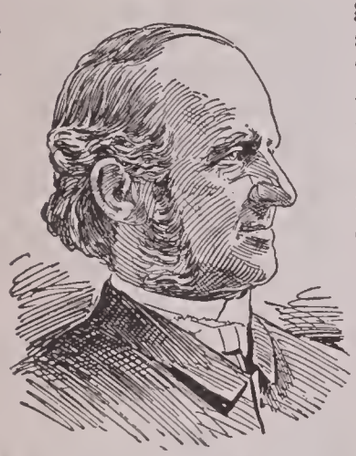
R.C.A.

CUMMING, John, a Scottish divine and author; born in Fintry parish, Aberdeenshire, Nov. 10, 1807. He was educated at King's College, Aberdeen, where he took his degree of M.A. in 1827, and in 1832 was ordained to the Scotch Church, Crown Court, Covent Garden, London, where he preached with great popularity and success till 1879. Edinburgh University gave him the degree of D.D. in 1844. He was active in philanthropic projects, and as a controversialist and lecturer, both against the party that formed the Scotch Free Church and in the "antipopery" cause; but his celebrity was chiefly due to his writings on the interpretation of prophecy. His audacity in this perilous enterprise drew upon him much ridicule. In 1868 he asked the pope if he might attend the Œcumenical Council, but his application was rejected through Archbishop Manning. His works number over a hundred various publications. Among them are *Apocalyptic Sketches* (3 series, 1848–50); *Prophetic Studies* (1850); *Signs of the Times* (1854); *The Millennial Rest* (1862); *Ritualism the Highway to Rome* (1867); *The Sounding of the Last Trumpet* (1867); and *The Seventh Vial* (1870). After some years of ill health, he died, July 5, 1881.

CUMMINGS, Amos Jay, journalist; was born in Broome County, New York, on May 15, 1841, and in boyhood learned the printer's trade in a country newspaper office. He served in the Civil War, in the Army of the Potomac,

and afterward became a typesetter on the New York *Tribune*, and later a member of its editorial staff. From the *Tribune* he went to the New York *Sun*. He was a prominent advocate and leader of "organized labor," and the champion of labor unions. He was elected a representative in the Fiftieth, Fifty-first, Fifty-second, and Fifty-fourth Congresses. He died on May 2, 1902. W.F.J.

CUMMINS, GEORGE DAVID, clergyman, was born in Delaware on December 11, 1822, and was graduated from Dickinson College in 1841. Three years later he entered the ministry of the Protestant Episcopal Church, and became the rector successively of churches in Norfolk, Va., Richmond, Va., Washington, D.C., Baltimore, and Chicago. In 1866 he was made assistant bishop of the diocese of Kentucky. His opposition to ritualistic practices led to his withdrawal from that church in 1873, and the next year he became a bishop of the Reformed Episcopal Church, of which he was one of the founders. He died on June 26, 1876. W.F.J.



BISHOP CUMMINS.

CUMMINS, MARIA SUSANNAH, author, was born at Salem, Mass., on April 9, 1827, and in her school days began to write for leading magazines. At the age of twenty-seven she wrote *The Lamplighter*, which had an enormous circulation and was one of the most successful works of fiction in American literature. She also wrote *Mabel Vaughan*, *El Fureidis*, and *Haunted Hearts*. She died at Dorchester, Mass., on October 1, 1866. W.F.J.

CUNAXA, an ancient city of Babylonia. See CYRUS THE YOUNGER, Vol. VI, p. 664.

CUNDINAMARCA, a department of central Colombia; area, about 5,060 square miles, of which only a small part is inhabited. It is crossed by the eastern Cordilleras on the east of which is the plain of Cundinamarca, which is very fertile and abounds in cattle. Population about 279,000.

CUNHA MATTOS, RAYMONDO JOSÉ, a Brazilian soldier and author; born in Portugal, November 2, 1776. He entered the army in 1800 as a private in a regiment of artillery, and served in numerous campaigns in Africa, Asia, and elsewhere, until 1816, when he emigrated to Brazil. Here he organized a military school and was engaged by the government as superintendent of fortifications. He was one of the founders of the National Geographical Institute of Brazil. During 1831–32 he was stationed in Portugal on military service. In 1834 he was retired with the rank of field-marshal. He wrote several historical works and an index of military law. His diary of the attack and defenses of the city of Porto was published in 1836, and in the following year appeared in book form his account of his travels and explorations in Brazil. He died in Rio de Janeiro, March 2, 1839. W.M.C.

CUNNINGHAM, SIR ALEXANDER, an English general and archæologist; born in London in 1814; was the son of Allan Cunningham, the poet. He received a military education, and in 1831 was second lieutenant of engineers; in 1834, aide-de-camp to the governor-general of India; in 1839, was on a special mission to Cashmere; and in 1840 became engineer to the king of Oudh. In 1858 he was chief engineer of the Northwest Provinces, and in 1870 became surveyor-general of Indian archæology. He published several important works on archæological topics, including *An Essay on the Aryan Order of Architecture* (1848); *The Bhilsa Topes; or, Buddhist Temples of Central India* (1854); *The Ancient Geography of India, the Buddhist Period*, a most important and valuable work, serving to solve some of the most difficult questions in regard to much that had been in dispute as to the geography of the East (1871); and *Book of Indian Eras* (1883). He died Nov. 28, 1893.

CUNNINGHAM, EDWIN, W., jurist, was born in Ohio on August 31, 1842, and was graduated from Hillsdale College, Mich., in 1866. He was a soldier in the Civil War, and afterward settled in Kansas as a lawyer. He became a justice of the Kansas Supreme Court in 1901, and is the author of various encyclopædia articles on legal topics. W.F.J.

CUNNINGHAM, JOHN F., clergyman, was born in Ireland in 1842, came to America in his youth, and was graduated from St. Benedict's College, Kansas, in 1860. He became a priest of the Roman Catholic Church in 1865, and was the first resident priest of that church at Fort Scott, Kansas. He was transferred to Lawrence, Kansas, where he built St. John's Church, and thence to Topeka, where he built the Church of the Assumption. In 1881 he became vicar-general of the diocese of Leavenworth, from 1882 to 1898 rector of the Leavenworth cathedral, and in 1898 bishop of the diocese of Concordia. W.F.J.

CUNNINGHAMIA, a genus of trees of eastern Asia, of the group *Coniferæ*, nearly allied to the pines and firs, but in foliage resembling the Araucarias. The cone-scales bear three inverted ovules, instead of two, as found in the ordinary pines.

CUP, DIVINATION BY, a mode of foretelling events, practiced by the ancient Egyptians. One of the Eastern methods consisted in throwing small pieces of gold or silver leaf into a cup of water, in which, also, were placed precious stones, with certain characters engraved upon them. The infernal powers were then invoked, and were believed to return answer, either in an intelligible voice, by signs on the surface of the water, or by a representation in the cup of the person concerning whom inquiry was made.

CUPAR-ANGUS, a town of central western Scotland, in the counties of Perth and Forfar, 13 miles W.N.W. of Dundee, situated on the left

bank of the Isla. It has extensive linen manufactories and timber traffic. Population, 4,729.

CUPULE, in botany, an involucre formed by a number of cohering bracts, and surrounding the fruit or the base of the fruit in certain plants; as, the oak, in which it is the cup of the acorn surrounding a single fruit; the beech, in which it is a spiny four-valved husk, surrounding several distinct fruits; the chestnut, in which it is the prickly husk. The term is applied also to the cup-shaped receptacle found on the thallus of certain liverworts (*Marchantia* and *Lunularia*), in which the reproductive bodies known as *gemmæ* are developed.

CUPULIFERÆ, a family of dicotyledonous plants, consisting of trees and shrubs, natives of temperate climates. The leaves are alternate and furnished with stipules; the staminate flowers, and sometimes the pistillate flowers, are disposed in catkins; the fruit is a one-celled nut in a woody cupule (whence the name of the family); and the seed is usually solitary. This order contains many of the most important trees of Europe and America, including the oak, beech and chestnut.

CURA, Venezuela, the capital of the state of Miranda near the southeastern shore of Lake Valencia, 58 miles southwest of Caracas. It is an agricultural and trading center; was destroyed by an earthquake (1900). Population 7,880.

CURAÇAO ORANGES, small oranges which have fallen from the tree long before maturity. They have properties similar to those of orange-peel, but are more bitter and acrid. A sweet, valued liquor, known as curaçao, is made by dissolving the dried orange-peel in alcohol with sirup and spices added, distilling the solution and adding about one per cent of Jamaica rum. The chief center of manufacture is Amsterdam.

CURARI, OURARI, WOORALI OR WOORARA, a celebrated poison, consisting of the aqueous extract of *Strychnos toxifera*, and various other species of the same genus, used by the South American Indians for arrow poison. When introduced into the blood, it causes nervous paralysis, convulsive movements, and death. Like snake-poison, it is comparatively inert when taken into the stomach.

CURCI, CARLO MARIA (1809–1891), an Italian ecclesiastic, entered (1826) the Society of Jesus, of which he soon became a distinguished defender, also a famous pulpit orator and writer, and from 1850–53 editor of the *Civiltà Cattolica*. For his violent attacks on the pope and the Jesuits he was expelled from the Society of Jesus, but recanted later on, and was reinstated a few days before his death, June 8, 1891.

CURCULIO, a name formerly used to denote a genius of coleopterous insects, but now generally applied to members of the family *Curculionidæ*, which are commonly known as weevils or snout-beetles. Many thousand species have been described and all are distinguished from other beetles by having the head prolonged into a beak or snout at the end of which is a horizontal pair of jaws. Most of the species are, in the larval state, destructive to plants and fruits, several of them feeding with especial voracity upon the young leaves of peas and beans. The females of some of the genera have the peculiarity of rolling the leaves of plants and trees into little nests where they deposit their eggs, thus furnishing the larvæ with food and shelter. *Conotrachelus menuphar* lays its eggs in the plum, peach, apricot, and other stone-fruits. R.W.C.

CURICO, Chile, the capital of the province and department of Curico, on the Mataquito River. Pop. 14,650.

CURIE, PIERRE, a French scientist, born in Paris, May 15, 1859, studied at the Universty of Paris, and held a professorship at the Sorbonne and at the city school of technical physics and chemistry up to the time of his death, April 19, 1906. In 1883 he discovered the piëzo-electricity of the crystals and, aided by his wife, Mary Curie, the radioactive elements radium and polonium. In 1901 he and his wife received the La Caze prize, and in 1903 the Noble prize for chemistry was awarded to him and Henri Beguerel. In 1898, he succeeded in obtaining radium from pitchblende. MRS. MARIE SKLODOWSKA CURIE, born on Nov. 7, 1867 at Warsaw, Poland, studied at the University of Paris; became professor of physics at the High school for women at Sèvres, and on the death of her husband in 1906, his successor at the Sorbonne. Mr. Curie's writings are contained in the *Annales de Physique* and *de Chèmie*, in the *Journal de Physique*, and in the *Bulletin de la Société de Minéralogie*.

CURITIBA, Brazil, the capital of the state of Paraná, on the Curitiba River, 76 miles by rail west of the seaport town of Paranaguá. It has manufactures of textiles, and exports maté, or Paraguayan tea. Population, 10,000, including many German and French settlers. C.L.S.

CURRENCY QUESTION. See COINAGE, CRIME OF 1873, and FINANCES OF THE UNITED STATES, in these Supplements.

CURRENT-METER. An interesting form of current-meter has been devised and used in studying the deep-sea currents off the Atlantic coasts of the United States. It consists of a weight hung at the lower end of a framework within which is a velocity apparatus with a recording device. The number of rotations of the velocity apparatus within a given time determines the speed of the current. A correct record cannot be obtained unless the apparatus is kept upright. To insure this, a rudder-like extension of the framework is made to carry a traveler, which runs on a rope that may be supported from the farther end of the vessel from which the observation is being taken.

C. H. COCHRANE.

CURRENT RIVER, 250 miles long, rises in the Ozark Mountains in Texas County, Missouri, flows east by south to the Arkansas border, then follows a southwesterly trend to join the Black River at Pocahontas, Randolph County. It is navigable to Jones Ferry, Mo. C.L.S.

CURRENTS, ALTERNATING. See ELECTRICITY, § 86, in these Supplements.

CURRER BELL, the *nom de plume* of CHARLOTTE BRONTË; q. v., Vol. IV, p. 328. Her two sisters wrote under the names of "Acton Bell" and "Ellis Bell."

CURRY, DANIEL, an American clergyman; born near Peekskill, N. Y., Nov. 26, 1809. He graduated at Wesleyan University in 1837, and the same year was elected principal of the Troy Conference Academy. In 1839 he became professor in the Georgia Female College at Macon, Ga. In 1841 he entered the Georgia Conference of the Methodist Episcopal Church, and was stationed successively at Athens, Savannah, and Columbus. When the differences about slavery broke out, which resulted in the rupture of the Church, he was transferred to the New York Conference. In 1854 he became president of Indiana Asbury University, Greencastle, Ind., but in 1857 he joined the New York East Conference and was stationed in Brooklyn. In 1858–59 he was pastor at Middletown, Conn.; in 1860 at New Rochelle, N. Y.; in 1862 at New York. He was editor of the *Christian Advocate*, 1864–76; of the *National Repository*, 1876–80; and was assistant editor of the *Methodist*, 1880–81. In the latter year he was stationed at 82d Street, New York, and in 1883 at Bethany Chapel, New York. He was several times a delegate to the General Conference. In 1852 he received the honorary degree of D.D. from Wesleyan University, and in 1878 that of LL.D. from Syracuse University. He was the author of several books. He died in New York, Aug. 17, 1887. E.E.T.

CURRY, JABEZ LAMAR MONROE, statesman and educator, was born in Georgia on June 5, 1825, and was educated at the University of Georgia and the Harvard University Law School. He served in the Mexican War, was for several years in the Alabama legislature, and was a representative from that state in the 35th and 36th Congresses. At the outbreak of the Civil War he withdrew from Congress and became a member of the Congress of the Confederate States. In the latter part of the Civil War he was a Confederate army officer. After the war he devoted himself to educational work, as president of Howard College, as a professor in Richmond College, and as general agent of the Peabody Fund. In 1885 he was made American minister to Spain and served for three years. In 1890 he was chosen a trustee of the Slater Educational Fund. He wrote a number of books, on *Struggles and Trials of Virginia Baptists*, *Civil History of the Confederate Government*, *Gladstone*, *Constitutional Government in Spain*, and other topics, and numerous magazine and review articles. He died on February 12, 1903. W.F.J.

CURRY, SAMUEL SILAS, educator, was born at Chatata, Tenn., in 1847, and was educated at Grant University and Boston University. He was professor of oratory in Boston University in 1879–88, and has since been professor of elocution at Newton Theological Seminary, and instructor at Harvard and Yale. He has written several works on elocution and oratory, and was the founder of the School of Expression in Boston. W.F.J.

CURSON, PAUL ALFRED, a French painter; born at Moulinat, near Poictiers, Sept. 7, 1820; studied under Drölling and Cabat, and also in Italy and Greece. The year 1857 brought him his first fame when he exhibited, at the Salon, *Dante and Virgil on the Shores of Purgatory; Blind Greeks;* and *Women of Piscinisco*; the last, a sweet poetic composition. In 1867 he exhibited his famous *Dominicans Decorating their Chapel*. Afterward he exhibited many works dealing with classical subjects, etc. His *Dominicans* and *Ostia* (1868) are hung in the gallery of the Luxembourg. He was a chevalier of the Legion of Honor, and died at Paris, July 22, 1895.

CURSORES, an artificial order in which the struthious birds (ostrich, emu, cassowary, etc.) were formerly associated, with forms having similar habits and superficial resemblances, such as the bustards.

CURTESY is the estate to which a man is entitled at common law in the lands and tenements of his wife. Four things are requisite to entitle a man to this estate: 1. Marriage; 2. Seisin of the wife in the estate; 3. Birth of a child; and 4. Death of the wife. At common law, when all of these circumstances had occurred, the husband was entitled to an absolute estate in his wife's property during his life. When the first three conditions had happened, but before the wife's death, he had an estate called curtesy initiate, which gave him control over her property, but at her death his estate became curtesy consummate. This right has been abolished, or greatly modified, in most states, and the right of dower substituted for it.

CURTIN, ANDREW GREGG, an American statesman; born in Bellefonte, Pa., April 22, 1817. He was educated for the law and practised that profession. In 1854 he conducted the campaign which resulted in the election of Governor Pollock, who, after his inauguration, appointed Curtin Secretary of the Commonwealth. In 1860 Mr. Curtin was elected governor of Pennsylvania, and during the war he carried out such a vigorous policy that the highest reputation was gained for both the State and himself, for sending forward, equipping, and caring for troops. In 1869 he was appointed minister to Russia. He served in the United States House of Representatives from 1881 to 1885. He died in Bellefonte, Pa., Oct. 7, 1894. E.E.T.

CURTIN, JEREMIAH, an American linguist and antiquarian; born in Milwaukee, Wisconsin, in 1840. He was graduated from Harvard in 1863. On leaving college he had acquired a good knowledge of French, Spanish, Portuguese, Italian, Roumanian, Dutch, Danish, Swedish, Icelandic, Gothic, German, and Finnish, besides Greek and Latin. He had also made considerable progress in Hebrew, Persian and Sanskrit. When Admiral Lissofsky's fleet visited America in 1864, Curtin became acquainted with the officers, and accompanied the expedition on its return

to Russia. From 1868 till 1877 he traveled in Europe and Asia, for the Russian government. He has written *Myths and Folk-Lore of Ireland; Tales of the Fairies and the Ghost World; Myths and Folk-Lore of the Russians; Hero Tales of Ireland*, and has translated the novels of Sienkiewicz from the Polish. D. Dec. 14, '08.

CURTIS, Benjamin Robbins, an American jurist; born in Watertown, Mass., Nov. 4, 1809. He graduated at Harvard in 1829; was admitted to the bar in 1832; and soon secured a prominent position at the Massachusetts bar. In 1851 he was appointed an associate justice of the Supreme Court of the United States, but resigned the position in 1857, returning to the practice of his profession in Boston. Judge Curtis was highly esteemed by his colleagues on the bench, as well as by his fellow-practitioners at the bar. He possessed in a remarkable degree the power of stripping a case of all extraneous matter, and stating in a clear, simple, and comprehensive manner the facts to which the law was to be applied. He took part in the impeachment proceedings in 1868, appearing for the President, and edited the reports of the First Circuit, 1851–56. He died in Newport, R. I., Sept. 15, 1874.

E.E.T.

CURTIS, George Ticknor, jurist, was born at Watertown, Mass., on November 28, 1812, and was graduated from Harvard College in 1832. He was admitted to the bar in 1836, and practiced in Boston and New York. Besides filling a leading place at the bar he was the author of a number of important works, including an authorative *History of the Constitution of the United States*, *Digest of English and American Admiralty Decisions*, *The American Conveyancer*, a *Life of James Buchanan*, a *Life of Daniel Webster*, *Rights and Duties of Merchant Seamen*, *Law of Copyright*, *Law of Patents*, *Creation or Evolution?* a philosophical work, and *John Charaxes*, a novel. In his legal practice he had for clients the inventors Goodyear, Morse, McCormick, and others, and he was one of the counsel in the Dred Scott case, maintaining the power and right of Congress to prohibit slavery in the territories. In the Civil War he maintained the right of the Federal government to suppress the Confederacy, though he denied its right to wage war against a State. In 1862 he argued against the constitutionality of the legal tender act. He served a few years in the Massachusetts legislature, but held no other public office, save that of U. S. commissioner in Boston at an early date. He remained in active practice before the Supreme Court of the United States until shortly before his death, being the oldest practitioner at that bar, and ranking among the most eminent. He died on March 28, 1894.

W.F.J.

CURTIS, George William, editor and author, was born at Providence, R. I., on February 24, 1824, and in his boyhood was placed in a commercial establishment in New York. At the age of eighteen, however, he went to work and study at the famous Brook Farm Community, where he spent nearly two years and where his whole after career was shaped. Thence he went to Europe and studied at the University of Berlin, and traveled in Egypt and Syria. In 1850 he returned home and published his first book, *Nile Notes of a Howadji*. He joined the staff of the New York *Tribune* in 1850 and wrote much for it. *A Howadji in Syria* appeared in 1852, and in that year he became editor of *Putnam's Monthly* and began contributing to it some of his most charming work. In 1853 he began writing for *Harper's Monthly* and for many years published in it the *Easy Chair* essays. In 1857 he also became connected with *Harper's Weekly*, of which he was for many years the editor. He likewise wrote much for *Harper's Bazar* after its establishment in 1867. As early as 1856 he identified himself with the Republican party and became a prominent orator in its campaigns. He went upon the lecture platform, and ranged among the most popular lecturers of his time. In 1860 he was a delegate to the National Republican convention, and at later dates was conspicuous in other such gatherings. He was an unsuccessful candidate for Congress in 1864, and was a Presidential elector in 1868. He was offered various political places, including the Consul-Generalship in Egypt and the English Mission, but declined them. President Grant made him a commissioner to prepare rules for the civil service, and thereafter he was the leader of the civil service reform movement throughout the nation. In 1864 he was elected a regent of the University of the State of New York, and afterward was chancellor of that organization. In 1884 and 1888 he separated himself from the Republican party and supported the Democratic ticket. He made his home on Staten Island, and continued his editorial work on *Harper's Weekly* until very shortly before his death, which occurred on August 31, 1892. He was a singularly graceful and fluent writer, one of the most eloquent lecturers of his day, and a man of unsurpassed personal charm.

GEORGE W. CURTIS.

W.F.J.

CURTIS, Joseph Bridgham, soldier, was born at Providence, R. I., on October 25, 1836, and was graduated from the Lawrence Scientific School of Harvard University in 1856. He then engaged in railroad work until the outbreak of the Civil War, when he entered the army. He was a staff officer for a few months, then in the Sanitary Commission. Returning to active service he was with Burnside at Roanoke Island, at the siege and capture of Fort Macon, and at Antietam, where he acquitted himself with much gallantry. He was promoted to the rank of lieutenant-colonel, and as such was in command of

the Fourth Rhode Island Regiment at Fredericksburg, on December 13, 1862, when he was shot dead while marching to the assault. W.F.J.

CURTIS, JOSIAH, physician, was born in Connecticut in 1816 and was educated at Yale and at Jefferson Medical College. He spent some years in Europe, studying sanitation. He had charge of the vital statistics of the United States census in 1860, and during the Civil War was an efficient army surgeon. He was appointed naturalist to the United States geological survey in 1872, and in 1873 medical director of the Indian service. He wrote many articles and treatises on professional and scientific topics, and was one of the first to make use of collodion, the honor of inventing which has been ascribed to him almost as much as to Maynard. W.F.J.

CURTIS, MOSES ASHLEY, an American clergyman and botanist; born in Stockbridge, Massachusetts, May 11, 1808. He was graduated from Williams College in 1834, and was ordained a clergyman in the Protestant Episcopal Church. He was a rector in various South Carolina parishes, and throughout his life devoted himself to the study of botany. He made a special study of fungi, and in 1866 published his *Esculent Fungi*, and in 1869 his *Edible Fungi of North Carolina*. His other published writings include *Enumeration of Plants Growing Spontaneously Around Wilmington, North Carolina* (1834); *Contributions to Mycology of North America* (1848); *New Fungi Collected by the Wilkes Exploring Expedition* (1851); *Catalogue of Plants of North Carolina* (1860); *Indigenous and Naturalized Plants of North Carolina* (1866). He died in Hillsboro, North Carolina, January 18, 1872. W.M.C.

CURTIS, NEWTON MARTIN, soldier and legislator, was born at De Peyster, New York, on May 21, 1835, and received an academic education. He was postmaster at De Peyster in 1857–61, and then served in the army through the Civil War, being mustered out in 1865 with the rank of brevet major-general of volunteers. He was collector of customs at Oswegatchie, N. Y., in 1866–67, a special agent of the United States Treasury in 1867–80, a member of the New York legislature in 1884–90, and a representative in Congress in 1891–97. He has given much attention to agriculture, and was president of the New York State Agricultural Society in 1880, secretary of the New York Agricultural Experiment Station in 1879–85, and president of the latter institution in 1885–90. W.F.J.

CURTIS, SAMUEL IVES, an American theologian; born in Union, Connecticut, February 5, 1844. He was graduated from Amherst College in 1867 and from the Union Theological Seminary in 1870. He was pastor of the American chapel in Leipsic in 1874 and in 1878 was appointed professor of biblical literature in Chicago Theological Seminary. His published works include *The Levitical Priests* (1877); translations of *Delitzsch's Messianic Prophecies* (1880); *Old Testament History of Redemption* (1881); *Franz Delitzsch* (1890); *Ezekiel and His Times* (1896). He has also made numerous translations. He died in London, Eng., Sept. 22, 1904. W.M.C.

CURTIS, SAMUEL RYAN, soldier, was born in Clinton County, N. Y., on February 9, 1807, and was graduated from West Point in 1831. He resigned his commission in 1832 and became a civil engineer in Ohio, a lawyer, and a militia officer. He served in the Mexican War, was governor of Matamoras, Monterey, and Saltillo, and afterward settled in Iowa, from which State he was a representative in Congress from 1857 to 1861. In the Civil War he had charge of an instruction camp near St. Louis, and then commanded in the field. defeating General Price at Pea Ridge, on March 8, 1862, and being made a major-general. In September, 1862, he was a commissioner to inaugurate the Pacific railroad enterprise. In 1864 he again defeated Price, and in 1865 was a commissioner to treat with the Sioux Indians. Thereafter he was chiefly interested in Indian affairs and in the Pacific railroad, with which he had been connected in some capacity from the beginning. He died at Council Bluffs, Iowa, on December 26, 1866. W.F.J.

CURTIUS, ERNST, one of the most distinguished German classical scholars of the last century, elder brother of GEORG CURTIUS (q. v.); was born at Lübeck on September 2, 1814, and was educated at Bonn, Göttingen, Berlin, and Athens. He became a teacher at Berlin, professor in the university there in 1844–49; tutor to the Crown Prince of Prussia; professor at Göttingen in 1856, and in 1868 professor at Berlin again. In 1853 he became a member of the Prussian Royal Academy of Sciences, and in 1871 one of its permanent secretaries. He was a painstaking student, and a voluminous writer upon philology and Greek history and archæology, and his researches in Greece and Asia Minor were fruitful of priceless results. His works comprise *Classical Studies* (1840); *Delphica Anecdotes* (1843); *Twelve Attic Inscriptions* (1843); *The Acropolis of Athens* (1844); *Naxos* (1846); *Olympia* (1852); *Ionia* (1855); *Topography of Asia Minor* (1872); *Ephesus* (1874); *The Peloponnesus* (1851–52); a *Manual of Greece* (1857–61), and an *Atlas of Athens* (1878). Two volumes of his collected orations at Göttingen and Berlin were also published in 1875–82. His *magnum opus* was his *Manual of Greece*, a monumental work in three volumes, which has passed through many editions. He died on August 12, 1885. W.F.J.

CURTIUS, GEORG, brother of ERNST CURTIUS (q. v., supra); was born at Lübeck on April 16, 1820; studied at Bonn and Berlin, and in 1849 became professor of classical philology at Prague. He afterward filled the same place at Kiel and at Leipsic. He was one of the foremost Greek scholars and classical philologists of his age, and did much to advance German scholarship. He was the author of numerous important works on philology, grammar, and the classics. He died on August 12, 1885. W.F.J.

CURULE CHAIR, the chair of honor of the

old Roman kings, and later of consuls, prætors, "curule ædiles," and some of the other higher magistrates of the republic having senatorial rank. It was a folding-stool, originally of ivory, then of metal, with curved legs crossing.

CURVES OF RESISTANCE, EQUATIONS OF. See STRENGTH OF MATERIALS, in these Supplements.

CURWEN, JOHN, teacher of music; was born in Yorkshire, England, on November 14, 1816, the son of a clergyman, and himself became a minister of the Congregational Church, at Plaistow. About 1841 he began to teach music and to advocate the "Tonic Sol-Fa" system, and two years later published a *Grammar of Vocal Music*. Thereafter he devoted himself largely, with much zeal, to the promotion of musical culture among the people, by means of class-teaching, lectures, books, magazine articles, and in all other possible ways. In 1861 he retired from ministerial work in order to give his entire time and strength to his musical propaganda, in which he was highly successful and through which he effected a wide extension of popular interest in music. He died on May 6, 1880. W.F.J.

CURZON, GEORGE NATHANIEL, a British statesman, the eldest son of the Rev. Alfred Curzon, Baron Scarsdale; born in 1859; educated at Eton and at Balliol College, Oxford, where he graduated M.A. in 1887. He was a fellow of All Souls' and president of the Union Society, a debating club, where many English Parliamentarians first cultivated their oratorical powers. He was elected for the Southport division of Lancashire in 1886, and subsequently returned for the same constituency, as a Conservative. He was Under-Secretary of State for India in 1891–92, and Under-Secretary for Foreign Affairs in 1895–98. He has traveled extensively, and published *Russia in Central Asia* (1889); *Persia and the Persian Question* (1892); and *Problems of the Far East* (1894). In a debate in the House of Commons in 1895 he took a prominent part in advocating the view that peers, on succession to their titles, were eligible to sit in the Commons if they had not previously sat in the Upper House. The debate arose in connection with the incident wherein Viscount Wolmer, who had been returned as member for West Edinburgh, attempted to take his seat therefor, though subsequent to his election he had succeeded to the peerage upon the death of his father, the first Earl of Selborne. The House declared that the seat of Viscount Wolmer was vacant. Mr. Curzon subsequently introduced a bill to relieve peers from this disability, but the bill was withdrawn May 24, 1895. Mr. Curzon married, April 22, 1895, a famous beauty, Mary Victoria, the eldest daughter of Levi Z. Leiter, a Chicago millionaire, the wedding taking place with much ceremony at the Washington home of the bride's father. On Aug. 12, 1898, he was made governor-general of India; and on Sept. 23, 1898, created Baron Curzon, of Kedleston, an Irish peerage. Resigned Indian position Aug. 20, 1905.

CUSACK, MARY FRANCES, philanthropist, known as the "Nun of Kenmare," was born in Ireland, and became a Roman Catholic nun. She established the community of the "Sisters of Kenmare" and was its head. During the agrarian agitation in Ireland in 1879–85 she was a prominent figure. In 1884 she established the "Sisters of Peace" in England, and later organized another such body in America. She wrote many educational and religious books. She died on June 7, 1899. W.F.J.

CUSCUS. See PHALANGER, Vol. XVIII, pp. 741, 742.

CUSHING, CALEB, an American statesman, jurist and diplomat; born in Salisbury, Massachusetts, January 17, 1800. He entered Harvard College at the early age of 13 and was graduated with high honors at the age of 17. For two years he remained at Harvard as a tutor of natural philosophy and mathematics, and then took up the study of law, being admitted to the Massachusetts bar at the age of 22. He began practice at Newburyport, and soon acquired widespread fame, standing with Rufus Choate at the head of the Essex County bar. In 1825 he was elected to the state legislature, continuing in office until 1834 with the exception of two years spent in European travel. In 1835 he was elected to Congress as a Jeffersonian Republican. Afterward he became a Whig and joined Tyler and his followers. President Tyler nominated him three times for Secretary of the Treasury but he was rejected by the Senate. In 1843 President Tyler appointed him commissioner to China to negotiate the treaty of July 3, 1844, which was ratified by Congress December 31, 1845. In 1846 after his return to Massachusetts, Mr. Cushing became an enthusiast over the prospect of war with Mexico, and the state legislature refusing to equip a volunteer regiment, he assumed the personal responsibility by advancing the amount of money necessary from his own purse, and was made colonel of the regiment thus organized. In 1845 he joined the forces of General Taylor, participated in the war and in 1847 was made a brigadier-general. In 1850 he returned to his home and was elected mayor of Newburyport. Two years later he was appointed associate justice of the state superior court and in 1853 was appointed Attorney-General of the United States. In April, 1860, he was president of the National Democratic Convention at Charleston, South Carolina. He later joined the extreme Southern faction of his party, and was president of the convention that nominated John C. Breckenridge for President. Just prior to the Civil War President Buchanan sent him to Charleston to induce the state troops to postpone their attack on Fort Sumter, but in this he was unsuccessful. During the war he was employed by President Lincoln upon various confidential and diplomatic missions.

CALEB CUSHING.

and in 1866 he was one of a commission to revise the United States statutes. In 1868 he was sent to Bogotá to settle a diplomatic quarrel. In 1870 he was employed to prepare the protocol of the treaty of Washington, and in the following year was appointed counsel before the Geneva Arbitration Tribunal. Two years later he was nominated Chief Justice of the Supreme Court to succeed Salmon P. Chase, but not being confirmed by the Senate, he was made minister to Spain. As a jurist he was one of the most eminent men of his time, his decisions being distinguished for both sagacity and erudition. As an author he is known by his historical and political writings, which include *Practical Principles of Political Economy* (1826); *History of Newburyport* (1826); *Historical and Political Review of the Late Revolution in France* (1833); *Reminiscences of Spain* (1834); *Growth and Territorial Progress of the United States* (1839); *Life of William Henry Harrison* (1840); *The Treaty of Washington* (1873). He died in Newburyport, Massachusetts, January 2, 1879.

W.M.C.

CUSHING, Frank Hamilton, ethnologist, was born at Northeast, Penn., on July 22, 1857, and in his boyhood became interested in Indian relics. In 1875 he was engaged in making surveys and collections for the Smithsonian Institution, at Washington, and was curator of that institution's exhibit at the Philadelphia World's Fair in 1876. In 1879 he was ethnologist with Major Powell's expedition in New Mexico, and remained among the Zuñi Indians for three years, was admitted to their tribal councils and was elected to their priesthood, thus gaining a peculiarly intimate knowledge of their customs and laws. In 1881 he discovered the ruins of the seven cities of Cibola, and in 1888 discovered other ruined and buried cities in Arizona, which he unearthed and explored. In 1895 he made interesting discoveries in Florida. Thereafter he was connected with the government Bureau of Ethnology at Washington. He was the author of several books, including *My Adventures in Zuñi* and *Myths of Creation*, and of numerous reports and magazine articles. He died at Washington on April 10, 1900. W.F.J.

CUSHING, Luther Stearns, an American jurist; born in Lunenburg, Mass., June 22, 1803. He became clerk of the Massachusetts House of Representatives in 1832; judge of the Court of Common Pleas in 1844; and in 1848 reporter to the Supreme Judicial Court, in which capacity he edited 12 volumes of reports (55–66 Mass.). He was author and editor of many law text-books and articles, and of the work now known as *Cushing's Manual of Parliamentary Practice*. He died in Boston, Mass., June 22, 1856.

E.E.T.

CUSHING, Thomas, an American statesman; born in Boston, Mass., March 24, 1725. He graduated at Harvard in 1744; represented his native city in the Provincial Assembly, and in 1763 became Speaker, throughout his career in this capacity constantly manifesting his patriotism and his aversion to the course of the British government. He was delegate from Massachusetts to the Continental Congress, 1774–76; commissary-general of Massachusetts, 1775; judge of common pleas and of probate in Suffolk County, Mass.; was lieutenant-governor of Massachusetts, 1779–88, and acting-governor in the latter year. He died in Boston, Feb. 28, 1788. E.E.T.

CUSHING, William, an American jurist; born in Scituate, Mass., March 1, 1732. He graduated at Harvard in 1751 and was appointed attorney-general of the Colony of Massachusetts. In 1772 he was commissioned judge of the Superior Court of Massachusetts, and in 1777 succeeded his father, John Cushing, as chief justice of that court. In 1782 he was made judge and in 1788 chief justice of the Supreme Judicial Court of Massachusetts. He was commissioned associate justice of the Supreme Court of the United States, Sept. 27, 1789, and held that office till his death, Sept. 13, 1810. E.E.T.

CUSHING, William Barker, naval commander, was born at Delafield, Wisconsin, on November 24, 1842, and was educated at the Naval Academy at Annapolis. He entered the navy in 1861 as a volunteer, and on the first day of his service captured a schooner, the first prize taken in the war. He distinguished himself by leading a bold attack upon Jacksonville, North Carolina, in 1862, and on October 27, 1864, performed the exploit for which he has since been famous. This was the destruction of the great ironclad ram *Albemarle*, which had been the terror of the Federal navy in the coast waters of North Carolina. Cushing prepared a huge torpedo, which he carried at the end of a spar, at the bow of a small steam-launch, and with a few volunteer comrades made his way to where the ram lay at Plymouth, N. C. Despite a hail of shot rained upon him he steamed straight up to the monster ironclad, in a spirit of daring shouted out to her crew, "Look out! I'm going to blow you up!" and exploded the torpedo. The *Albemarle* was wrecked. Cushing's own boat was sunk and he was nearly killed, but he swam to the shore in the darkness and escaped. For this he received the official thanks of Congress, and in 1872 he was promoted to the rank of commander. He died at Washington on December 17, 1874.

W.F.J.

CHARLOTTE CUSHMAN.

CUSHMAN, Charlotte Saunders, actress, was born in Boston on July 23, 1816, the descendant of Robert Cushman, one of the Plymouth pilgrims. At the age of 13 she became a choir singer, and afterward had a successful concert and operatic career until her voice failed. Then she went upon the dramatic stage, making her first appearance at New Orleans as Lady Macbeth. In

1843 she played with the great English tragedian, Macready, and two years later played with Edwin Forrest in England. Thereafter she ranked for years as one of the foremost actresses of the world, winning the plaudits of people and critics in Europe and America. Her repertory comprised many parts, chief among them being Lady Macbeth, Rosalind, Beatrice, and Queen Catherine, in Shakespearean plays; Bianca in Milman's *Fazio;* Julia in *The Hunchback;* Lady Teazle in *The School for Scandal;* Nancy Sykes in a dramatization of *Oliver Twist;* and Meg Merrilies in a dramatization of Scott's *Guy Mannering*—the last-named being perhaps her greatest achievement, and one of the most impressive ever seen upon the stage. During the Civil War she acted several times, despite ill health, for the benefit of the sanitary commission. She made a farewell tour of the chief American cities in 1874–75, her last appearance being at the Globe Theatre in Boston on May 15, 1875, and she died in Boston on February 18, 1876, leaving behind her one of the most splendid and inspiring memories in all the annals of the stage. She was a woman of great charm of personal character, of rare native intelligence, of untiring industry, and of indomitable will. W.F.J.

CUSHMAN, Pauline, actress and spy, was born in New Orleans and became a variety actress. She offered her services to the United States government in the Civil War, and was for some time engaged as a military spy. She enabled the government to foil the plans of Southern sympathizers, and several times passed through the lines and secured information of the movements of Confederate troops. Once she was captured and condemned to be hanged, but escaped and rejoined the Union army. She was popularly known by the soldiers as Major Cushing.

W.F.J.

CUSHMAN, Robert, an American Colonial founder; born in England about 1580. He was a member of the Leyden Nonconformist colony, and in 1617, with John Carver (q. v.), went to London to negotiate with the Virginia Company for leave to settle in North America and to petition King James for liberty of conscience there. He subsequently made two similar trips,—the last time with William Brewster (q. v.),—resulting in the issuance of a patent, and in 1620 he went to London for the fourth time, with Carver and Martin, to procure funds and charter the *Mayflower* and *Speedwell.* When the latter vessel put back, leaky, Mr. Cushman remained behind, and brought on the next company on the *Fortune*, which reached Plymouth, Mass., Nov. 9, 1621. He returned to England in the *Fortune*, which was captured by the French and detained two weeks; acted as agent in London for the Colony; and in 1623 procured a new charter for territory on Cape Ann. Early in 1625, while preparing to sail thither, he died. E.E.T.

CUSSET, France, a watering place in the department of Allier, 1,000 feet above sea-level, near the chalybeate springs of Vichy, 32 miles northwest of Roanne. Pop., 5,000. C.L.S.

CUST, Robert Needham, an English Orientalist and philologist; born in 1821 in Bedfordshire, England; educated at Eton, and entered her Majesty's Indian civil service. He remained in this employment until 1860, taking an active part in military service, and ardently devoting himself to the study of Oriental languages and customs. Upon his return to England he became a barrister at law. Mr. Cust is the author of *Modern Languages of East Indies; Modern Languages of Africa; Modern Languages of Oceana; Sketches of Anglo-Indian Life;* and, at the Chicago congresses of 1893, presented an important essay upon *The Progress of African Philology.*

CUSTER, a town and the capital of Custer County, southwestern South Dakota, on French Creek, and on the Burlington and Missouri River railroad, among the Black Hills. There is a large amount of lumber and some gold and silver in the vicinity. Population 1900, 599.

CUSTER, George Armstrong, an American soldier; born in New Rumley, Ohio, December 5, 1839. He was graduated from the United States Military Academy at West Point in 1861 and entered active service at Bull Run during the Civil War. He was then transferred to General Smith's staff, being placed in charge of balloon reconnaissances. For courage and endurance he was soon after appointed on McClellan's staff, and captured the first colors taken by the Army of the Potomac. In 1863 he went on General Pleasonton's staff, and for gallantry was appointed brigadier-general of volunteers, commanding a Michigan brigade. He defeated the Confederate General Stuart at Gettysburg, for which he was brevetted major in the regular army. In 1864 his brigade was assigned to Sheridan's corps and he became one of the most brilliant officers in the Virginia campaigns. He was promoted brevet lieutenant-colonel and brevet colonel. He won victories at Woodstock and Cedar Creek and was brevetted major-general of volunteers. In 1865 his division won the battle of Waynesboro, capturing 1,600 prisoners and 11 guns. He fought at Five Forks and Dinwiddie Court-House, and was brevetted brigadier-general. After the surrender at Appomattox he was brevetted major-general and appointed major-general of volunteers. He was then assigned to duty in Texas, where he was chief of cavalry till mustered out of the volunteer service. In 1866 he took the lieutenancy of the Seventh cavalry at Fort Riley, Kansas, under Hancock, who was succeeded by Sheridan in the summer of 1867. Custer shortly after saw his first Indian service, and closed a campaign against the Cheyennes in 1868. He was stationed in Kentucky in 1871 and in 1873 was sent to Dakota, where he had

GENERAL CUSTER.

various cavalry commands and several times defeated hostile Indians. On June 25, 1876, with a force of 1,100 men, he attacked a body of Sioux, afterward found to number 9,000, encamped on the Little Big Horn, in Montana, and he and his entire command were killed. In 1888, his wife, Elizabeth Bacon Custer, published a biographical volume *Tenting on the Plains, or Life with General Custer.* W.M.C.

CUSTIS, George Washington Parke, an American author; born in Mount Airy, Maryland, April 30, 1781. His grandfather was Daniel Parke Custis, the first husband of Martha Washington, and he was the adopted son of George Washington. He wrote *Recollections of George Washington* (1860), a posthumous work, and was also the author of several plays and orations. In 1802 he left Mount Vernon and erected Arlington House, near Washington, where his father had left him a large estate. His daughter married Robert E. Lee. He died at Arlington House, Fairfax County, Virginia, October 10, 1857. W.M.C.

CUTHBERT, Georgia, the seat of Randolph County, and the terminus of a branch line of the Central railroad of Georgia, 25 miles southeast of Eufaula. Cotton-ginning, thread, and grist mills represent the chief industries. Population, 1900, 2,641. C.L.S.

CUTHBERT BEDE, pseudonym of Bradley, Edward; q.v., in these Supplements.

CUTLER, Manasseh, an American clergyman, scientist, and pioneer; born in Killingly, Conn., May 3, 1742. He graduated at Yale in 1765; engaged in the whaling business, and opened a store in Edgartown, Mass. While thus engaged he studied law, and in 1767 was admitted to the bar; but a predilection for the ministry caused him to remove to Dedham, where he studied theology. In 1770 he was licensed to preach, and in 1771 was ordained as pastor in Ipswich. In 1776 he was commissioned chaplain in the Revolutionary army. At the close of the war he studied medicine and general science, especially botany. In 1781 he was elected a member of the American Academy of Arts and Sciences, and the memoirs of that society contain many papers from his pen. In botanical affairs he was practically self-taught, and has been termed the pioneer of New England botany. He was among the first white explorers of the White Mountains. In 1786 he joined the Ohio Company, and contracted with the government in its behalf for 1,500,000 acres of land northwest of the Ohio River. With 45 associates he founded the city of Marietta, and in 1800–04 he sat in Congress. He died in Hamilton, Mass., July 28, 1823. E.E.T.

CUT-OUT, Electric, a device, in numerous forms, for switching, or cutting out, or separating some portion of an electric circuit from the remainder. It is often made with fusible wire connections, so that when too strong a current exists in a circuit the wires may burn out, thus cutting out the rest of the current, as in the interior of a building, and preventing harm to those who have to do with the electrical apparatus. Such a cut-out, placed on a building in an incandescent-light circuit, would prevent interior damage if the outside wires came in contact with the exposed wires of an arc circuit.

CUTTER, a small single-masted vessel furnished with a straight-running bowsprit, rigged like a sloop, carrying a fore-and-aft mainsail, gaff top-sail, stay-foresail, and jib. Also a boat belonging to a ship of war. See Sail, Vol. XXI, p. 161. W.R.B.

CUTTHROAT TROUT (*Salmo clarkii* or *S. mykiss*), a true salmon trout inhabiting the fresh-water streams of northwestern United States. It has a crimson slash on its lower jaw and black spots on its tail. R.W.C.

CUTTINGS, branches or portions of branches of trees or shrubs employed to produce new plants, by burying the lower end in the earth so that new roots may arise from the nodes. See Horticulture, Vol. XII, pp. 243, 244.

CUTWORMS, larval forms of the *Noctuidæ*, or night-flying moths, *Agrostis* being a well known species. These worms eat through the stalks of grain and other plants at or near the surface of the ground. R.W.C.

CUVILLIER-FLEURY, Alfred Auguste, French journalist; born March 18, 1802, in Paris, was appointed private secretary by Louis Napoleon, ex-king of Holland, and became later on tutor of the Duc d'Aumale. He was elected a member of the Academy in 1866 and died in Paris, Oct. 18, 1887. He published *Portraits Politics et Révolutionaires* (1851), which are fine in form and diction; *Études Historiques et Littéraires* (1854); *Nouvelles Études* (1855); *Voyage et Voyageurs* (1856); *Derniers Études Historiques et Littéraires* (1859); *Historiens, Poètes et Romanciers* (1863); *Études et Portraits* (1865–68). G.A.S.

CUYAHOGA FALLS, Ohio, a summer-resort of Summit County, 4 miles northeast of Akron on the Cleveland, Akron & Columbus, and the Pittsburg & Western railroads. Here the deep channel of the Cuyahoga River falling 240 feet in a short distance yields enormous power for factories. Population, 1900, 3,186. C.L.S.

CUYAHOGA RIVER, Ohio, 60 miles long, rises in Geauga County and enters Lake Erie at Cleveland. C.L.S.

CUYO, capital of Cuyos group, Philippine Islands, on small bay of Cuyo island. It has trade in cocoanut oil, rice and trepang. Pop., 1903, 12,773.

CUZCO, a department of Peru; area 156,270 square miles and population 438,646. The population of Cuzco, the capital was 15,000 in 1900.

CYANEA, a genus of jelly-fishes of the class *Acraspeda* (*Scyphomedusæ*). The animal is a disk-shaped, jelly-like bell, of a reddish brown color, varying from a few inches to several feet in diameter. The slender, thread-like tentacles are arranged in bundles, and are of great length.

CYANIDE PROCESS. See Gold and Gold-mining, in these Supplements.

CYANIDES OR SALTS OF PRUSSIC ACID. See CHEMISTRY, Vol. V, pp. 480–482.

CYANITE, KYANITE OR DISTHENE, a mineral composed of alumina and silica. See MINERALOGY, Vol. XVI, p. 426.

CYANOGEN (CN or Cy), although intrinsically of little importance, is one of the most interesting compounds of carbon. Cyanogen forms poisonous compounds with metals, forming *metallic cyanides*, of which the best known is the *cyanide of potassium*, a salt of much importance in photography. With hydrogen it forms the deadly prussic or hydrocyanic acid, while it is united with oxygen in cyanic acid. See CHEMISTRY, Vol. V, p. 480.

CYANOTYPE PROCESSES, in photography, those processes in which the compound radical cyanogen is employed; they were discovered by Sir John Herschel. The process is employed in the making of the so-called "blue-prints." See PHOTOGRAPHY, Vol. XVIII, p. 845.

CYATHEA, a genus of tropical tree-ferns, characterized by its cup-shaped indusium. It forms the type of the family *Cyatheaceæ*, which includes the principal tree-ferns of palm-like habit. This family numbers about two hundred species, all tropical, and which form forests in certain parts of Australia. *C. medullaris* of New Zealand is one of the most common tree-ferns in cultivation.

CYATHOPHYLLUM, a genus of fossil stony corals, with a simple or branched polyparium, internally lamellated, the lamella having a quadripartite arrangement. The older portions are cut off by transverse "tables," or septa, and the base of the stem is often supported by root-like processes. This genus first appeared in the Silurian, was abundant in the Devonian, and disappeared at the close of the Carboniferous epoch. See also *Cyathophyllidæ*, under CORALS, Vol. VI, p. 340.

CYAXARES. See PERSIA, Vol. XVIII, p. 575.

CYCADS, a group of plants. See VEGETABLE KINGDOM, Vol. XXIV, p. 142.

CYCHLA, a genus of fishes of the family *Chromidæ*. They are remarkable for the beauty and brilliancy of their colors, and some of them are highly esteemed for the table. In form and habits they resemble the sunfishes.

CYCLAMEN, a flowering plant. See HORTICULTURE, Vol. XII, pp. 258, 271.

CYCLE, a term used in chronology to denote an interval of time in which certain phenomena recur in the same order. Cycles have chiefly arisen from the fact that neither the year (the period of the earth around the sun), nor the month (the period of the moon around the earth), can be measured by days, or even by hours, so exactly as not to leave fractions. Cycles eliminate these fractions, since they are reckoned from the time a heavenly body is in a particular relation with the earth to a time when it again occupies the same place in the heavens and calendar. See *Solar Cycle*, *Lunar Cycle* and *Cycle of Indiction*, under CALENDAR, Vol. IV, pp. 593, 594; and *Metonic Cycle*, under ASTRONOMY, Vol. II, p. 653.

CYCLOBRANCHIATA, a name formerly applied to a group of mollusks in which the gills were circularly arranged. This was highly artificial, and is now obsolete.

CYCLODUS, a genus of lizards of the family *Scincidæ*, found in Australia and the neighboring islands.

CYCLOID. If a circle roll along a straight line in its own plane, any point on the circumference describes a curve which is called a cycloid. This is the most interesting of what are called the transcendental curves, both from its geometrical properties and its numerous applications in mechanics. In dynamics, for example, we find that a heavy particle descends from rest from any point in the arc of an inverted cycloid to the lowest point in the same time exactly, from whatever point of the curve it starts. See INFINITESIMAL CALCULUS, Vol. XIII, p. 58.

CYCLONES. See METEOROLOGY, Vol. XVI, pp. 159, 160; and in these Supplements.

CYCLOPEAN WALLS. See ARCHITECTURE, Vol. II, pp. 352, 395.

CYCLOPS, a genus of small fresh-water crustaceans, type of a family *Cyclopidæ* in the order *Copepoda*. See CRUSTACEA, Vol. VI, p. 587.

CYCLOSIS, the name employed to designate certain protoplasm confined within a cell-wall. These movements are characteristic of all cytoplasm, and appear as currents setting in various directions, sometimes steadily about the cell-walls, sometimes along strands connecting the wall cytoplasm with that investing the nucleus, flowing in one direction for a time, and then perhaps reversing it. The currents are made visible from the fact that the cytoplasm current carries numbers of opaque granules. This movement is also known as "circulation" and "rotation," and is easily seen in the body-cells of the *Characeæ*, leaves of *Anacharis* and *Vallisneria*, stamen-hairs of *Tradescantia*, etc.

CYDNUS, a river of Asia Minor. See ASIA MINOR, Vol. II, p. 619.

CYLINDER PRESS. See PRESSES, in these Supplements.

CYMA, in architecture. See ARCHITECTURE, Vol. II, pp. 357, 406.

CYMBALS, a pair of concave plates of brass which are struck together to produce a sharp ringing sound of no fixed pitch. They are of very ancient origin and were used by the Greeks in the worship of Cybela. The attempts made to discover the composition of the metal in the ancient instruments have failed, the nearest approach being an alloy of 80 parts copper to 20 of tin. Cymbals are essentially military instruments and play the same part as the bass drum. In orchestras the same performer plays both instruments. One cymbal is tied to the drum and the other held in the left hand. W.R.B.

CYME, a term employed in botany to designate those forms of inflorescence which are definite or centrifugal. See BOTANY, Vol. IV, p. 111.

CYNANCHUM, a genus of *Asclepiadaceæ*, of which some species have been used medicinally.

The Indian *Cynanchum extensum* yields fiber, and *Cynanchum ovalifolium*, a native of Penang, yields caoutchouc of excellent quality.

CYNOCEPHALUS, an African ape. See APE, Vol. II, p. 133.

CYNODON, a genus of grasses, having digitate or racemose spikes, so named from its sharp-pointed underground shoots. The most important species (*C. Dactylon*) is the widely distributed and well-known Bermuda grass. It is the principal fodder and pasture grass of India, where it is known by the names of *dhob*, *doorba*, etc.

CYNOGALE, an animal of the civet family. See MAMMALIA, Vol. XV, p. 442.

CYNOMORIUM, a genus of the curious parasitic family *Balanophoraceæ*. *C. coccineum*, a plant of a strange fungus-like appearance, is found in the islands of Malta and Gozo, parasitic upon the roots of *Salicornia*. It was long known as *fungus Melitensis*, and enjoyed the highest reputation as a styptic, besides being used as an astringent in dysentery and other maladies. These uses, however, depended on the doctrine of signatures alone, its scarlet color and blood-like juice being interpreted as providential indications of its curative destination for all injuries or diseases accompanied by bleeding.

CYNOSURE (literally, "the dog's tail"), the constellation of the Little Bear. As the pole-star is the principal star of the constellation, the eyes of mariners are frequently directed to it, hence the common application of the term *cynosure* to anything that strongly attracts attention; a center of attention.

CYNTHIANA, Kentucky, the seat of Harrison County, on the east bank of the South Licking River, and on the Kentucky Central division of the Louisville & Nashville railroad, 37 miles N. E. of Frankfort, and 66 miles S. of Cincinnati. Water power is supplied by the river for its whisky distilleries, notably the "Kentucky Bourbon" brand, for extensive flour milling interests, and other industries of an agricultural and stock-raising region. Superior horses are bred and the town is an important race-meeting center. The neighborhood was the scene of Confederate victories July 17, 1862, and June 11, 1864, and of a Union victory June 14, 1864. Pop., 1900, 3,257. C.L.S.

CYPERACEÆ, the family of sedges, nearly akin to grasses, but easily distinguished by their solid, unjointed, generally triangular stems, undivided leaf-sheaths and absence of paleæ. There are between 2,000 and 3,000 species, widely distributed throughout all climates, but more especially in temperate and cold regions, and in marshy soils, of which they often take almost entire possession. Characteristic genera are *Cyperus* and *Scirpus*, while the largest genus, *Carex*, forms a highly specialized group.

CYPERUS, a large genus of sedges, sometimes called "galingales," and very widely distributed. It is characterized by its perfect flowers, flattened spicate or clustered spikelets, involucrate inflorescence and absence of bristles. *C. esculentus*, of the Mediterranean region, is somewhat cultivated for its nut-like sweet tubers, called "chufa." *C. phymatodes* and *C. rotundus*, variety *Hydra* ("nutgrass" or "coco-grass") are troublesome weeds of the southern United States, propagating by nut-like tubers, and very difficult to extirpate.

CYPRINIDÆ, a large family of fresh-water bony fishes, with open swim-bladders. Barbel, bream, carp, chub, dace, gold-fish, gudgeon, minnow, roach, and tench are familiar examples. They are distinguished by their small, toothless mouths, naked head, usually scaled body, and by the absence of the adipose fin. The family includes over a hundred genera, and eight times as many species. See ICHTHYOLOGY, Vol. XII, p. 731.

CYPRINODONTIDÆ ("toothed carp") a family of small bony fishes, with open swim-bladders. They are allied to carps (*Cyprinidæ*), but the mouth bears teeth, the head and body are scaled, and there are never barbules. The family includes twenty genera and over a hundred species, widely distributed in the warm and tropical zones, both fresh-water and marine.

CYPRIPEDIUM. See ORCHIDS, Vol. XVII, p. 840.

CYPRIS, a very common, small fresh-water crustacean, type of a family (*Cypridæ*) in the order *Ostracoda*. Like other ostracods, this small "water-flea" has an unsegmented body, seven pairs of appendages, a rudimentary abdomen and a bivalve mollusk shell inclosing all. The shell of cypris is dainty and elastic; the posterior antennæ bear a long tuft of bristles on their second joint; the second pair of maxillæ have a small gill appendage. See also CRUSTACEA, Vol. VI, p. 587.

CYPRUS, a large, historic island in the eastern part of the Mediterranean Sea. For its history down to 1875, geography and general description, see Vol. VI, pp. 659–661.

By virtue of a convention concluded between the representatives of England and the sultan of Turkey, in Constantinople, June 4, 1878, the island became a British colony. Under the same convention it became obligatory upon the inhabitants of the island to pay each year to the Sublime Porte a tribute of £92,800. There was extended to the people in 1882 the privilege of the election of their own representatives in a newly created legislature of limited power. In April of 1895 there began in the island, with apparent spontaneity, a vigorous movement for the abolition of the objectionable tribute to Turkey and for union with Greece.

Cyprus is politically divided into six districts, whose capital, Nicosia (q. v., in these Supplements), has a population of 14,752. The island is 3,584 sq. miles in extent, and had a population in 1901 of 237,022. Imports and exports alike amount to about £290,000 in their annual value. The coins of England and Turkey are current; the weights and measures of the latter nation are used. Cotton, wheat and barley remain the agricultural exports of chief importance, but the dwindling of the

once famous forests of Cyprus, now almost totally lost, has greatly impaired the fertility as well as the climate of the island. The numerous flocks of goats prevent the development of new vegetation by the destruction of all young shoots. The climate of Cyprus, though generally considered unhealthful, has proved beneficial to the English troops who are stationed there.

Copper, for which Cyprus was once famous, and which took its name from that of the island, has ceased to be an export of importance. An English corporation, which controls the Cyprian output of this mineral, operates only a few mines in the western portion of the island. Salt, once shipped, under the Turks, to a value of $40,000 per annum, is only produced for local consumption.

The highest official on the island is the High Commissioner, who is assisted by an executive council, and by a legislature of 18 members, three of whom are elected (for five years) by Mohammedan and nine by non-Mohammedan voters. An English judicial system is in vogue, and barrister judges preside over the courts. Half a regiment of infantry constitutes the English force of occupation, which is quartered at Polymedia, four miles north of Limassœ. Telegraphic communication with Europe has been established for many years.

Cyprus is a field of great interest and fertility for the archæologist. Here, in the ninth century, there was discovered the *Codex Cyprius*, in which is contained the oldest complete copy extant of the Holy Gospels. Late in the nineteenth century extensive and systematic excavations were begun in Cyprus by the British Museum. These were made in the vicinity of the ancient town of Curium, and there were unearthed many inscriptions and other relics, important in historical confirmation. It became evident, as stated by the historian Strabo, that the town Curium had originally been founded by a colony from Argos. There are contained in the Metropolitan Museum of Art, in New York City, Cyprian relics of great antiquity, which were unearthed by General Louis P. di Cesnola in 1870–75. These include pieces of statuary and like objects.

CYPRUS, CHURCH OF. The Church of Cyprus has characteristics similar to the other orthodox Churches of the East, but has always maintained an independent position; has not been subject to any patriarch. Although attempts were made as early as 431 A.D. and as late as 1600 by the patriarchs of Antioch to claim authority over it their efforts were unavailing. Aside from the period during which Cyprus was in the hands of the Lusignans and the Venetian Republic (1193–1571) the church has always retained its independence. It received the holy ointment from other organizations — up to 1860 from Antioch and after that time from Constantinople, but this was done as an act of courtesy not as an obligation. There are several monasteries dating from the 11th century and onwards; and an archiepiscopal school at Nicosia founded in 1812, and in 1893 it added a high-school department for girls. The absence of any theological seminary has been a drawback to the culture of the clergy, but steps for progress in this direction were recently adopted.

CYRIL OR CONSTANTINE, a missionary and apostle to the Slavs. See METHODIUS, Vol. XVI, p. 202.

CYRIL LUCARIS. See GREEK CHURCH, Vol. XI, p. 141.

CYSTICERCUS. See TAPEWORMS, Vol. XXIII, p. 57.

CYSTIDEA. See ECHINODERMATA, Vol. VII, p. 552.

CYTOLOGY. See EMBRYOLOGY, in these Supplements.

CYTOPLASM, a name applied to the general protoplasm of the cell, in which lie imbedded the other cell-structures, as nucleus, plastids, centrospheres, etc. It is a viscid substance, and as it is the chief seat of the nutritive processes, it must contain at different times all the substances which enter into the structure of the plant.

CZAR OR TSAR, a Slavonic word for prince, not related to Cæsar; a monarch of absolute authority; specifically, the title of the emperors of Russia. Ivan IV, "the Terrible," the first tsar of Russia, was crowned in Moscow in 1547. The empress of Russia is called the *tsaritsa* or *czarina;* the heir apparent, the *tsarevitch;* his wife, the *tsarevna.*

CZECH, SVATOPLUK, Czech poet, was born Feb, 21, 1846, at Ostredek, Bohemia. Having completed his studies at the gymnasium of Prague and in the university of the same city, he divided his time between occupation as an advocate and as the editor of various papers. In 1874 he traveled extensively in Russia, and many of his writings are based upon material gained in this journey. Noteworthy among his contributions to epic poetry are *Dreams; The Adamites; Slavia;* and *Europe.* His collected lyric poems have been published under the title *Narrations, Arabesques and Humoristic Subjects.* His epic poem, *Dagmar*, is thought to be unexcelled in contemporary Czech literature. As one of the editors of *Kvéty* and the *Lumir*, he has become prominent among Bohemians.

CZERNOWITZ, the capital of the Austrian Duchy of Bukowina (See Vol. VI, p. 666). Of the modern buildings of note there is the Episcopal Palace in Byzantine style, the Greek Orthodox Cathedral, the Jesuit church and a Hebrew temple in the Moorish style. The Francis Joseph University which was opened in 1875 has three departments, law and politics, philosophy, and theology. The doctrines taught in theology are Greek Orthodox and the language in which instruction is given is German. There were 41 professors and lecturers and 390 students in the institution in 1897. The trade is principally in the hands of the Jews and Armenians, the town has a garrison of 2,965 men. Population, 1900, 67,622.

D

DAB—DAGOBERT I

DAB, the name of a fish belonging to a group sometimes known as flat-fishes. The body is very much compressed laterally; and both eyes are on one side. R.W.C.

DACELO, a genus of Australian birds known as laughing king-fishers on account of their loud, gurgling note. It belongs to the Picarian order and includes the largest forms of its family, the *Alcedinidæ*. A common species is classified as *D. gigas* or *D. gigantea*. R.W.C.

DACITE, in geology, the name of certain volcanic quartz bearing andesites, carrying in the matrix of rock glasses, felspar, lime-soda, mica, hornblende and pyroxene, containing about 66 per cent of silica; alumnia, 19 per cent; ferric oxide, 2 per cent; ferrous oxide, 1.5 per cent; magnesia, 1.5 per cent; lime, 3 per cent; soda, 4 per cent; potash, 3 per cent. This rock often presents the appearance of porphyry-bearing quartz. Dacite graduates into greenstone, or trachyte rock containing quartz. The name has been given because of the preponderance of the rock in the Roman province of Dacia. W.R.B.

DA COSTA, Jacob M., physician, was born at St. Thomas, Danish West Indies, on February 7, 1833, was graduated from the Jefferson Medical College, Philadelphia, in 1852, and also studied in Paris and Vienna. From 1872 to 1891 he was professor of the practice of medicine and clinical medicine in Jefferson College, and thereafter until his death professor emeritus. He had a distinguished career as a physician and surgeon, and was the author of many standard works and innumerable papers and addresses. By common consent he ranked among the foremost physicians and surgeons of his time. He died in 1900. W.F.J.

DACRES, Sir Sidney Colpoys, naval commander; was born in England in 1805, and entered the navy in 1817. He rendered important services in the Greek War in 1828 and received the cross of the Legion of Honor and the decoration of the Order of the Saviour. In the Crimean War he bombarded Sebastopol and was made a C.B. Afterward he held various commands at sea, was commander-in-chief in the Channel, became first sea lord of the admiralty in 1868, was made vice-admiral and K.C.B. in 1865 and G.C.B. in 1871, and after 1872 was governor of Greenwich Hospital. His death occurred on March 8, 1884. W.F.J.

DACRYDIUM, a genus of coniferous trees of the family *Taxaceæ*, chiefly natives of Tasmania and New Zealand. The Huon Pine (*D. Franklinii*) is valuable for its timber, which is excellent for spars. *D. taxifolium*, the Kakaterra tree of New Zealand, attains a height of two hundred feet, and is also valuable for timber. The fertile cone has usually but one to six bracts, which resemble the ordinary imbricate foliage leaves, in the axils of which there develops a single seed with a fleshy aril.

DACTYLOPTERUS. See Flying-fish, Vol. IX, p. 308.

DADAR, a town of Baluchistan, five miles S.E. of the Bolan Pass. It is said to be one of the hottest places in the world, although in latitude 30° N. The British troops here routed a Kelat force in November, 1840. The neighborhood produces grain, pulse, cotton, sugar, madder and fruits. Population, about 3,000.

DADEVILLE, a village and the capital of Tallapoosa County, central eastern Alabama, situated about 50 miles N.E. of Montgomery, on the Central Railroad of Georgia. It has a mineral spring and manufactories of buggies and wagons. Population 1890, 873; 1900, 1,136.

DADO (It., a die), a term applied in architecture to the body of a pedestal, the cubic block between the base and cornice. It is also applied to a protection running around the bottom of the walls of a room, more commonly known as wainscoting.

DAET, a town of the island of Luzon, in the South China Sea, one of the Philippines. It is situated in the southern part of the island, on a river of the same name, and is the capital of the province of North Camarines. Population, 7,702.

DAGNAN-BOUVERET, Pascal Adolphe Jean, a French painter; born Jan. 7, 1852, in Paris. He studied at the École des Beaux Arts as a pupil of Gérôme, and in 1876 won a second *Grand Prix de Rome*. In the following year his work made its first appearance in the Salon, being represented by two mythological subjects, *Orpheus and the Bacchantes* and *Bacchus, Child*. M. Dagnan-Bouveret attained high rank in the contemporary French school, his mastery of technique and color being of the first order. Primarily a *genre* painter, his subjects are always in admirable taste. *The Parental Blessing*, in a Russian collection, and *The Conscripts*, in the state collections of France, are the most highly regarded of his later achievements. He was made an officer of the Legion of Honor, Dec. 31, 1891.

DAGO, DAGÖE or DAGDEN, an island in the Baltic Sea, near the entrance to the Gulf of Finland, belonging to the Russian province of Esthonia. It is separated from the island of Oesel by the Dago or Dagden Sound. It measures 34 by 15 miles in extent, has rocky and almost sterile soil, and is inhabited by about 14,000 people. W.F.J.

DAGOBERT I, a Frankish king; received, in 622, Austrasia from his father, Clotaire. He grew up under the tutelage of Major-Domo Pipin

and of Bishop Arnulf, of Metz. On the death of his father, in 628, he became sole ruler of the Frankish kingdom, having transferred his residence to Paris. He died in 638, the last sturdy scion of the Merovingian family. See FRANCE, Vol. IX, p. 469. DAGOBERT II ruled over Austrasia from 673 to 678, when he was murdered. G.A.S.

DAGUPAN, a Philippine town in Pangasinan, Luzon, an important road center, money-order station and terminus of Manila and Dagupan Ry. Chief shipping point of province. Pop., 1903, 20,357.

DAHLAK OR DAHALAK, an archipelago in the Red Sea, belonging to the Italian province of Eritrea, and lying about 28 miles east of the port of Massowah. The chief island of the group, called Dahlak, was known to the ancient Romans as Orina, and was famous for its pearl fisheries. Two others are named Nora and Harmil. W.F.J.

DAHLEN, a town of Germany in the Prussian Rhine province, about 26 miles E. of Leipsic. It has extensive manufactories of linen and silk. Population, 2,866.

DAHLGREN, FREDERIK AUGUST, a Swedish poet and critic; born in Nordmark, Sept. 20, 1816. He was graduated from the University of Upsala in 1839, and in 1871, having become well known as a historian, as a dramatic author, and as a poet, was elected to the Swedish Academy. He was associated with Chemnitz in the publication of *The Thirty Years' War*, a monumental work, and published several lesser historical works of his own. His *Vermländingarne*, a national opera, was brought out in 1846, and achieved great success. He also furnished for theatrical use translations into Swedish of many of the plays of Shakespeare. Died in 1895.

DAHLGREN, JOHN ADOLPH, an American naval officer; born in Philadelphia, Pennsylvania, November 13, 1809. His father, Bernard Ulric Dahlgren, was for twelve years United States consul to Sweden. John Adolph joined the navy at the age of seventeen, passed midshipman in 1832, was advanced to the rank of lieutenant, and in 1855 to that of commander. In 1845 he was detailed to Washington, being assigned to duty in the Ordnance Department. It was due to his efforts that the Ordnance Bureau was extended and developed. He was the inventor of the Dahlgren gun (q. v.), besides contriving an improved and more effective method of mounting gunboats with 12 to 24 pound howitzers, throwing canister-shot and shrapnel-shells. At the outbreak of the Civil War he was commander of the naval station at Washington and in June, 1862, was appointed chief of the Ordnance Department. In July, 1862, he undertook the supreme command of the South Atlantic squadron, and after the death of Admiral Foote in 1863 was appointed to the command of the South Atlantic blockading fleet stationed before Charleston. He was given command of the South Pacific squadron in 1866 and in 1868 was again made chief of the Ordnance Bureau. He published *Thirty-two Pound Practice for Ranges* (1850); *Systems of Boat Armament in the United States Navy* (1852); *Naval Percussion Locks and Primers* (1852); *Ordnance Memoranda* (1853); *Shells and Shell-guns* (1856). He died in Washington, July 12, 1870. His *Memoirs* appeared in 1882. W.M.C.

ADMIRAL DAHLGREN.

DAHLGREN GUN, a form of ordnance named for its inventor, Admiral Dahlgren of the United States navy. It was the result of a careful series of experiments on the construction of large guns. The chief improvement consisted in having relatively less metal in front of the trunnions, and more behind, where there is the greatest strain in firing. The 9-inch and 11-inch Dahlgrens are still the favorites of American seamen, and are unsurpassed by any ship-gun in the world.

DAHLONEGA, a town and the county seat of Lumpkin County, Georgia, in the northern part of the state. It lies on the Chestatee River, a tributary of the Chattahoochee, in a rich agricultural and mineral region, gold having been found in paying quantities in the neighboring mountains. It was once the seat of a United States mint, and is now the site of a state Agricultural College. Its population was 896 in 1890, and 1,255 in 1900. W.F.J.

DAHN, JULIUS SOPHUS FELIX, jurist, historian and poet, son of an eminent actor and actress; was born in Hamburg, Germany, on February 9, 1834, and studied at Munich and Berlin. He became a professor at Munich in 1862, at Würzburg in 1863, and at Königsberg in 1872, filling there the chair of German jurisprudence. He was a voluminous and authoritative writer of great versatility. Four of his books are standard treatises upon German and other law, six are histories dealing with the Germans, Romans, Goths and Langobards, others form a notable series of popular historical romances, including some of the most powerful in modern German literature, and still others are lyrical and dramatic poems of singular beauty. W.F.J.

DAHOMEY. A complete account of Dahomey is contained in Vol. VI, pp. 674–676. Subsequent history alone need be added here. The kingdom of Dahomey, formerly the most powerful on the Slave Coast, Upper Guinea, has been greatly reduced in size and strength, especially by long and disastrous wars waged against Abeokuta and other petty Yoruba states on its eastern frontier. It now comprises an area of about sixty thousand square miles, with an estimated population of a million. Capital, Porto Novo, pop., 50,000. It extends from Yoruba westward to the River Volta, separating it from Ashanti, and borders northward on the Wangera territory. It is entirely an inland state. According to the treaty of delim-

itation between British and French West African possessions, by convention of Aug. 10, 1889, Dahomey came within the sphere of France. Early in 1890 difficulties arose respecting the disputed stations of Porto Novo and Kotonu on the south coast, but after a brief series of hostilities peace was concluded in September, 1890, Dahomey recognizing the French claims to those places. Hostilities were resumed by the war-loving natives in 1893, and French troops under Colonel Dodds advanced from the coast to the capital, Abomey, which was captured in November, 1893. King Behanzin surrendered upon the 25th day of January, 1894, and was exiled to Algiers, where he died in 1906. His successor, King Guthili, was, in 1900, exiled to the Congo.

There are annually exported from Dahomey 10,000 tons of palm-oil and 20,000 of palm kernels, value 12,000,000 francs.

DAIMIO. See JAPAN, Vol. XIII.

DAIMLER, GOTTLIEB, inventor of the gasoline-motor, and of the first practical gasoline automobile; born at Schorndorf, Württemberg, on March 17, 1834; studied at the Polytechnical School of Stuttgart. In 1884 he patented the first horizontal one-cylinder motor, which he, in 1885, improved upon by the invention of the carburator. In the same year he invented the motor-cycle, the gasoline motor-boat, and later on the gasoline street car and the four-cylinder motor. He died on March 6, 1900, at Canstatt, Württemberg. See Supplements, AUTOMOBILE VEHICLES.

DAINGERFIELD, a town and the capital of Morris County, northeastern Texas, situated 17 miles S. E. of Mount Pleasant on the Rio Grande railroad. It is in a fine forest region, and has manufactures of chairs and other wooden articles. Population 1890, 553.

DAIRY PRODUCTS, in the United States. See AGRICULTURE, and BUTTER, in these Supplements.

DAKOTA CITY, a town 16 miles N. of Fort Dodge, on the Blue Earth River, and on the Chicago and North-Western railroad; the capital of Humboldt County, northwestern central Iowa, Humboldt College is situated one mile north of the town. Population 1900, 362.

DAKOTA CITY, capital of Dakota County, northeastern Nebraska. It is located on the west bank of the Missouri, seven miles below Sioux City, Iowa, and on the Chicago, St. Paul, Minneapolis and Omaha railroad. Population 1900, 521.

DAKOTA FORMATION, a geological formation of the Cretaceous period, so named from the Dakota Indians. There are borne in this formation rich deposits of coal and of vegetable remains, indicating that the banks of the water-body depositing the formation were heavily timbered. Frequent shale and sandstone beds common throughout the Great Plains, especially in the western portion, and reappearing in the Colorado uplands, mark the outcrop of this formation. Reservoirs of artesian water occurring in the sandstones of this formation are the most important sources of deep-well supply in the West.

DAKOTA RIVER, also called JAMES RIVER, from the French *Rivière à Jacques*, is a large tributary of the Missouri River, which rises near Devil's Lake in the north-central part of North Dakota, and flows southward through that state and South Dakota to the Missouri River near Yankton, S. D. W.F.J.

DALAGUETE, town on S.E. coast of Cebú, Philippine Islands. Chief occupations, weaving of rough fabrics and the growing of Indian corn, sibucao, cacao, copra and sugar. Pop., 1903, 21,354.

DALAMOW OR DALMOW, a city of India, on the Ganges, in the department of Oude. It is a reputed holy place, containing two antique temples of Siva. Population, 10,000.

DALBERGIA, a genus of trees and climbing shrubs of the natural order *Leguminosæ*, having a stalked and membranous pod, which is flat, tapers to both ends, and contains one to three flat seeds. All the species are natives of warm climates. Some are valuable timber trees and *D. monetaria* of Surinam yields resin similar to dragon's blood. The genus is named in honor of the Swedish botanist, Nicholas Dalberg. W.R.B.

DALE, ROBERT WILLIAM, an English Congregational minister; born in London, Dec. 1, 1829. He was educated at Spring Hill College, Birmingham, and at the University of London. In 1859 he became pastor of the Congregational church at Carr's Lane, Birmingham, having since 1853 served as its associate pastor. For several years editor of *The Congregationalist*, he delivered the Congregational Union lectures in 1873, and took a prominent part in the movements of the churches of his denomination in England. Mr. Dale traveled in the Orient, and in 1877 visited America at the invitation of the theological faculty of Yale College to deliver the Lyman Beecher lectures on preaching. On his return to England he published, in *The Ninteenth Century*, his *Impressions of America*. He was a frequent contributor to the English reviews, and wrote numerous works, among which are *Week-Day Sermons; The Ten Commandments; Nine Lectures on Preaching;* and *Lectures on the Epistle to the Ephesians*. He was a man of exceptional strength and breadth of learning, famous as a writer upon popular subjects, as well as a pulpit orator. He died in London, March 13, 1895.

DALECARLIA, the län or county of Kopparberg, formerly a province of Sweden, lying in the south-central part of the kingdom. The Dalecarlians are celebrated for bravery and patriotism, especially for the part they took in freeing their country from the rule of Christian II of Denmark. As a reward, they are accorded special privileges by the king. The county is rich in mineral resources, especially in iron and copper, and is noted for its rugged and picturesque scenery. Area of Kopparberg, 11,522 square miles; population (1900), 217,708.

DALEVILLE, a village of Lauderdale County, central eastern Mississippi, of importance only as being the seat of Cooper-Huddleston College.

DALHOUSIE, a seaport town of northern New

Brunswick, situated at the mouth of the Restigouche River, and capital of Restigouche County. It has a fine harbor and docks. The chief industry is preserving salmon and lobster. Its exports are fish and lumber. The Intercolonial railway passes within four miles of the town. Population 1901, 2,600.

DALIAS, a town of southwestern Spain, in the province of Almeria, about 20 miles from the city of that name, and 4 miles from the Mediterranean Sea. It is poorly built and subject to earthquakes. It has lead-mines. The people are chiefly employed in mining, smelting and fishing. Population, 6,400.

DALKISSORE OR ROOPNA-RAYAN, a river of Bengal, rising in lat. 23° 30′ N., and long. 86° 34′ E. It has a southeasterly course of about 170 miles, emptying into the Hoogly River at Diamond Harbor. It is navigable for the greater portion of its course.

DALL, WILLIAM HEALEY, naturalist, was born in Boston on August 21, 1845, and studied under Louis Agassiz. He went with the international telegraph expedition to Alaska in 1865–68, and travelled much in Alaska and Siberia; served on the U. S. coast survey in Alaska in 1871–84, was palæontologist to the U. S. geological survey in 1884–98, and has been attached to the U. S. National Museum since 1880 and professor of invertebrate palæontology in the Wagner Institute, Philadelphia, since 1893. He has written a number of books on Alaska, on molluscs, and on fossils. His mother, Caroline Wells Dall, was a well known writer of the last generation. W.F.J.

DALLAS, a town and county seat of Paulding County, Georgia, in the northwestern part of the state. It was the scene of several battles fought by General Sherman just before taking Atlanta in 1864. Its population was 644 in 1900. W.F.J.

DALLAS, a town and the capital of Polk County, northwestern Oregon, fifteen miles west of Salem, on the Rickreal River, and on the Southern Pacific railroad. It has an academy, woolen and flour mills, tannery, etc. Population, 1900, 1,271.

DALLAS, a city of Texas, the metropolis of the northern portion of the state, capital of Dallas County, on the Trinity River, about one mile below the mouth of the West Fork. Although it was first settled in 1841, it has become one of the most important cities in the state. It is situated in the midst of a productive agricultural region, and has large grain-elevators and commercial warehouses. It is an important railroad center, being at the crossing of the Houston and Texas and the Texas and Pacific railways. It is abundantly supplied with good water, obtained from artesian wells; has gas-works, street-railways and electric-lighting systems. It has a university of the Christian Church, a college for women (Episcopal), a medical college, and excellent public and parochial schools. Its principal manufactures are flour, cottonseed-oil, agricultural implements, cement, artificial stone, wagons and carriages, and cotton and woolen goods. It also carries on an immense trade in cotton, grain, hides, etc. The Texas State Fair and Dallas Exposition buildings are located here, and cover eight acres of ground. It has many literary and benevolent institutions. Population 1890, 38,067; 1900, 42,638.

DALLAS, ALEXANDER JAMES, an American statesman; born in Jamaica, W. I., June 1, 1759. He was educated at Edinburgh and at Westminster. He came to the United States in 1783, and in 1785 was admitted to the Pennsylvania bar. In 1791 he was appointed Secretary of the Commonwealth of Pennsylvania, an office he filled for several years. In 1801 he was appointed United States district attorney for the Eastern District of Pennsylvania, and held that position till 1814, in which year he was chosen Secretary of the Treasury. He inaugurated a vigorous financial policy, recommended the establishment of a national bank, and brought order out of the chaos in which he found Treasury matters on assuming office. In 1815 he undertook the additional post of Secretary of War; on April 10, 1816, the national bank act was passed; and in November of that year Mr. Dallas resigned his offices. He published four volumes of Reports of the decisions of the Supreme Court of Pennsylvania, covering a period between 1754 and 1806, and an annotated edition of the State laws. He died in Trenton, N. J., Jan. 16, 1817. E.E.T.

DALLAS, GEORGE MIFFLIN, an American statesman; born in Philadelphia, July 10, 1792, second son of A. J. Dallas (q. v.). He graduated at Princeton, 1810, and was admitted to the bar in 1813. He became private secretary to Albert Gallatin, who was sent on a special mission to St. Petersburg, whence Mr. Dallas was sent to London with despatches to the Russian ambassador there. He spent several months at Ghent during the peace negotiations, and was thence sent home with despatches. He began practice in Philadelphia, and became solicitor to the United States Bank. In 1817 he was appointed deputy attorney-general of Pennsylvania for Philadelphia County. In 1828 he was elected mayor of Philadelphia, but resigned the following year on being appointed United States district attorney, which office he also resigned on being elected United States senator, a position he filled from 1831 to 1833. He was attorney-general of Pennsylvania, 1833–35; minister to Russia, 1837–39; Vice-President of the U. S., 1845–49; minister to Great Britain, 1856–61. He died in Philadelphia, Dec. 31, 1864. E.E.T.

GEORGE M. DALLAS.

DALLES CITY OR "THE DALLES," capital of Wasco County, northern Oregon, located on the south bank of the Columbia River, and on the Oregon railroad, 90 miles E. of Portland. It was

founded in 1852. It has fine churches and excellent schools, including a Catholic academy. There is a branch mint and large woolen mills. Cattle, sheep and wool form its chief staples of industry. Pop. precinct, 1900, 1,277.

DALLES OF THE COLUMBIA, a place on the Columbia River where the stream is greatly narrowed, to less than one-third its general width, and accordingly plunges with great velocity and tumult between the confining walls of rock. It is in Wasco County, Oregon, about 75 miles east of Portland and 50 miles east of and above the Cascades. The name Dalles is applied to similar places in other rivers; particularly in the St. Louis River, Minnesota. W.F.J.

DALLES OF THE ST. LOUIS, a part of the St. Louis River, in Minnesota, near Duluth, which is greatly narrowed and filled with rapids, entirely impeding navigation. W.F.J.

DALLINGER, William Henry, an English clergyman and naturalist; was born in 1841 at Davenport, England. At the age of 20 he entered the Wesleyan ministry, and for 12 years served in Liverpool. In 1888 he resigned the governorship of Wesley College, Sheffield, and devoted himself to his specialty, the study of minute forms of animal life. In 1866 he published *Minute Forms of Life;* in 1878, *The Origin of Life;* and in 1881, *Creator, and What We May Know of Creation.* The valuable results of Mr. Dallinger's investigations won him recognition throughout the scientific world, in which he held positions of high honor. As a minister he strove to demonstrate the harmony between Christian faith and scientific truth.

DALL'ONGARO, Francesco, Italian journalist and patriot; born 1808 at Mansué; studied theology at Vienna and Padua. In 1836 he founded the journal *La Favilla*, in Triest, and wrote several dramas. Having been expelled in 1847 on account of a revolutionary public speech, he went to Venice, became editor of the *Monitore Romano* and organized the First Italian Legion. Expelled, he spent ten years in exile; was allowed, however, to return in 1859, and became professor of literature at Florence, and later at Naples, where he died Jan. 10, 1873. He wrote *Poesie; Stornelli Politici e non Politici*, etc. G.A.S.

DALRYMPLE, Alexander, a Scotch geographer, younger brother of Sir David D.; was born near Edinburgh, July 29, 1737. During his service with the East India Company (1752–65) he undertook several expeditions to the South Pacific Archipelago; returned, 1765, to England, but again entered the service of the company from 1775–77, and in 1779 was appointed hydrographer of the company, and in 1795 hydrographer of the Admiralty. He died in London, June 19, 1808. His most memorable writings are *Account of Discoveries in the South Pacific Ocean Before 1764*, and *Historical Collection of South Sea Voyages.* G.A.S.

DALTON, a town and the county seat of Whitfield County, Georgia, in the northwestern part of the state. It lies among the mountains, near the Costanaula River, in a rich mineral country, and has considerable mining and manufacturing interests. It was the scene of severe fighting between General Sherman and General Johnston in 1864, during the former's march from Chattanooga to Atlanta, and was nearly destroyed by the ravages of war. With the return of peace its prosperity was restored. It is reached by the Southern railroad. Its population was 3,046 in 1890 and 4,315 in 1900. W.F.J.

DALTON, a town of Berkshire County, Massachusetts, among the Berkshire Hills, a few miles north of east from Pittsfield. It has paper-making and other industries, and is reached by the Boston and Albany railroad. Its population was 3,014 in 1900. W.F.J.

DALTON, John Call, physician and surgeon; was born at Chelmsford, Mass., on February 2, 1825, and was educated at Harvard and Harvard Medical School (1844 and 1847). He was a professor successively in the Buffalo Medical College, the Medical College of Vermont, the Long Island College Hospital in Brooklyn, N. Y., and the College of Physicians and Surgeons in New York. He was one of the foremost physiologists of his time, and wrote a valuable work on *Human Physiology* in 1859. He died on February 12, 1889. W.F.J.

DALTON-IN-FURNESS, England, an iron mining and manufacturing town of the Furness peninsula, Lancashire, 4 miles north of Barrow-in-Furness, on an inlet of Morecambe Bay in the Irish Sea. An abundance of red hematite iron ore in the vicinity promotes its prosperity. The ruins of the ancient Peel of Foundey castle and the fine remains of Furness Abbey are in the neighborhood. Population, 13,020. C.L.S.

DALTONISM or COLOR-BLINDNESS. See Dalton, John, Vol. VI, p. 691.

DALY, Augustin, dramatist, was born at Plymouth, N. C., on July 20, 1838, but spent most of his life in New York City. He began as a journalist, and was dramatic critic of *The Courier* and *Enquirer*, but in 1862 adapted and produced a play and thereafter devoted himself to dramatic work. He wrote and adapted many plays, and managed various theatres in New York. He opened Daly's Theatre in 1879, and made it the home of the best plays produced by the best stock company in America. Many leading actors and actresses were trained by him there. He died on June 7, 1899. W.F.J.

DALY, César Denis, a French architect and publicist; born July 19, 1811, at Verdun, France. Early in his career he began architectural study under Jacques Félix Duban, the greatest French architect of his time. At about the same time he became one of the prominent contributors to the *Democratie Pacifique*, a daily journal whose advocacy of the social philosophy of Fourier, and whose staff of brilliant writers won for it great celebrity. M. Daly established, also, what became the foremost of architectural journals, *La Revue de l'Architecture et des Travaux Publics.* This he edited until his death. He visited America in 1855, traveling

extensively and making archæological and ethnological studies in the United States and in Central America. His most important work in construction was done from 1840 to 1845, during which time he had in charge the restoration of the cathedral of St. Cecilia, at Albi. The most considerable of M. Daly's professional writings is his monumental *Motifs Historiques d'Architecture et de Sculpture d'Ornement*. He died in Paris, in March, 1894.

DALY, Charles Patrick, an American jurist; born in New York, Oct. 31, 1816. He was a clerk, a foremast hand at sea, and a mechanic; but he studied law and was admitted to the bar in 1837. He was a member of the New York Assembly, 1843; was appointed judge of the court of common pleas in 1844, and held the office 42 years, for 27 of which he was chief justice. He was president of the American Geographical Society from 1864 until his death, which took place in North Haven, L. I., Sept. 19, 1899. E.E.T.

DAM. See Water-supply, Vol. XXIV, pp. 427–429.

DAMALA, Madame. See Bernhardt, Rosine, in these Supplements.

DAMANHUR, a town in the province of Behere, in Lower Egypt, 36 miles from Alexandria, known to the ancients as Hermopolis Parva. It has large cotton mills. Pop. 27,000. W.F.J.

DAMAR, a town of Yemen, southern Arabia, situated about 120 miles N.N.W. of Aden. It has a college, and is the residence of a governor. It contains 20,000 inhabitants.

DAMARALAND, a German protectorate in western South Africa, extending along the coast from the Kunene River to Walfish Bay, inland to long. 21° E. It forms the northern part of the German possessions in southwest Africa. The coast is bare and desolate, but inland are richer tracts. The country is occupied by the South-West African Company, an Anglo-German Syndicate, which obtained the right to search for and work the minerals of the district, outside the bounds of the German Southwest African Colonial Company, which holds the right principally for the coast-lands. The country is apparently rich in copper, and in agricultural resources, though as yet undeveloped. The area, including Great Namaqualand, is 322,450 square miles with a population of 204,600 of which, in 1904, 4,600 were whites. See also Africa, in these Supplements.

DAMASTES, historian; born in Greece in the time of Herodotus, and according to Suidas, a disciple of Hellanicos of Leslos. His works included a *History of Greece*, genealogies of the heroes of the Trojan War, and a treatise upon *The Poets and the Sophists*. G.J.H.

DAMBOOL or DAMBULA, a village of Ceylon, about 40 miles north of Kandy. Its principal feature, for which it is world-renowned, is a vast Buddhist temple, or series of temples, hewn out of the rock in a hillside. This extraordinary shrine was constructed about 100 B. C., and is especially rich in carvings and statuary, some of the rock-hewn figures being of colossal size. There are also some interesting historical inscriptions upon the walls of great antiquity The temples are said to have been founded by some kings or chieftains of Ceylon, who found in that place a refuge against their foes. W.F.J.

DAME'S VIOLET (*Hesperis*), a genus of plants of the family *Cruciferæ*, of which there are several species, natives chiefly of the middle and south of Europe. The common dame's violet, or white rocket (*H. matronalis*), is cultivated in gardens in the United States. The night-rocket (*H. tristis*) is a favorite flower in Germany.

DAMIEN, Joseph de Veuster, Father, a Belgian clergyman and missionary; born in Louvain, January 3, 1840. He was a member of the Society of the Sacred Heart of Jesus and Mary, and at twenty-four years of age, while yet a theological student at the university, he received permission to embark for Honolulu, in place of an elder brother belonging to the same order, who was destined for the mission. In 1873, Father Damien first went to Molokai to help the lepers make their Easter duties. He remained at the Molokai colony until leprosy caused his death August 10, 1889. W.M.C.

DAMM, Christian Tobias, a Greek scholar and theologian; born near Leipsic in 1699. He was rector of the Berlin gymnasium for twenty years (1744–64). His *Homeric and Pindaric Lexicon*, published in 1765, was his principal work. He also translated into German the Homeric poems. Died in 1778.

DAMMUDAH, a river of India, rising in Ramgarh, Bengal, about lat. 23° 55′ N., and long. 84° 53′ E.; pursues a southeasterly course of about 350 miles, and empties into the Hooghly from the right. The valley of the river is rich in deposits of iron and coal. The stream is navigable for light boats through most of its course.

DAMOPHON, of Messene, a Greek artist, who flourished in the fourth century B. C., famous as a sculptor of large images of gods, made partly of marble and partly of wood. In Elis he was charged with the work of restoring the Olympian Zeus, executed by Phidias, but partly ruined in the length of time. Remains of statues of immense size, made by Damophon, were found in 1889 at Lykosura, Arcadia. G.A.S.

DAMPIER ARCHIPELAGO and STRAIT, named for the noted buccaneer and navigator William Dampier. The archipelago lies off the northwestern coast of Australia, at lat. 21° S., long. 117° E. They are not important or large; they belong to Western Australia. The strait is at the western end of Papua, or New Guinea, and separates it from Waigoe Island, lat. 0°, long. 131° W. It is 35 miles wide and 70 long.

DAMPS, in mining, the name given to the gaseous products eliminated in wells, coal-mines, etc. There are two kinds: *Choke-damp*, mainly composed of carbonic acid, and so called from its extinguishing flame and life; and *fire-damp*, consisting principally of light carburetted hydrogen, and so called from its tendency to explode when mixed with atmospheric air and brought into

contact with flame. See also COAL, Vol. VI, p. 67.

DAMROSCH, LEOPOLD, a German-American composer, conductor and violinist; born in Posen, Prussia, October 22, 1832. He was graduated from the medical school of the University of Berlin and for several years was a practicing physician. Meanwhile he had arduously studied music, making his *début* as a concert violinist in 1855. He was a pupil of Ries and Dehn and made such favorable progress as a musician that in 1864 he surrendered his profession of physician and started on a concert tour through Germany. He met with great success and on his return to Posen was appointed musical director at the Stadt Theatre. In 1866 he was appointed to a similar post in Breslau. In 1869 he removed to the United States and in 1871 became leader of the Arion Society in New York city. He was the first to introduce German opera in the United States, its presentation being at the New York Metropolitan Opera House in 1884. He was the founder of the New York Oratorio Society and the Symphony Society, of which organizations he remained leader until his death. In 1881 he conducted in the Seventh Regiment Armory the finest musical festival ever held in New York. He died in New York city, February 15, 1885. W.M.C.

DAMROSCH, WALTER JOHANNES, a German-American musical conductor and composer; born in Breslau, Prussia, January 30, 1862. He removed to New York with his father, Leopold Damrosch, and in 1871 became director of the New York Oratorio Society and New York Symphony Society. He succeeded his father as director of German Opera at the Metropolitan Opera House. He was married in 1890 to Margaret, daughter of James G. Blaine (q.v.). He composed the musical score of the opera *The Scarlet Letter*, after Nathaniel Hawthorne's romance, which was produced in Boston with great success. He was the first conductor to produce *Parsifal* in the United States. He also brought out Grell's *Missa Solemnis* and Liszt's *Christus*. W.M.C.

DAMS, SUBMERGED. See IRRIGATION, in these Supplements.

DAMSON (Lt., *damascanum*), a small succulent oval plum originally brought from Damascus, Syria. There are many sub-varieties of different colors—black, dark purple, yellow, bluish, etc. The most popular damsons are the Frogmore, Shropshire and French varieties, which are largely cultivated in the United States. It is highly prized for making preserves. W.R.B.

DAN, a river which rises in the southern part of Virginia, flows into North Carolina, then back into Virginia, and finally empties into the Roanoke River. The city of Danville, Virginia, is situated upon its banks. W.F.J.

DANA, CHARLES ANDERSON, journalist and *littérateur;* was born at Hinsdale, New Hampshire, on August 8, 1819, a member of the same family that produced Justice Dana and the two Richard Henry Danas. He fitted himself for college, studied two years at Harvard, and then entered the Brook Farm community, where he was intimately associated with some of the foremost intellectual leaders of the day, and where his after career was largely determined. He is said to have been the only one in the community who regarded its affairs with practical business sense. After the failure of Brook Farm he entered newspaper work in Boston, and in 1847 became a member of the staff of the New York *Tribune*. There he remained until 1861, being most of the time Horace Greeley's most trusted aid. From 1861 to 1865 he was assistant Secretary of War at Washington, then edited a paper in Chicago for a short time, and in 1868 became editor of the New York *Sun*, in which capacity he won his chief distinction. A man of strong friendships and equally strong animosities, a trenchant writer, and an encyclopædic scholar, he made the *Sun* one of the foremost journals of America. He was engaged in collaboration with George Ripley in much important encyclopædic work, edited a *Household Book of Poetry*, which still ranks among the best collections of English verse, and wrote a *Life of Ulysses S. Grant*. Down to 1868 a strong Republican, he was thereafter, as editor of the *Sun*, an ardent Democrat until 1884, when he became independent of party ties. In 1896 he again supported the Republican party. He died at his home at Dosoris, Long Island, on Oct. 17, 1897. W.F.J.

CHARLES A. DANA.

DANA, EDWARD SALISBURY, mineralogist; born in New Haven, Conn., Nov. 16, 1849; was graduated at Yale University in 1870, and studied at Heidelberg and Vienna. He began his work as an instructor in 1874, being successively tutor in mathematics, assistant professor, and professor of physics. He also became curator of the mineral cabinet and a trustee of the Peabody Museum, and was elected a member of the National Academy of Sciences in 1884. He is the author of *Text Book of Mineralogy* and other mineralogical works. G.J.H.

DANA, JAMES DWIGHT, scientist; was born at Utica, N. Y., on February 12, 1813, and was graduated from Yale College in 1833, where he was a pupil of the elder Silliman. Later he was an assistant to Silliman, then mineralogist and geologist to the Wilkes exploring expedition which was sent by the U. S. government to the South Pacific in 1838–42. The next thirteen years were spent in preparing the reports of this expedition and in other scientific work. He also edited *The American Journal of Science and Arts* which had been founded by Silliman. In 1855 he succeeded Silliman as professor of geology and natural history at Yale, which place he filled for many years, his work there marking an epoch in American scientific instruction and re-

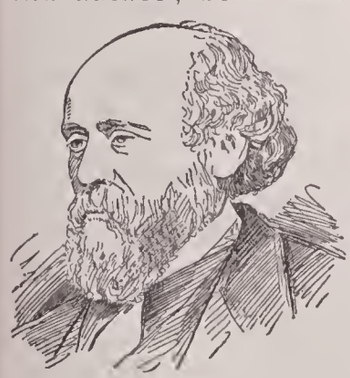
search. He was elected president of the American Association for the Advancement of Science in 1854, and was elected to membership in many learned societies throughout the world, including the Royal Academies of Sciences in Berlin and Munich, and the geological and Linnæan societies in London. He easily ranked among the foremost geological philosophers of the world, and imparted imperishable distinction to American science and scholarship. He wrote a number of standard works on geology, mineralogy and allied themes, which have been translated and circulated in all countries. Among them are a *Manual of Geology; Text Book of Geology*, *Corals and Coral Islands; Geological Story Briefly Told*, and *Characteristics of Volcanoes*. He died at New Haven, Conn., on April 14, 1895. W.F.J.

JAMES D. DANA.

DANA, JOSEPH, an American clergyman; born in Pomfret, Connecticut, November 13, 1742. He was graduated from Yale College in 1760 and was ordained as the minister of the South Society in Ipswich, Massachusetts, November 7, 1765, where he remained for 60 years. Twelve of his occasional sermons were published, one of which was on the death of Washington. On the 60th anniversary of his ordination, at the age of 83, he preached a sermon in which he stated that he had followed about 900 of his parishioners to the grave. He died November 16, 1827. W.M.C.

DANA, JUDAH, jurist and legislator; was born in Massachusetts in 1772, and was graduated from Dartmouth College in 1795. He became a lawyer, was district attorney for Oxford County, Maine, for six years, judge of probate for twenty years, common pleas judge for nine years, one of the authors of the Maine constitution, a member of the State Executive Council in 1834, and U. S. Senator in 1836–37. He died on December 27, 1845. W.F.J.

DANA, RICHARD HENRY, an American lawyer and author; born in Cambridge, Massachusetts, August 1, 1815. He was a son of Richard Henry Dana (q. v., Vol. VI, p. 701). He studied at Harvard, but ill health compelled him to leave college and he shipped as a sailor on the ship *Pilgrim* on a voyage around Cape Horn to the Pacific coast. He detailed his experiences at sea in a volume *Two Years Before the Mast*, which gained wide popularity and remains one of the classics in American literature.



RICHARD H. DANA.

Upon his return he again entered Harvard, graduating in 1837. He then studied law and in 1840 was admitted to the Massachusetts bar. He was active in the formation of the Free Soil party and was a delegate to the Free Soil Convention meeting in Buffalo in 1848. In 1853 he was a member of the Massachusetts Constitutional Convention. In 1858 and 1859 he made a pleasure voyage around the world. In 1860 he was appointed United States attorney for Massachusetts, and in 1867 was elected to the state legislature. He ran for Congress in 1868 but was defeated. In 1876 he was nominated by President Grant United States minister to England, but was rejected by the Senate. He wrote a revision of Wheaton's *International Law*, *The Seaman's Friend*, a manual of laws and customs of the sea; and memoirs of Edward Channing and Washington Allston. Like his father he was a prominent contributor to the *North American Review*. In 1880 he went to Europe to examine into questions of international law. He died in Rome, Italy, January 7, 1882. W.M.C.

DANAO, Philippine Island town on E. coast of Cebú, 4 miles N. of Compostela. Population, 1903, 16,173.

DANBURY, a city of southwestern Connecticut, and one of the capitals of Fairfield County. Danbury is noted chiefly for its manufacture of hats, an industry which has flourished there for more than a century. It has manufactures of sewing-machines, boots and shoes, shirts, etc. There are also iron foundries, extensive waterworks, a town farm for the indigent, a cemetery of remarkable beauty, a high school, several graded schools, and a fine public library. The population of the city in 1890 was 16,552; of the town, including the city, 19,473. In 1900 the population of the city was 16,537; including the town, 19,474. See DANBURY, Vol. VI, p. 702.

DANCE OF DEATH, a certain class of allegorical representations illustrative of the universal power of death, and dating from the fourteenth century. The drama was constructed simply, consisting of short dialogues between Death, portrayed by a skeleton figure, and a number of followers. They were enacted originally in churches, and by religious orders. After a time an illustration was attached to each strophe, and these eventually became the chief point of interest. Being transferred from the quiet convent to more public places, they gave a new impulse to popular art, and series of scenes founded upon the Dance of Death are to be found treated in painting, sculpture and tapestry throughout Europe. The more ancient name was Dance Macabre, a word whose origin has given rise to a great amount of dispute among etymologists.

DANE, NATHAN, an American jurist; born in Ipswich, Mass., in 1752. He graduated at Harvard in 1778; studied law in Salem, Mass., and began to practise in Beverly in 1782. He was a member of the State House of Representatives, 1782–85; delegate to the Continental Congress, 1785–88; member of the State Senate, 1790, 1794,

1796–98; commissioner to codify the State laws, 1795 and 1812; and member of the Hartford Convention, 1814. He founded the Dane professorship of law at Harvard, stipulating that Judge Story should be its first incumbent. He died in Beverly, Feb. 15, 1835. E.E.T.

DANENHOWER, JOHN WILSON, naval commander and explorer, was born in Chicago on September 30, 1849, and was graduated from the U. S. Naval Academy in 1870. He became an ensign in 1871, a master in 1873, and a lieutenant in 1879. He served on surveying work in the North Pacific in 1873–74, in Hawaii in 1873, and in the Mediterranean in 1877. In 1878 he was sent with the *Jeannette* Arctic exploring expedition, of which he was second in command. Upon the sinking of the vessel he had command of one of the three boats in which the survivors sought to escape, and after a threemonths' march across floating fields of ice succeeded in reaching the Siberian shore in the Lena delta, in September, 1881. He sent forward native messengers to secure aid while he searched for the crews of the other boats. Finally he led his crew 6,000 miles to Orenburg, leaving Melville to continue the quest. He reached America in 1882, published *The Voyage of the Jeannette*, and died on April 20, 1887. W.F.J.

DANIEL, JOHN WARWICK, soldier and Senator, was born at Lynchburg, Virginia, on September 5, 1842, and received an academic education. He entered the "Stonewall Brigade" of the Confederate army in May, 1861, and became General Early's chief of staff, serving until crippled in the Wilderness in May, 1864. Then he studied law at the University of Virginia and engaged in its practice with much success. He served in the Virginia house of delegates in 1869–72, and in the state senate in 1875–81; was a Democratic Presidential elector-at-large in 1876; has been a member of Democratic national conventions since 1880; was candidate for governor in 1881; was a representative in Congress in 1885–86, and in 1887 took his seat as a United States Senator, which he still occupies. He has long been one of the foremost Senators on the Democratic side. He is the author of two notable law treatises, *Daniel on Attachments* and *Daniel on Negotiable Instruments*. He is an impressive orator, and has been much in demand as a public speaker. W.F.J.

JOHN W. DANIEL.

DANIELL'S CELL. See ELECTRICITY, Vol. VIII., p. 87; and ELECTRICITY, §§ 99, 100, in these Supplements.

DANIELSON OR DANIELSONVILLE, a manufacturing town of Windham County, Connecticut, in the northeastern part of the state. It lies on the Quinnebaug River, and is reached by the New England railroad. Its population in 1900 was 2,823. W.F.J.

DANITES, a secret organization among the Mormons, founded in 1838, whose members are believed to have been the authors of the Mountain Meadow massacre in 1857, and to have committed other atrocities. See MORMONS, Vol. XVI, p. 852.

DANKALI OR DANAKIL, a semi-independent state of Abyssinia, extending along the S.W. border of the Red Sea, included in the Italian colony of Eritrea. It is sterile and almost destitute of water. The heat is excessive, often reaching 110°F. The population, about 70,000, is Arabic and Mohammedan; the people are treacherous, indolent, and cruel.

DANNEWIRKE OR DANNEWERK, an ancient Danish wall of defense. See SCHLESWIG, Vol. XXI, p. 432. *The Dannewirke* is a favorite title for Danish newspapers.

D'ANNUNZIO, GABRIELE, Italian poet and novelist; born on the yacht *Irene* in the Adriatic, near Pescara, in 1864; educated at the College of Prato, Tuscany; went to Rome in 1880, but of late years has lived at Chieti. His works are brilliant, but realistic and sensual, and the later ones pessimistic. They include *Primo Vera* (1880); *Terra Vergine; Canto Novo* (1882); *Intermezzo dirime* (1883); *Il Libro delle Vergini* (1884); *San Pantoleone* (1886); *Isotheo; Chimera; Elegie Romana; Poema Paradisiaco; Il Piacere* (1889; in English, "*Pleasure*," 1898); *Marine Odes* (1893); *The Triumph of Death* (1894; English, 1896); *Maidens of the Crag* (1895); and *L'Innocente*.

DANSVILLE, a town of Livingston County, New York, in the western part of the state, on a tributary of the Genesee River. It has considerable industries, and is the site of a large health resort. Its population in 1900 was 3,633. W.F.J.

DANVERS, a town of Essex Co., Mass., 20 miles N. of Boston, on the Boston and Maine railroad; has large factories of shoes, iron, brick, carpets, and lumber, and a state insane asylum. Pop. 1900, 8,542.

DANVILLE, a city, the capital of Vermilion Co., Ill., an important railroad center on the Chicago, Danville and Vincennes, the Paris and Danville, the Wabash, the Indianapolis, Bloomington and Western, and the Evansville, Terre Haute and Chicago railroads; also on the Big Vermilion River; has various factories, also the car and machine shops of the Chicago, Danville and Vincennes railroad; and is engaged largely in the mining and shipment of coal, which crops out in abundant quantities from the bluffs in the immediate vicinity. Pop. 1880, 7,733; in 1890, 11,491; in 1900, 16,354. See DANVILLE, Vol. VI, p. 722.

DANVILLE, a town, the capital of Hendricks Co., Ind., 19 miles W. of Indianapolis, on the Cleveland, Cincinnati, Chicago and St. Louis railroad; has flouring-mills, and factories of wooden articles. Population 1890, 1,569; 1900, 1,802.

DANVILLE, a town and the county seat of Boyle County, Kentucky, near the center of the state. It is in the heart of the best stock-raising region of Kentucky, 75 miles southeast of Louisville and 30 miles south by west of Lexington. It is the seat of several colleges and seminaries, and of a state asylum for the deaf and dumb, and is reached by the Cincinnati Southern railroad. The battle of Perryville on October 8, 1862, was

fought near the town. Its population was 4,285 in 1900. W.F.J.

DANVILLE, a flourishing city of Pittsylvania County, Virginia, on the Dan River Falls, 65 miles S. of Lynchburg, and is a railroad center. It is estimated that between 30,000,000 and 50,000,000 pounds of tobacco are sold at Danville annually. There are nearly 150 tobacco establishments and three cotton-mills in the city. It is the seat of the Danville Male Academy, the Danville Female Academy, and the Roanoke Female College. Population in 1890, 10,305; in 1900, 16,520.

DANZIG, capital of the province of West Prussia on the Vistula. The old fortifications and bastions which surrounded the inner town were taken down in 1895–96, the trenches filled in and promenades and gardens made on part of the area. A cordon of detached forts were since built for the defence of the harbor. The market hall, post office and railway station are among the new buildings. The industries, in part, are ship building, steel foundries, rolling mills, sugar refineries, flour and oil mills. Pop. 1905, 159,648. See DANTZIC, Vol. VI, p. 720.

DAPHNE, a genus of shrubby plants of the family *Thymeleaceæ*, natives of Europe and Asia, characterized by its very tough bark, entire leaves, salverform or funnelform variously colored flowers in umbel-like lateral or terminal clusters, and brightly colored berries. *D. Mezereum* and *D. Cneorum*, both of Europe, and *D. odora* the "sweet daphne" of China, are in common cultivation. The nearest American representative is the allied genus *Dirca*, known as "leatherwood" or "moose-wood."

DAPHNIA. See CRUSTACEA, VI, 568, 587.

DAPONTE, LORENZO, an Italian composer of librettos; born at Ceneda, Venice, March 10, 1749. He went from Treviso, where he held a professorship at a seminary, to Venice, Gôrz, Dresden, and settled at Vienna. He wrote librettos for Salieri, Martini and Mozart, of which those of *The Marriage of Figaro* and of *Don Juan* obtained the greatest fame. He left Vienna for Triest, London, and New York. In the latter city he, in 1878, became professor of Italian at the Columbia College, and died Aug. 17, 1838. Besides 34 dramatic pieces and opera librettos he also published his *Memoirs* (1823–27). G.A.S.

DARAGUNJ, an Indian town in the Northwest Provinces, opposite Allahabad, and connected with it by a ferry across the Ganges.

DARBUNG, a mountain torrent of Bussaher, Hindustan. It rises in the Himalaya Mountains, 15,000 feet above sea-level, and, after flowing for twenty-seven miles, is lost in the Sutlej, the most easterly of the five rivers of the Punjab. A wooden bridge about thirty-three feet in length crosses this river about seven miles above its junction with the Sutlej, at a descent of 6,000 feet from its source, the banks of the river still farther up being bordered by several villages. Its source, which consists of fields of snow and ice half concealed beneath stones and rubbish, is described as a scene of terrific desolation.

DARBY, JOHN NELSON, an English theologian; and DARBYITES, a sect, his followers. See PLYMOUTH BRETHREN, Vol. XIX, pp. 250, 251.

DARBY CARBONIZING PROCESS. See IRON AND STEEL, in these Supplements.

D'ARCET, JEAN PIERRE JOSEPH, a French chemist; born in Paris, Aug. 31, 1777, the son of Jean D'Arcet, director of the porcelain manufactory at Sèvres; died Aug. 2, 1844. He introduced many innovations in manufacturing gunpowder, steel and bronze wares. He first brought into use bone-dust as a fertilizer, and in 1802, discovered boiling sulphuric acid to be a medium for separating gold from silver. G.A.S.

DARDANELLE, a town and county seat of Yell County, Arkansas, is reached by the St. Louis and Iron Mountain railroad. Its population was 1,602 in 1900. W.F.J.

DARDANELLES, a town of the Turkish province of Bigha Asia Minor, situated at the Ægean extremity of the Dardanelles Strait where it is but one mile between the continents of Europe and Asia. It commands the approach to Constantinople from the Mediterranean. Pop. 1901, 13,000. See DARDANELLES, VI, 724.

DARIEN SCHEME. See PATERSON, WILLIAM, Vol. XVIII, pp, 364, 365.

DARK AGES (476–918 A.D.). A period in European history beginning with the fall of the Roman Empire, in 476 A.D., down to that of the consolidation of the German monarchy under Henry I., "the Fowler," the first of the Saxon line of the kings of Germany and emperors of the Holy Roman Empire, in 919 A.D. In English history, it is the era when Saxon supremacy was firmly established and the feudal system had its beginning. Some historians speak of the era of the "Dark Ages" as synonymous with that of the "Middle Ages," extending the period from 476 A.D. to the close of the 15th century, with the invention of printing, the revival of learning in Europe, and the discovery of America. The era cannot be rigidly put within limits, though we should hardly place the close of the "Dark Ages" beyond the 13th century—the era which saw the rise of modern towns and the germ of political freedom in municipal institutions, the result of a reaction and protest against feudal violence and papal tyranny. For the transition period between the Middle Ages and modern times, see RENAISSANCE, Vol. XX, p. 392.

DARLEY, FELIX OCTAVIUS CARR, artist, was born in Philadelphia, Penn., on June 23, 1822, and in boyhood showed much artistic ability. His first published work was a series of sketches of city street scenes, for a local periodical. In 1848 he removed to New York, where he made illustrations for Irving's *Sketch Book*, *Dietrich Knickerbocker's History of New York*, *Legend of Sleepy Hollow*, *Rip Van Winkle*, and other works. He also illustrated Hawthorne's *Scarlet Letter*, Longfellow's *Evangeline*, *Courtship of Miles Standish*, etc., and some of Cooper's and Dickens's novels. He was the author of *Sketches Abroad with Pen and Pencil*. His best work

was done in illustrating Judd's novel, *Margaret*, work widely recognized throughout the world as of surpassing excellence. Some of his pictures have been used for the adornment of United States bonds and bank notes. He died at Claymont, Delaware, on March 27, 1888. W.F.J.

DARLING, a river of New South Wales, southwestern Australia, formed by the confluence of a number of rivers in the northern part of the colony, flows southwest for 600 miles and enters the Murray at about lat. 34° S., and long. 142° E.

DARLING, Grace, life-saving heroine; was born at Bamborough, England, on November 24, 1815, the daughter of William Darling, lighthouse keeper on Longstone Island. On September 7, 1838, the ship *Forfarshire*, with 63 persons aboard, went ashore on Harker's Rock. Forty-three lives were lost before the wreck was seen. Then Darling and his daughter, with marvelous skill and daring, put out in a small boat through a raging storm and rescued the survivors. This exploit made Grace famous, but she died of consumption on October 20, 1842. W.F.J.

DARLINGTON, a town and the capital of Darlington County, northeastern South Carolina, 93 miles E.N.E. of Columbia, on the Atlantic coast line. It has a large trade in cotton, shipping annually twenty thousand bales, and also manufactures cotton goods. Population 1900, 3,028.

DARLINGTON, a city and the county seat of Lafayette County, Wisconsin, in the western part of the "southern tier" of that state. It lies on the Pecatonica River, a tributary of Rock River, in a rich agricultural and cattle country, and has considerable manufacturing industries and an extensive commerce. Other interests are mineral springs, which have given rise to a large health resort, and fresh water pearl fisheries. It is reached by the Chicago, Milwaukee and St. Paul railroad, about 130 miles northwest of Chicago. Its population was 1,808 in 1900. W.F.J.

DARLINGTON, William, an American botanist and politician; born in Birmingham, Pa., April 28, 1782. He spent his early life on a farm, studied medicine, and graduated at Pennsylvania University in 1804. In 1806–07 he voyaged to the East Indies as ship's surgeon, and on his return practised at West Chester, Pa., for several years. He raised a company of volunteers in 1812; was major of a regiment in 1814; sat in the United States House of Representatives, 1815–17 and 1819–23; and in 1826 established a botanical society in West Chester, in which city he died, April 23, 1863. E.E.T.

DARLINGTONIA, a genus of Californian plants of the family *Sarraceniaceæ*, being the Pacific coast representative of the Sarracenias, or pitcher-plants of the Atlantic region. The single species known (*D. Californica*) has the habit of the Sarracenias, growing in boggy ground, with a radical rosette of pitcher-like leaves, from the center of which rises the long scape bearing a single large nodding flower. The "pitchers" are the largest and among the most elaborate to be found in the family. The funnel-shaped tube rises with a spiral twist, becomes enlarged at the summit into the inflated over-arching dome which comes down over the rim of the pitcher, and terminates in a gaudily colored fish-tail appendage. Within the pitcher are numerous downwardly pointing hairs, to prevent the escape of the entrapped insects, and an accumulation of a sweetish liquid, in which they are drowned and macerated. Honey-like secretions upon the outside of the pitcher and upon the fish-tail appendage serve as a lure to the rim of the pitcher, within which a glazed zone usually insures a fall into the liquid, and the retrorse hairs prevent an escape. So far as known, the bodies thus obtained are macerated merely for absorption, and not subjected to the action of a digestive fluid, as in certain other carnivorous plants. The pitchers of *Darlingtonia* are two or three feet high, and form one of the most complete insect-traps known. See Insectivorous Plants, Vol. XIII, p. 145.

DARMESTETER, Arsène, a French philologist and classical scholar; born in Paris, Jan. 5, 1846. Having undertaken studies anticipatory to the duties of a Jewish rabbi, he became deeply interested in philology, and determined to make that his life-work. His studies with Paris, the eminent French philologist, began in 1867. A few years later he had won the recognition of contemporary philologists, and had become a prominent authority upon the philology of the Romance languages. Solely to him is credit due for demonstration of the great importance of certain Old French glosses upon Hebrew words in determining the precise character of eleventh-century French. His dictionary of the French language, begun in association with M. Hatzfeld in 1871, is a monumental work of great value to philologists. In 1877 he published *Concerning the Actual Creation of New Words in the Freneh Language*, and, a year later, *View of French Literature in the Sixteenth Century*. At the time of his death, which occurred Nov. 7, 1888, he had but just reached what promised to be the most important period of his work.

DARMESTETER, James, a French Orientalist, brother of the preceding; born March 28, 1849, at Château-Salins, studied in Paris comparative philology, theology, and Old Persian in particular. In 1885 he became professor at the Collège de France. He published *Harvatât et Ameratât* (1875); *Essais Orientaux* (1883); *Le Mahdi* (1885); *Études Iraniennes* (1883); *Les Origines de la Poésie Persane* (1887). After his death, Oct. 19, 1894, at Maisons-Lafitte, appeared a complete translation of the *Zend-Avesta* (1902–03), his chief work, which obtained the grand prize by the Institute de France. G.A.S.

DARNEL, the common name of *Lolium temulentum*, a pasture-grass introduced into the United States from Europe. It grows one or two feet high, with a loose spike of spikelets placed edgewise. It also is called "rye-grass" or "ray-grass," and, frequently being associated with wheat, its grains were supposed once to render the flour injurious.

DARTER. See SNAKE-BIRD, Vol. XXII, p. 198.

DARTER-FISH, the *Toxotes jaculator*, of the East Indies, supposed to capture insects on overhanging shrubbery by squirting water upon them; also applied to some perches. R.W.C.

DARTMOOR, a granitic upland in Devonshire, England, the source, with two exceptions, of all the principal rivers of the county, remarkable alike for its wild and rugged scenery, its antiquities, its wide, solitary, trackless wastes, and its mineral products. To the brief notices found under DEVONSHIRE, Vol. VII, pp. 120, 121, the addition of more particulars of Dartmoor is desirable, visited as its rugged wilds are by tourists, and favorite subject as its bold scenery has been for the brush of many an artist.

The moor proper is upward of 130,000 acres, or 203 square miles, in extent, the extreme length from north to east being 25 miles, and the extreme breadth from east to west, 20 miles. The outline is irregular, and the surface has been well described as an extensive knob of granite covered by a peaty sponge. Its higher ranges are bleak and barren, but it has some pretty wooded valleys, through which run numerous streams, all well stocked with trout. The characteristic features of Dartmoor, however, and what give to it the chief interest, particularly for the antiquary and archæologist, are its many "tors," or huge blocks of granite, crowning the hills, its "maenhirs," its stone circles and its prehistoric villages, all walled around against wolves. Over the East Dart a rude cyclopean bridge still stands. Antiquaries attribute it to Celtic days, and its structure is such that the scythed chariots of Damnonian warriors might pass the river in safety. Near by is Crockern Tor, where the Stannary Parliament was wont to meet in the open air, until the middle of the last century. Kistvaens, or stone tombs of prehistoric days, are numerous, and Druidical circles are scattered over the moorland. In the most desolate part of the moor is Foxtor-mires, a treacherous morass, in which perished the only convict who has succeeded in escaping from the prison of Prince Town. This last was erected in 1808, at a cost of $635,000, as a place of confinement for prisoners of war. With peace, it was converted into a naphtha factory, but on the cessation of penal transportation it was reclaimed by government and employed as a convict station. Two strong walls inclose a circular area of about thirty acres, on which are built the prisons and offices. They are constructed of large blocks of stone, and radiate from a center. Four of the buildings (each 300 feet long and 50 feet wide) are used as prisons. Upward of 120 acres in the neighborhood are cultivated by the prisoners, and produce barley, oats, flax, carrots and mangold-wurzel.

A little to the west of Prince Town lie the enormous Dartmoor quarries, connected with Plymouth by the Plymouth and Dartmoor railway, and worked by convict labor from the neighboring prison.

The chief drawback to haphazard traveling over Dartmoor is the rough character of its upper parts. No one whose aim is enjoyment should attempt to cross by any but the beaten tracks, except in clear and dry weather.

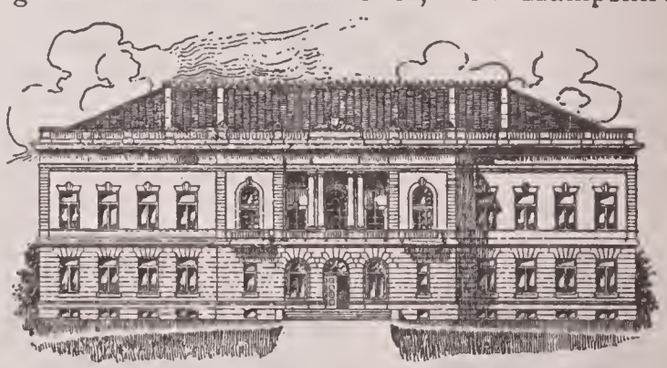
Tavistock, Lidford, with its fabled prototype of lynch law, whereof Browne, the Tavistock poet, wrote:

> I 've ofttimes heard of Lydford law,
> How in the morn they hang and draw,
> And sit in judgment after.

Moreton Hampstead, Bovey Tracey with a church full of quaint epitaphs of Anglican martyrs, Holne, Ashburton and Ivy Bridge are old-fashioned and curious towns around the moor, much frequented by tourists seeking picturesque repose. Dartmoor sheep are a small, hardy race, wild and restless, whose original home is in the forest and heathlands of Devonshire and Cornwall. In size they are small, their average weight on killing being about eleven pounds per quarter. Their mutton is highly esteemed for its flavor, and commands a ready sale. Their wool is soft and long, but of little bulk. They feed upon pasture too poor for the sustenance of other sheep, have white faces and legs, and when the ewes are crossed with Leicesters, heavy lambs are produced. A meteorological station is maintained on Lee Moor at an altitude of 860 feet above sea-level. The mean annual rainfall from 1866 to 1880 was seventy inches. The moor is often used for army maneuvers and artillery practice. Rowe's *Perambulation of Dartmoor* (1895) and Page's *Dartmoor* and *Rivers of Devon* (1895) contain valuable information.

DARTMOUTH, a town of Nova Scotia, connected by ferry with Halifax. It contains a number of manufactories, three tanneries, a provincial lunatic asylum and many handsome residences. Population 1891, 6,252; 1901, 6,579.

DARTMOUTH COLLEGE, an institution of higher education at Hanover, New Hampshire.



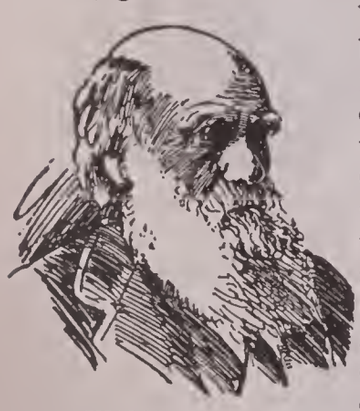
BUTTERFIELD MUSEUM, DARTMOUTH COLLEGE.

Its buildings stand upon the banks of the Connecticut River, amid beautiful surroundings. Save Harvard, Yale and Brown, Dartmouth is the oldest of the New England colleges. Moore's Indian Charity School, named for its benefactor, Joshua Moore, was established at Lebanon, Connecticut, Dec. 18, 1754, by Eleazer Wheelock, and out of it grew Dartmouth College. One Samson Occum, an Indian preacher who made a tour of England in 1865, was the means of arousing great interest in this school, and a sum of £10,000 was raised there for its benefit. At this time the first

board of trustees was elected, and the Earl of Dartmouth, who had taken keen interest in the enterprise, was chosen its president. The college was named in his honor. It was not, however, called a college until its removal, in 1865, into the township of Hanover, in the province of New Hampshire. The attendance was then about equally divided between Indian and English youths. The charter of the institution was given by Governor John Wentworth, in the name of King George III, Dec. 13, 1769. The college, whose early patrons were mostly in Great Britain, suffered keenly during the War of the Revolution, but it held its own and slowly regained prosperity. In 1816 the state legislature passed an act to change the name to "Dartmouth University," and to put the institution under state control. Out of this legislation grew the notable Dartmouth case, tried before the supreme court of the United States, and argued by Daniel Webster, who won the case for his *alma mater*. The old board of trustees was completely upheld in its maintenance of the sacredness of a private corporation, and its right to non-interference on the part of the state. The "university" was annulled and the former order of things resumed.

Dartmouth has become one of the foremost of institutions of higher education in the Eastern states, and is regarded as typical of the old-fashioned New England college. The religious tone is high, although the institution is non-sectarian. Associated with Dartmouth are the New Hampshire Medical School, the Chandler Scientific School, the Thayer Engineering School and the New Hampshire College of Agriculture and Mechanic Arts. Students in attendance in 1904, 963; instructors, 92; volumes in library, 100,000. The presidency of the college has been held as follows: Eleazer Wheelock, 1769–79; John Wheelock, 1779–1815; Francis Brown, 1815–20; Daniel Dana, 1820–21; Bennett Tyler, 1821–28; Nathan Lord, 1828–63; Asa Dodge Smith, 1863–77; Samuel Colcord Bartlett, 1877–92; William Jewett Tucker, 1893.

DARWIN, Charles Robert, an English naturalist, grandson of Dr. Erasmus Darwin (q. v., Vol. VI, p. 730) was born at Shrewsbury, Feb. 12, 1809. He was educated at Edinburgh University, and at Christ's College, Cambridge. It was at the latter institution that his biological studies seriously began. On Dec. 27, 1831, shortly after taking his degree of B.A., he was appointed through the influence of Prof. J. S. Henslow of Cambridge, his instructor in botany, naturalist to the expedition of H.M.S. *Beagle* for a hydrographical survey of South American waters. He returned to England Oct. 2, 1836. It was during this long expedition that he obtained that intimate knowledge of the fauna, flora, and geological conditions of many tropical, subtropical and temperate climates which so admirably equipped him for the great work he was afterward to perform. On his return he formed the friendship of several scientific leaders, through whose influence he was appointed, in 1838, secretary of the Geological Society. In the next year he was elected to the Royal Society, and married his cousin, Miss Wedgewood. In the same year he published *Journal of Researches Into the Geology and Natural History of the Various Countries Visited by H.M.S. Beagle.* From 1840 to 1843 Darwin was occupied with the publication of the *Zoölogy of the Voyage of the Beagle.* In 1842 appeared his work on *The Structure and Distribution of Coral Reefs;* in 1844, *Geological Observations on Volcanic Islands;* and in 1846, *Geological Observations on South America.* These placed him at once in the front rank of contemporary scientific thinkers. Three years after his marriage, Darwin settled at Down, in Kent, where the remainder of his life was passed, private means enabling him to devote himself unremittingly to the pursuit of science. In 1858, Darwin set to work seriously to condense his vast mass of notes, and put into shape his great work, *The Origin of Species by Means of Natural Selection,* published in November, 1859. This book (see Variation, Vol. XXIV, pp 85, 86), written in a style straightforward, and of charming simplicity, yet whose sensational theories represented the farthest reach of scientific knowledge, at once aroused a storm of controversy as no book of its kind has ever done. Its effect was widespread and profound. Darwin, meanwhile, calmly continued the work, in which he had shown the genius of patience and insight. In his subsequent publications he maintained, throughout a bitter theological and scientific warfare, the undisturbed serenity characteristic of the simple seeker after truth. No personal element finds place in his writings. The great series of works supplemental to *The Origin of Species* includes, besides his scarcely less famous *Descent of Man, The Fertilization of Orchids; Insectivorous Plants; Earthworms; Expression of Emotions in Man and Animals;* and *Cross and Self Fertilization in the Vegetable Kingdom.* It is as the great leader of evolutionary biology that Darwin will mainly be remembered. Though not himself the originator of the hypothesis, he was undoubtedly the first to gain for it acceptance among biological experts. He died April 19, 1882, and was buried with unusual honors in Westminster Abbey.



CHARLES DARWIN.

The article on Tides, in this Encyclopædia, was written by Mr. Darwin's son, George Howard.

DARWIN, Erasmus, English naturalist and poet; born Dec. 12, 1731, at Elton; died April 18, 1807. His chief work on natural history is *Toonomia, or the Laws of Organic Life.* As a poet he is known by *The Temple of Nature.* G.A.S.

DARWIN, Francis, an English botanist; son of Charles Robert Darwin; born at Down, Kent, England, Aug. 16, 1848. He studied at Cam-

bridge and became professor of botany at the University of Cambridge in 1888. He assisted his father in the editing of his work, *The Power of Movements in Plants* (1880 and 1881). He also wrote treatises on physiological botany, and in conjunction with Acton *Practical Physiology of Plants* (1894). G.A.S.

DARWIN, GEORGE HOWARD, an English scientist, the eldest son of Charles Robert Darwin, was born in 1845. He graduated from Trinity College in 1868, and in 1870 took part in the eclipse expedition to Sicily. He became a fellow of the Royal Society in 1879, and after that time his labors mainly were directed to investigation in physical astronomy. In 1882 he assisted in the revision of Thompson and Tait's *Natural Philosophy*. He became Plumian professor of astronomy and experimental philosophy at Cambridge in 1883. Besides numerous contributions to scientific journals, he has published *On the Influence of Geological Changes on the Earth's Axis of Rotation; On the Remote History of the Earth;* and *On Tides* (1898).

DARWINISM. See EVOLUTION, Vol. VIII, p. 673; and SOCIALISM, Vol. XXII, p. 230.

DASENT, SIR GEORGE WEBBE, an English author; born May 20, 1820, at St. Vincent, in the West Indies, of which island his father was attorney-general; was educated at Westminster School and King's College, London, and at Magdalen College, Oxford; called to the bar at the Middle Temple in 1852. An accomplished linguist, he acted frequently as examiner in English and modern languages for civil service appointments. In 1870–92 he was a civil service commissioner. In 1876 he was knighted for his services. He published a translation of *The Prose, or Younger Edda* (1842); *The Norseman in Iceland* (1858); *Popular Tales from the Norse* (1859); and *Tales from the Fjeld* (1874), both from the Norwegian of Asbjörnsen; translations from the Icelandic of the *Saga of Burnt Njal* (1861) and the *Story of Gisli, the Outlaw* (1866). His introduction to Asbjörnsen's *Popular Tales* is an admirable exposition of the Aryan theory of story transmission. His novels include *Annals of an Eventful Life; Three to One; Vikings of the Baltic;* and *Half a Life.* He died at Ascot, June 11, 1896.

DASYA, a genus of usually filamentous branching Red Algæ. Certain characteristic branches give rise to the *tetraspores*, or reproductive bodies. The species are numerous, brightly colored, and largely of tropical seas, but *D. elegans* is a common species of the Atlantic coast of the U. S.

DASYPODIDÆ. See MAMMALIA, Vol. XV.

DASYURIDÆ. See MAMMALIA, Vol. XV.

DATE-LINE, COMMERCIAL, coincides practically with the nautical date-line, or the 180 meridian east of Greenwich, in the middle of the Pacific. On crossing this meridian the sailors change the date and the day of the week, so that on a trip from east to west one day is omitted, while on a journey from west to east, a day and a date is entered twice in succession.

DATE-PLUM, a name given to species of *Diospysos*, a genus of plants of the family *Ebenaceæ*. The trees are deciduous, with a globose berry, and grow in a warm or temperate climate. Some species produce ironwood, which is a hard timber, and the blackheart-wood of others is ebony (q.v., Vol. VII, p. 535). The common date-plum, or pishamin, although a native of the coasts of the Caspian Sea, Mauritania, etc., is naturalized and cultivated in southern Europe, and also is called the European lotus and the date of Trebizond. It is a tree growing from 20 to 40 feet high, having shining oblong leaves; the small flowers are reddish white; the fruit, usually the size of a cherry, grows larger in favorable climates, and is then sweet and astringent, and yellow in color. When over-ripe it is eaten, like the medlar, or is used for conserves. One species (*D. Virginiana*), known as the persimmon, or Virginia date-plum, is found throughout the Atlantic and Mississippi valley states, and bears an edible fruit of a reddish color.

DATHOLITE. See MINERALOGY, Vol. XVI, p. 426.

DATIA, a city of central India, capital of a state of the same name. Its population is less than 30,000. W.F.J.

DATISCACEÆ, a small family of plants, allied to *Begoniaceæ*, and consisting of herbs and trees, mostly found in the temperate regions of the northern hemisphere. *Datisca cannabina*, a plant much resembling hemp in its general appearance, a native of Crete, possesses very marked tonic properties. It contains, also, an amylaceous substance, called *datiscin*, resembling *inulin*, and affords a yellow dye.

DATURA, a genus of plants of the family *Solanaceæ*, known as "thorn-apples," or "stramoniums," rank-scented, large-flowered, poisonous weeds, but some in cultivation for ornament. It is characterized by its prismatic calyx, large plaited funnelform corolla, often prickly, globular pods, and large flat seeds. *D. Stramonium*, the common thorn-apple or "Jamestown-weed" (corrupted into "jimson") with green stems and white flowers, and its associate, *D. Tatula*, with purple stem and flowers, are common weeds in waste places in the United States. *D. metel* and *D. meteloides*, and the tropical tree-like shrubs *D. arborea*, and *D. suaveolens*, are cultivated for ornament.

DAUBER, a wasp of the family *Sphegidæ* and genus *Pelopæus*, so named because its nests of mud, which consist of several cells, look like dabs of mud. R.W.C.

DAUBIGNY, CHARLES FRANÇOIS, was born in Paris in 1817, the son of a miniature-painter, and studied under his father, Paul Delaroche, and others. In 1838 he began to exhibit at the Salon, and for many years ranked among the foremost landscape painters of France, his work being notable for its fidelity to nature as well as for its originality of treatment. He had many pupils and imitators, and was practically the founder of a new school of landscape art. He won a first-class medal at the Salon in 1853 with his *Pool of Gylien*. Among his best works are *Springtime; The Banks of the Oise; Windmills at Dord-*

recht; The Rising Moon, and *Vintage*. Many of his masterpieces are in the Luxembourg and other public galleries, including public and private collections in the United States, where he has always been a great favorite. The French government purchased many of his works. He was also an eminently successful etcher and book illustrator, often producing his plates directly from nature in a style of exquisite freedom and spirit. He died on February 19, 1878.

W.F.J.

DAUDET, ALPHONSE, a French dramatist and novelist; born at Nîmes, May 13, 1840, and educated at the Lyons Lycée. In 1857 he went to Paris, where, in 1864, he became secretary to the Comte de Morny, president of the legislative corps. His literary efforts began with poetry, and his first book, *Les Amoureuses* (1858), immediately gained for him a reputation, and led to his employment on several newspapers. In *Figaro* appeared soon afterward *Les Gueux de Province*, in which he depicted with fidelity the miseries of the ushers in provincial schools. He devoted some not too successful years to theatrical work, writing, by himself or in collaboration, *La Dernière Idole* (1862); *L'Œillet Blanc* (1865); *Le Frère Aîné* (1868); *Le Sacrifice* (1869); *Lise Tavernier;* and *L'Arlésienne* (1872). Some of his best work appeared in journals, especially in *Figaro*, including *Lettres de Mon Moulin* (collected 1869); *Tartarin de Tarascon* (1872); the *Contes du Lundi* (1873); and *Robert Helmont* (1874). It was not till about 1874 that he adopted the style which made him famous. He sketched something of the kind in *Le Petit Chose* (1868), a story founded on his own childhood; and the publication of *Fromont Jeune et Risler Aîné* (1874) established his reputation. These were followed by *Jack*, the story of a workman (1876); *Le Nabab* (1877), a caricature of well-known personages under the empire; *Les Rois en Exil* (1879); *Numa Roumestan* (1882); *L'Évangéliste* (1883); *Sapho* (1884); *L'Immortel* (1888); *Souvenirs d'un Homme de Lettres* (1888); *Port-Tarascon* (1890); *Rose et Ninette* (1892); *La Petite Paroisse* (1895); and *Soutien de Famille* (1896). Died in Paris, Dec. 16, 1897.

ALPHONSE DAUDET.

DAUDET, ERNEST, a French politician, publicist, and novelist, brother of Alphonse Daudet, was born at Nîmes, France, May 31, 1837, and removed to Paris in 1857. For a time, with his brother, in the employment of Comte de Morny, he became successively president of the Legislative Assembly, editorial secretary of the proceedings of the Assembly, and chief clerk of the Senate. While occupying these positions he was a constant contributor to various journals, and in 1873 was appointed director of the *Journal Officiel*. In 1877 he became editor of *L'Estafette*. He is author of numerous novels, of works on the political questions of the day, and some of his later works have dealt with matters of history. *L'Histoire des Conspirations Royalistes du Midi sous la Révolution* (1881) was crowned by the French Academy, and a prize was granted to the author on its account. He also wrote the following noteworthy novels: *Jean le Gueux; La Carmelite;* and *Henriette. Histoire de la Restauration* and *Les Bourbons et la Russie pendant la Révolution Française* are others of his important historical productions. He received the cross of the Legion of Honor in 1868.

DAUGHTERS OF THE AMERICAN REVOLUTION. See COLONIAL SOCIETIES, in these Supplements.

DAUGHTERS OF THE REVOLUTION. See COLONIAL SOCIETIES, in these Supplements.

DAUNOU, PIERRE CLAUDE FRANÇOIS, a French author and statesman; born Aug. 18, 1761, at Boulogne-sur-Mer; died in Paris, June 20, 1840. In the national convention of 1792 he opposed extreme measures against Louis XVI. From 1804–16 he held important public offices, but lost them by the Restauration. Reinstated by the Revolution of 1830, he resigned from the professorship of history at the Collége de France. His chief work is *Cours d'Études Historiques* (20 vols., 1842–49).

G.A.S.

DAVENPORT, a flourishing city of eastern Iowa, and capital of Scott County, on the Chicago, Rock Island and Pacific railroad, and is the southern terminus of the Davenport and St. Paul railroad. It is connected with eastern cities by other railroads terminating on the opposite or eastern bank of the Mississippi River. The western terminus of the Hennepin canal, connecting the Mississippi River with the Great Lakes, is opposite Davenport. It has extensive manufactories of carriages, farming implements, woolen goods, cars, furniture, lumber, flour, etc., the census of 1900 showing 416 manufacturing establishments, having an aggregate capital of $10,774,707, and producing annually nearly $12,000,000 worth of finished products. It has numerous excellent schools, the Catholic Seminary of St. Charles Borromeo, a well-endowed Catholic hospital, and a large public library. It is also the seat of Griswold College (Protestant Episcopal), which was founded in 1859, and is the see of the Episcopal Church of Iowa. On the other side of the river, opposite the city, is Rock Island, a beautiful island several miles in length, owned by the United States government. Rock Island is the site of a United States arsenal and military headquarters, and is connected with Davenport by a notable wrought-iron bridge costing over a million dollars. Population of Davenport in 1890, 26,872; 1900, 35,254. See DAVENPORT, Vol. VI, p. 736.

DAVENPORT, EDGAR LOOMIS, actor; born in Boston, Mass., Nov. 15, 1816. He made his *début* as an actor in Providence, R. I., in 1836, as *Wellborn* in *A New Way to Pay Old Debts*, and for ten years afterward was a valued member of the stock companies of Boston theaters. In 1847 he supported Anna Cora Mowatt during a tour in England, and afterward supported Mac-

ready for two seasons. He married Fanny Vining, who became a favorite actress. For many years he was a successful star, showing great versatility and much excellence in all his parts. He died Sept. 1, 1877. G.J.H.

DAVENPORT, Fanny Lily Gipsy, actress; was born in London, England, on April 10, 1850, the daughter of Edward L. Davenport, an eminent actor. She made her first stage appearance in a child's part in *Metamora* in Boston. Her first speaking part was at Burton's Theater, New York, in 1857, and her *début* as an adult actress was made at Niblo's, New York, in 1862. After playing a variety of parts she became the leading lady of Augustin Daly's stock company in New York, in 1869, playing chiefly in the standard English comedies, some Shakespearean parts, and some French adaptations. Later she made many tours of America and of England, with great success, and for years was esteemed one of the foremost American actresses. She gave memorable performances of *Nancy Sykes* in *Oliver Twist*, and of *Fédora* in Sardou's drama of that name. She introduced several of Sardou's plays to the American public. Her second husband, Melbourne McDowell, was with her in many plays. She died on September 26, 1898. W.F.J.

FANNY DAVENPORT.

DAVENPORT, John, an American pioneer clergyman; born in Coventry, England, in 1597. He was educated at Oxford, and became an eminent preacher among the London Puritans. His Nonconformist tendencies brought him into conflict with Archbishop Laud, and he resigned his benefice and retired to Holland, where he spent about two years, returning then to London, where a letter from John Cotton induced him to sail for Boston, where he arrived June 26, 1637. On March 30, 1638, he sailed with a company for Quinnipiac (New Haven) to found a new colony. He was minister there for 30 years, and established a system of civil polity which was based on Scriptural rules and the supremacy of the Church. He sheltered the regicides, and when John Wilson, the pastor of the church at Boston, died in 1667, he succeeded him. He died in Boston, Mass., March 15, 1670. E.E.T.

DAVID, a city of the Republic of Panama, about 200 miles west of the city of Panama, and near the northeastern end of David Bay, an indentation of the Pacific coast. It lies at the southern foot of the Cordilleras of Chiriqui, and has some mines of gold and other metals. Its population in 1900 was about 10,000. W.F.J.

DAVID CITY, the capital of Butler County, central eastern Nebraska, 63 miles W. of Omaha, and a railroad center of importance. It is on the Burlington and Missouri River, the Fremont, Elkhorn and Missouri Valley and the Union Pacific railroads. It is employed principally in the shipping of grain and stock raised in the neighborhood, but it also has manufactories of importance. Population 1890, 2,028; 1900, 1,845.

DAVID I and DAVID II, kings of Scotland. See Scotland, Vol. XXI, pp. 504, 511.

DAVIDS, Thomas William Rhys, a British Orientalist; born at Colchester, May 12, 1843, and educated at the University of Breslau. He has held various appointments in Ceylon. His works include *Buddhism* (1878); a *Translation of the Fausböll Collection of Buddhist Birth-Stories* (1880); *Buddhist Suttas from the Páli* (1881); and *The Question of King Milanda* (1890). He is professor of Páli and Buddhist literature at University College, London.

DAVIDSON, George, an American geodesist, engineer and astronomer; born in Nottingham, England, May 9, 1825. He removed to the United States with his parents in 1832 and was graduated from the Central High School, Philadelphia, in 1845. He then joined the United States Coast Survey and was chief engineer of a party which surveyed a ship canal route across the Isthmus of Darien. He also made a geographical survey of the coast of Alaska, and traveled in Egypt, China, India and Europe, for scientific study. From 1877 to 1884 he was regent of the University of California, and was president of the California Academy of Sciences. In 1895 he retired from the Coast Survey and became professor of geography in the University of California. He is the author of numerous works on irrigation, harbor and river improvements, transit observations, transit instruments, and the *Coast Pilot of California, Oregon, and Washington*. He has also invented chronometers, a meridian instrument for latitude and time, and various astronomical instruments. W.M.C.

DAVIDSON, John, a Scottish poet; born April 11, 1857, at Barhead, Renfrewshire, Scotland. His youth was largely spent in the chemical department of a sugar-refinery. For several years he was a teacher in small Scottish towns, and in 1890 went to London, where he engaged in journalism and authorship. His best-known volume of verse is *Scaramouch in Naxos*. Others of his works are *A Random Itinerary; A Romantic Farce; An Unhistorical Pastoral; Fleet-Street Eclogues; Plays, Collected Edition; Godfrida* (a drama, 1898); and *The Last Ballad, and Other Poems* (1899).

DAVIDSON, Robert, educator, was born at Elkton, Maryland, in 1750, and was educated at and taught at Newark Academy, Delaware. He became professor of history in the University of Pennsylvania, in 1774, and ten years later settled at Carlisle, Penn., as pastor of a Presbyterian Church. The next year he became professor of history in and vice-president of Dickinson College, and from 1804 to 1809 was president of that institution. He was successful as an educator and administrator, and was much esteemed as a preacher. He wrote a metrical version of the Psalms and some other works, and was noted as a linguist, having at his command no fewer than eight lan-

guages. He was also an expert astronomer and the inventor of a cosmosphere or compound globe, and was a musician and artist. He died at Carlisle in 1812. W.F.J.

DAVIDSON, Samuel, theologian; was born in Ireland in 1807, was educated at the Royal College in Belfast, and entered the ministry of the Presbyterian Church, from which he changed in 1839 to the Congregational Church. In 1835 he was made professor of Biblical criticism in the Belfast College, and in 1842 was called to a chair in the Congregationalist College in Manchester, England. This latter place he was compelled to resign on account of some opinions expressed by him in an edition of Horne's *Introduction to the Study of the Scriptures*. He was a member of the committee on the revision of the Old Testament, and was the author of numerous theological works of marked ability and authority. These include *Sacred Hermeneutics; An Introduction to the New Testament; Treatise on Biblical Criticism; Introduction to the Old Testament; The Canon of the Bible*, and *The Doctrine of Last Things*. He died in 1898. W.F.J.

DAVIDSON, Thomas, an American naval officer; born in Nottingham, England, August 28, 1828. He was a brother of George Davidson (q. v.). He removed to the United States with his parents in 1832 and was apprenticed to a ship-builder in Philadelphia. In 1861 he entered the employ of the government in the Philadelphia navy-yard, being made quartermaster and promoted to commander. He constructed the *Tuscarora*, *Miami*, and *Juanita* during the Civil War in remarkable short-time periods. The *Juanita*, which carried seven guns, was built in a little over two months. He saved the *Monongahela* from destruction by successfully floating the vessel, which had been driven ashore forty feet on the beach at Santa Cruz. He died in Philadelphia, Pennsylvania, February 18, 1874. W.M.C.

DAVIDSON, Thomas, palæontologist; was born in Edinburgh, Scotland, on May 17, 1817, and was educated at the University of that city. He also studied in France and Italy, and spent much of his life abroad, in travel, study and research. His palæontological work led to his election to the secretaryship of the Geological Society of London, and in 1865 to the awarding of the Wollaston gold medal to him. He wrote a number of scientific works, the chief of which was a treatise on *British Fossil Brachiopoda*. He died on October 16, 1885. W.F.J.

DAVIDSON, Thomas, philosopher and archæologist; was born at Deer, Aberdeenshire, Scotland, on October 25, 1840, and was educated at the University of Aberdeen. After teaching in various English schools he came to the United States in 1867, and became professor of classics in the St. Louis High School. In 1875 he settled in Cambridge, Massachusetts, and afterward traveled much in Italy, Greece and elsewhere, studying art, archæology, literature, and Roman Catholicism. He wrote *A Short Account of the Niobe Group* (1874); *The Place of Art in Education* (1886); *Giordano Bruno; The Relation of His Philosophy to Free Thought* (1886); *A Hand-Book to Dante, from the Italian of Seartazzini* (1887); *Prolegomena to Tennyson's In Memoriam; Aristotle and Ancient and Modern Educational Ideals*, and *The Education of the Greek People and Its Influence on Civilization*. He died on September 14, 1900. W.F.J.

DAVIDSON, William, an American soldier; born in Lancaster County, Pennsylvania, in 1746. He entered the army at the outbreak of the Revolution and was appointed brigadier after the battle of Camden. In January, 1781, he was sent by General Greene to prevent Cornwallis from passing the Catawba at Cowan's Ford. He was shot and killed in the battle which ensued on February 1. W.M.C.

DAVIDSON COLLEGE (named in honor of William Davidson, q.v., in these Supplements), a Presbyterian institution, founded, in 1837, at Davidson, Mecklenburg County, North Carolina. Having been endowed with $300,000 by Maxwell Chambers of Salisbury, North Carolina, it became one of the most important educational institutions in the state. It has over 800 alumni, an average attendance of 175 and a faculty of 13 members. Women are not admitted. President, Henry L. Smith, M. A.

DAVIES, Charles, an American mathematician; born in Washington, Litchfield County, Connecticut, January 22, 1798. He was graduated from the United States Military Academy at West Point in 1824, and was appointed professor of mathematics there in 1828. From 1839 to 1841 he was a professor at Trinity College, and from 1841 to 1845 was paymaster in the United States army. In 1845 he was called to the chair of mathematics at the University of New York, and in 1846 was a professor at the Albany Normal School. From 1857 to 1865 he was professor of higher mathematics at Columbia College. He published *Surveying* (1832); an edition of Legendre's *Geometry; The Metric System; Descriptive Geometry; Logic and Utility of Mathematics; Differential and Integral Calculus*, and other works and text-books on arithmetic and mathematics which were largely adopted by the academies and schools. He died at Fishkill Landing, New York, September 18, 1876. W.M.C.

DAVIES, Henry Eugene, soldier; born in New York city, July 2, 1836; educated at Harvard and Williams Colleges and the Columbia Law-School; practised law in New York until 1861, when he became a captain in the 5th New York Volunteer Infantry. He was subsequently major, lieutenant-colonel, and colonel of the 2d New York Cavalry; and in September, 1863, was brevetted brigadier-general. He was assistant United States district attorney in New York in 1870–73; and died in 1894. G.J.H.

DAVIES, John Llewellyn, an English clergy

man and author; born at Chichester, Feb. 26, 1826. He was educated at Repton School and at Trinity College, Cambridge, and in 1850 became a fellow of Trinity. Ordained in 1852, he was appointed incumbent of St. Mark's Church, London, and subsequently became rector of Christ Church. He was for some years principal of Queen's College, London, chaplain-in-ordinary to the Queen, and a frequent contributor to periodical literature. He published *Theology and Morality, Belief and Practice* (1873); *The Christian Calling* (1875); *Order and Growth in the Spiritual Constitution of Human Society* (1891); and *Spiritual Apprehension* (1898).

DAVIES, Sir Louis Henry, a Canadian jurist and statesman; born in Charlottetown, Prince Edward Island, May 4, 1845. He was educated at Prince of Wales College, and was called to the bar of the Inner Temple, London, in 1866. He was solicitor-general of his native province in 1869, and again in 1872. He was in the legislative assembly until September, 1876, when he became premier and attorney-general, which portfolios he retained till 1879. He was one of the counsel representing Great Britain before the International Fishery Commission in 1877. He entered the Dominion House of Commons in 1882, and in 1886 was made judge of the Supreme Court. He was knighted in 1897, and was Minister of Marine and Fisheries from 1896 to 1901. In 1898 he was one of the joint high commission for settlement of all differences with the United States respecting Canada. W.M.C.

DAVIES, Samuel, ecclesiastic; born in Newcastle County, Del., Nov. 3, 1724. He was ordained a Presbyterian clergyman in 1747, and sent as a missionary to Virginia, where he met with much opposition from the Episcopal Church. He contested its supremacy and found that the Act of Toleration extended to Virginia. In 1759 he was made president of Princeton College, succeeding Jonathan Edwards. He died Feb. 4, 1761. G.J.H.

DAVIES, Thomas Alfred, an American soldier and author; born at Black Lake, St. Lawrence County, New York, Dec. 3, 1809. He was graduated from the United States Military Academy at West Point in 1829. In 1831 he was an engineer on the Croton aqueduct. At the outbreak of the Civil War he entered the army as colonel of the Sixteenth New York Regiment, and was present at the battle of Bull Run and Corinth. In 1865 he was brevetted major-general of volunteers. His published works include *Cosmogony, or Mysteries of Creation* (1858); *Genesis Disclosed* (1860); *Answer to Hugh Miller and Theoretical Geologists* (1861), and *How to Make Money and How to Keep It* (1866). He died in St. Lawrence County, New York, August 19, 1899. W.M.C.

DAVIESS, Joseph Hamilton, lawyer, whose name as "Joe Daviess" is borne by counties in several western States, was born in Virginia on March 4, 1774, and in infancy was taken by his parents into the Kentucky wilderness. At the age of 21 he was admitted to the bar, being finely educated chiefly through his own private studies. He was in 1802 the first western lawyer to appear before the U. S. Supreme Court. In 1808 he was prosecuting counsel against Aaron Burr for making war against a nation with which the United States was at peace, but failed to sustain the charges through the absence of witnesses. He entered the army and was killed at the battle of Tippecanoe, on Nov. 7, 1811. His name is said to have been originally spelled Daveiss. W.F.J.

DAVIS, Andrew Jackson, an American spiritualist and author; born in Blooming Grove, Orange County, N. Y., Aug. 11, 1826. He had little education, and learned shoemaking, but came under the influence of certain mesmerizers, who exploited his powers; among others the Rev. William Fishbough (then of New Haven), who took down, *verbatim*, from his lips, some 800 pages of "revelations," which purported to embrace a range of ontological, cosmical, theological, spiritual, and social subjects. He then renounced the mesmerical idea, but devoted himself to writing books which purported to be spiritually inspired. Among his writings are *The Principles of Nature*, and *Genesis and Ethics of Conjugal Love*. E.E.T.

DAVIS, Arthur Powell, engineer; born in Decatur, Ill., Feb. 9, 1861; was graduated at the State Normal School of Kansas, and then pursued studies in engineering at Columbian University. In 1884–94 he was topographical engineer on the United States Geological Survey, and conducted explorations and surveys in California, New Mexico, and Arizona. In 1895–97 he had charge of all government stream measurements, and in 1898 conducted the hydrographic investigation of the Panama and Nicaragua canal routes. He then became the head engineer of the Arid Land Reclamation Service. His publications are chiefly technical. G.J.H.

DAVIS, Charles Harold, artist, was born at Cambridge, Mass., on January 7, 1856, and studied at the Boston Museum of Fine Arts, and in the Julien Academy in Paris, in the latter place enjoying the instruction of Boulanger and Lefèbvre. He spent ten years in France, and then returned to America for a prosperous career. Examples of his work are to be found in the Metropolitan Museum of Art in New York, the Pennsylvania Academy of Fine Arts in Philadelphia, the Art Institute in Chicago, and other galleries. He received prizes at the Paris Exposition of 1889, at the Columbian World's Fair of 1893, at the Atlanta Exposition in 1895, and at other exhibitions. W.F.J.

DAVIS, Charles Henry, naval commander and mathematician, was born in Boston on January 16, 1807, entered the United States navy in 1823, served on various surveying expeditions, and prepared the *American Almanac* prior to the Civil War. In 1861 he was chief of staff in the Port Royal expedition, and in 1862 was flag officer of the Mississippi flotilla, in which capacity he forced the evacuation of Fort Pillow. After the war he received the thanks of Congress, was made rear-

admiral, and had charge of the naval observatory, and commander of the Norfolk navy-yard. He excelled as a mathematician, and wrote various books and papers on scientific topics. He died on February 20, 1877. W.F.J.

DAVIS, Charles Henry, naval commander, son of Charles Henry Davis (q. v.), was born at Cambridge, Mass., on August 28, 1845, and was graduated from the Naval Academy in 1864. He served in the Civil War, and afterward was engaged in various expeditions for determining latitude and longitude. In 1878–79 he was superintendent of the naval observatory. In the Spanish War of 1898 he was in command of the auxiliary cruiser *Dixie*. He was promoted to be captain in August, 1898. He has written several works on scientific topics, and also a *Life of Rear-Admiral Davis*. W.F.J.

DAVIS, Cushman Kellogg, an American statesman; born in Henderson, New York, June 16, 1838. He was graduated from the University of Michigan in 1857, studied law and was admitted to the bar. He served in the Civil War and began the practice of law in St. Paul, Minnesota, in 1865. He was sent to the Minnesota legislature in 1867; became United States District Attorney in 1868; was elected governor in 1874; and was elected United States Senator in 1887, 1893, and 1899. In 1898 he was a member of the peace commission which negotiated the treaty between Spain and the United States. He died in St. Paul, Minn., Nov. 27, 1900. W.M.C.

DAVIS, David, an American jurist and statesman; born in Cecil County, Md., March 9, 1815. He received a classical education, graduating at Kenyon College, Ohio, in 1832. He studied law at Lenox, Mass., and at the law school at New Haven; was admitted to the bar and commenced practice in Illinois in 1835; and located at Bloomington, Ill., in 1836. He was a member of the State House of Representatives in 1844; delegate to the State Constitutional convention in 1847; was a circuit judge from 1848 to 1862; and a delegate to the national Republican convention a Chicago in 1860. In October, 1862, he was appointed by President Lincoln an associate ju tice of the Supreme Court of the United States, and served till March, 1877, when he resigned to take his seat as United States senator from Illinois, succeeding John A. Logan, to which office he had been elected the previous January. He was elected president of the Senate, *pro tem.*, Oct. 13, 1881; served until March 3, 1883; and died at Bloomington, June 26, 1886. E.E.T.

JUDGE DAVID DAVIS.

DAVIS, Edwin Hamilton, archæologist, was born in Ross County, Ohio, on January 22, 1811, and was educated for the medical profession. His chief attention was given to archæological research, his inspiration arising from the Indian mounds of Ohio and other western states. His exploration of these mounds and collection of relics marked an epoch in our knowledge of the American aborigines, and his book on *Ancient Monuments of the Mississippi Valley*, the first work published by the Smithsonian Institution, remains a noble monument of American scholarship. There is a large collection of his Indian relics in the American Museum of Natural History, in New York. He died on May 15, 1888. W.F.J.

DAVIS, Garret, an American statesman; born in Mount Sterling, Kentucky, September 10, 1801. He studied law and in 1823 was admitted to the Kentucky bar. In 1833 he was elected to the state legislature and was a member of the Kentucky Constitutional Convention of 1839. He was then elected to Congress and served continuously until 1847. He was a pro-slavery champion and tried to prevent the secession of Kentucky during the Civil War. He was elected United States Senator to succeed John C. Breckenridge and filled that office until his death at Washington, District of Columbia, September 22, 1872. W.M.C.

DAVIS, George Royal, an American soldier, legislator and financier; born in Palmer, Massachusetts, January 3, 1840. He commenced the study of law, but in 1862 entered the Union army. After the war he engaged in manufacturing in Chicago. He was elected to Congress in 1878, serving until 1885. He was treasurer of Cook County, Illinois, from 1886 to 1890. He was director-general of the World's Columbian Exposition in 1893. He died in Chicago, November 25, 1899. W.M.C.

DAVIS, Henry Gassaway, capitalist; born in Howard County, Maryland, Nov. 16, 1823; educated at public schools; went to work young, became superintendent of a plantation, then brakeman, conductor, and later agent at Piedmont, W. Va., of the B. & O. R. R.; became president of railroads and of the Davis Nat. Bank of Piedmont; was state senator, 1867–69; U. S. Senator from W. Va., 1871–83, and nominated for Vice-President on the Democratic national ticket, July 10, 1904.

DAVIS, Henry Winter, an American statesman and orator; born in Annapolis, Maryland, August 16, 1817. He was graduated from Kenyon College in 1837, studied law at the University of Virginia and was admitted to the Virginia bar in 1841. He gained local reputation as a political orator and in 1854 was elected to Congress, serving for three terms. In 1860 he declined the Republican nomination for Vice-President and also declined a cabinet portfolio under President Lincoln. In 1863 he was again elected to Congress where he was chairman of the Committee on Foreign Affairs. He was among the foremost men in Congress, advocating emancipation and loyalty to the Union. He wrote *The War of Ormuzd and Ahriman in the 19th Century* (1853), and *Speeches and Addresses in Congress* (1867).

He died in Baltimore, Maryland, December 30, 1865. W.M.C.

DAVIS, JEFFERSON, an American statesman, and President of the Confederate States during the Civil War; born at Abberville, Christian County, Kentucky, June 3, 1808. At an early age he removed with his parents to Wilkinson County, Mississippi. He was given an academic education and entered Transylvania University in 1822, which he left two years later to enter the United States Military Academy at West Point, from which he was graduated in 1828.

JEFFERSON DAVIS.

He served in the Black Hawk War in 1831, being promoted to first lieutenant of dragoons for gallantry in action, and was employed in various expeditions against the Comanches, Pawnees and other hostile Indian tribes. He left the army in 1835, married the daughter of Zachary Taylor, and settled down in Mississippi as a cotton planter. In 1844, after some years of retirement, he began taking an interest in politics and was a Democratic presidential elector. In 1845 he was elected a representative to Congress; but resigned in 1846, having been elected colonel of the First Mississippi Volunteer Regiment of Rifles. He joined the army of General Taylor in the Mexican War and distinguished himself at Monterey and Buena Vista, being severely wounded in the latter battle. In 1847 he was appointed brigadier-general of volunteers, but declined the commission on the grounds that, by the Constitution, the militia appointments were reserved to the states and that such appointments by the President were in violation of state rights. He was then appointed by Governor Brown of Mississippi to fill a vacancy in the United States Senate. In 1850 he was elected Senator for a full term by the state legislature. While in the Senate he was an ardent advocate of state rights and was chairman of the Committee on Military Affairs. In 1851 he resigned his seat in the Senate, having received the Democratic nomination for governor of Mississippi. He was defeated in a close contest. In 1853 he was appointed Secretary of War by President Pierce and held this post until the inauguration of President Buchanan in 1857. In addition to many army reforms, he inaugurated "the system of explorations in the western part of the continent for geographical purposes and for determining the best route for a railroad to the Pacific Ocean." He was again elected a member of the United States Senate from 1858 to 1861. He was at this time one of the most prominent members of the Democratic party, and was frequently mentioned as a candidate for the presidency. He was a leading member of the secret caucus of Southern senators which met in Washington January 5, 1861, and framed the scheme of revolution which was shortly afterwards carried into action. On January 21, he took his leave of the Senate in a speech in which he gave his opinion that, by the secession of his state, his connection with that body was terminated, and reaffirmed the doctrine of the right of secession. The states of South Carolina and Mississippi led the way in seceding from the Union. On February 9, 1861, Jefferson Davis was unanimously elected by the Confederate Congress which met at Montgomery, "President of the Confederate States of America." On February 16, he accepted the office in an address, in which he expressed his desire for the maintenance of peaceful relations with the states which remained in the Union. He declared that if war should be forced upon them, they would make the enemies of the South "smell Southern powder and feel Southern steel." Meanwhile President Davis had assumed control of the militia of his state, and began the enormous task, after war was declared, of organizing the military resources of seceding states. He practically created the Confederate army and navy and the organization necessary to carry on a war. On April 17, 1861, he issued a proclamation authorizing privateering. In his message to the Confederate Congress, April 24, President Davis voiced the sentiments of his people when he said: "We protest solemnly in the face of mankind that we desire peace at any sacrifice save that of honor. In independence we seek no conquest, no aggrandizement, no concessions of any kind from the states with which we have lately been confederated. All we ask is to be let alone; that those who never held power over us shall not now attempt our subjugation by arms." The Confederate Constitution allowed the President to veto any part of a bill and approve the remainder, giving his reason for such action, and fixed the term of office of the President at six years and made him ineligible for a second term. On May 21, President Davis approved an act in answer to one enacted by the Federal government, providing that all persons owing debts to parties in the North should pay the same into the Confederate Treasury. In the war the Confederates mustered into service something like 600,000 men. President Davis called to his assistance the best fighting blood in the South, with such generals as Robert Edward Lee, Albert Sidney Johnston, Joseph E. Johnston, P. G. T. Beauregard, Stonewall Jackson, Bedford Forrest, J. E. B. Stuart, Stephen D. Lee, Richard Taylor, Fitzhugh Lee, Wade Hampton, Kirby Smith, W. J. Hardee, John B. Gordon, Jubal A. Early, and others. On August 14, President Davis issued a proclamation warning all persons of fourteen years and upwards owing allegiance to the United States, to leave the Confederacy within forty days or be treated as alien enemies. In November, 1861, Mr. Davis was duly elected by the Confederate States President for the full term of six years, and in the following February the first Congress assembled at Richmond, where Mr. Davis was

inaugurated on the 22nd. The President reluctantly yielded to the passing of a conscription law, and on the approach of McClellan's army he declared martial law for ten miles round Richmond. President Lincoln having issued his proclamation of emancipation January 1, 1863, Mr. Davis replied by an indignant counter-manifesto, in which he described the emancipation proclamation as the "most execrable measure recorded in the history of guilty man." The war advanced with varying fortunes. During the early part of 1864, the future promised well for the Confederacy, but subsequent Northern successes sent a gloom over the South and a peace party grew rapidly. At the commencement of 1865 a feeling of despondency began to spread over the South. Mr. Davis still contemplated resistance, however, notwithstanding the contrary advice of his generals. In April he left Richmond for Danville, Greensboro, and Charlotte, to confer with his generals. Meanwhile Lee had surrendered to Grant, and on May 10, Mr. Davis was captured at Irwinsville, Georgia, by a party of Union soldiers. He was taken to Fort Monroe and indicted by the Grand Jury of the District of Columbia for treason. He was, however, never brought to trial, but after two years' imprisonment was taken into court at Richmond and was released at the instance of the government on bail. Horace Greeley was one of his sureties. He was included in the General Amnesty Act of Congress of December 25, 1868. After his release he was looked upon as a hero throughout the South and was welcomed everywhere. At one of many public receptions given him, he made a speech in which he reaffirmed his adhesion to the doctrine of state sovereignty. For several years after the war he was president of a Southern insurance company and resided in Memphis, Tennessee. The last years of his life were spent upon his estate at Beauvoir, Mississippi, where he wrote a valuable historical work *The Rise and Fall of the Confederate Government* published in 1881. He died in New Orleans, Louisiana, December 6, 1889. In 1893 his remains were removed to Richmond, Virginia, and reinterred with imposing ceremonies. Mrs. Davis died Oct. 16, 1906. W.M.C.

DAVIS, Jefferson Columbus, soldier; was born in Indiana on March 2, 1828, and at the age of eighteen left school to enlist in the army for the Mexican War, in which he served with distinguished gallantry. At the outbreak of the Civil War he was a member of Major Anderson's garrison of Fort Sumter. He afterward served under General Blunt in Missouri and under Sherman in Georgia. After the war he was on duty in Alaska and in the Modoc War in California. He was the first American army officer to command in Alaska, and Fort Davis there was named for him. He died in Chicago on November 30, 1879. W.F.J.

DAVIS, Jessie Bartlett, an American operatic singer; born near Morris, Illinois, in 1860. She received her musical education under Frederick Root of Chicago, in which city she sang in the choir of the Church of the Messiah. She appeared in *Pinafore*, presented by the Chicago Church Choir Opera Company in 1879, and in 1882 filled the rôle of *Siebel* in *Faust*. She then studied a year in Paris with Madame La Grange. She was married to Will J. Davis in 1880, and in 1886 joined the American Opera Company. For many years she took leading contralto parts with the Bostonians. Died May 14, 1905. W.M.C.

DAVIS, John, an American statesman; born in Northborough, Mass., Jan. 13, 1787. He graduated at Yale in 1812; studied law, and commenced practice in Worcester, Mass., in 1815. He was a Representative in Congress from Massachusetts, 1825–34, when he resigned his seat, having been elected governor of Massachusetts. In March, 1835, having been elected to the United States Senate, he resigned the governorship and sat in the Senate from 1835 to 1840, when he was again elected governor and so remained till January, 1843. He was elected to the Senate in 1845, and sat till 1853. He died at Worcester, Mass., April 19, 1854. E.E.T.

DAVIS, John Chandler Bancroft, diplomat; born in Worcester, Mass., Dec. 29, 1822. His father, John Davis, was four times elected governor of Massachusetts; his mother, Eliza Bancroft Davis, was a sister of George Bancroft, the historian. Educated in the schools of Worcester and at Harvard he studied law, and was admitted to the bar in 1844, but gave up his practice in 1849 to become secretary of the United States legation in London. He returned to the practice of law in 1852, but retired in 1862 owing to ill health. In 1869 he was elected a member of the New York legislature from Newburg, where he then resided, and before his time expired was called by President Grant to serve as Assistant Secretary of State. During his incumbency of this office, he took part in several important diplomatic matters, and prepared the *Case of the United States* for submission to the "Alabama Claims" arbitration tribunal at Geneva. In 1873 he was appointed United States minister to Germany, a position which he resigned in 1877. For the succeeding four years he was judge of the United States Court of Claims, resigning this post to serve again as Assistant Secretary of State under President Arthur. He filled this post for six months when, in 1882, he was reappointed to the Court of Claims. The following year he became the reporter of the United States Supreme Court. Died Dec. 27, 1907. G.J.H.

DAVIS, Sir John Francis, an English Orientalist and army officer; born in London in 1795. He was long a resident in China as chief superintendent of Canton, and afterward as governor and commander-in-chief of the colony of Hongkong. He was created a baronet in 1845. His *China During the War and Since the Peace* appeared in 1852, and was followed in 1857 by *China: A General Description of That Empire*, one of the most trustworthy authorities on China and the Chinese. He died in London, Nov. 13, 1890.

DAVIS, Nathan Smith, physician; was born

at Greene, New York, on January 9, 1817, and was educated at the Fairfield Medical College. He settled in practice at Binghamton, N. Y., and was also a teacher and lecturer there. It was largely through his efforts that a national medical convention was called in 1846 and the American Medical Association was formed. Of that association, of which he was practically the founder, he was president in 1864–65. In 1847–49 he practiced in New York City and was a lecturer in the College of Physicians and Surgeons. In 1849 he removed to Chicago, where he has since remained. He was a professor in the Rush Medical College there in 1849–59, and in 1859 was one of the founders of the Chicago Medical College, now a part of the Northwestern University, in which he was professor from 1859 to 1889, and dean of the faculty from 1889 to 1898. W.F.J.

DAVIS, NATHAN SMITH, JR., physician, was born in Chicago on September 5, 1858, son of Nathan Smith Davis (q. v.). He was educated at the Northwestern University, the Chicago Medical College, the University of Heidelberg, Germany, and in Vienna, Austria. He is dean of the Chicago Medical College, is the author of several important treatises, and has been a member of several international medical congresses. W.F.J.

DAVIS, NOAH, jurist, was born at Haverhill, New Hampshire, on September 10, 1818, was educated at the Lima, N. Y., Seminary, and was admitted to the bar in 1841. He was a justice of the supreme court of the state of New York from 1857 to 1868, and in 1869–70 was a Republican representative in Congress. President Grant appointed him United States district attorney in New York City, in which place he served in 1870–72. In the latter year he was returned to the supreme court, and in 1874 became its chief justice. He presided over the trial of Edward S. Stokes for the killing of James Fisk, Jr., and the famous trial of "Boss" William M. Tweed for official corruption. He returned to private practice in 1887, in New York City, and for the remainder of his life was a conspicuous figure at the bar. He died in New York on March 20, 1902. W.F.J.

JUDGE NOAH DAVIS.

DAVIS, REBECCA HARDING, author; born in Washington, Pa., Jan. 24, 1831. Her parents removed to Alabama while she was quite young, and later settled in Wheeling, then in Virginia. While residing there she wrote her first stories, *Life in the Iron Mills* and *Margaret Howth*, which attracted much attention. In 1863 she was married to L. Clarke Davis, a Philadelphia editor (died Dec. 14, 1904), and after that date resided in Philadelphia. Among her later novels are *Dallas Galbraith; Waiting for the Verdict; A Law unto Herself; Silhouettes of American Life; Doctor Warrick's Daughters*, and *Frances Waldeaux*. For several years she was an editorial writer for the New York *Tribune*. Richard Harding Davis is her son. G.J.H.

DAVIS, RICHARD HARDING, journalist, son of L. CLARK DAVIS and REBECCA HARDING DAVIS (q. v.); was born in Philadelphia on April 18, 1864, and was educated at Lehigh University and Johns Hopkins University. He began newspaper work in Philadelphia, where his father and mother were leaders of that profession, and then removed to New York and became a reporter for the *Evening Sun*. For a time he was on the staff of *Harper's Weekly*. During the war with Spain he essayed correspondence from the front in Cuba, and in the Russo-Japanese War he received a similar commission. In addition to his newspaper work he has written many short stories for magazines, and several novels, books of travel, plays, etc. Among his books are *Stories for Boys; Van Bibber and Others; The Rulers of the Mediterranean; The Princess Aline; Three Gringoes in Venezuela; About Paris; Soldiers of Fortune; The Exiles and Other Stories; The West from a Car Window; Our English Cousins; Cinderella; Gallagher*, and *The King's Jackal*. W.F.J.

DAVIS, WILLIAM MORRIS, geologist; born in Philadelphia, Pa., Feb. 12, 1850, a grandson of the noted reformer, Lucretia Mott. He was educated at the Lawrence Scientific School, Harvard, graduating in 1869, and was an assistant at the National Observatory, Cordova, Argentina, 1870–73. In 1876 he was appointed a teacher in Harvard University and in 1890 became professor of geology there. He is an editor of *Science; American Naturalist*, and *American Journal of Science*. G.J.H.

DAVIS STRAIT, a body of water separating Greenland from Baffin Land, about 180 miles in width, and connecting Baffin Bay with the Atlantic Ocean. A branch of the Arctic current flows through this strait southward along the Atlantic coast of America. It is important as a whaling region.

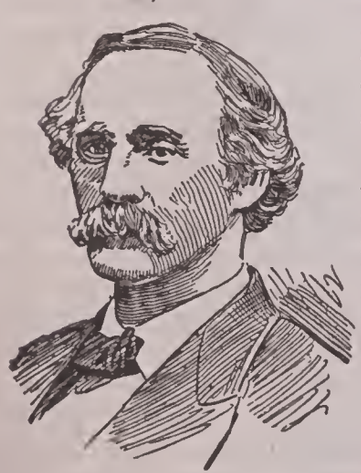
DAVITT, MICHAEL, founder of the Irish Land League, born in 1846 near Straid in County Mayo, Ireland, of poor parents. His father was the victim of a policy of eviction, and Michael Davitt was but four years of age when he saw his home destroyed. His father and mother took him to England, being so poor that they had to beg through the streets for bread. They settled at Haslingden, in Lancashire, and here the child was sent to a mill to work. An accident destroyed his right arm and turned him to books for self-education. In 1866 became connected with the Fenian movement, being concerned in the abortive attempt to seize Chester Castle. In 1870 he was sentenced to 15 years' imprisonment for treason felony, but was released on ticket of leave in 1877. In 1879 he founded, in conjunction with Charles S. Parnell, the Irish Land League. He made a tour of the United States on behalf of that organization in 1880, and on his return to England was again arrested on his

old sentence and held in prison for 15 months. On the day of his release, May 6, 1882, Lord Frederick Cavendish and Mr. Burke were assassinated in Phœnix Park, Dublin. Mr. Davitt, with Parnell and Dillon, issued a manifesto condemning the murders. While he was in prison he was elected a member of Parliament, but was not permitted to take his seat. Mr. Davitt wrote frequently on subjects both literary and political, and actively engaged in the cause of Irish nationalism. In 1892 he was elected to Parliament, but vacated on account of bankruptcy. He was elected without opposition in 1895 and resigned in 1899. He died May 30, 1906.

DAVOUT, Louis Nicolas, incorrectly spelled Davoust; was born on May 10, 1770, in Burgundy, and was a schoolmate of Napoleon Bonaparte. He went to Egypt with Bonaparte and greatly distinguished himself, being the hero of the battle of Aboukir. Upon his return to France he was made a general in 1800 and a marshal in 1804, and was created Duke of Auerstädt in 1808 and Prince of Eckmühl in 1811. He rendered services of the most brilliant and valuable character at Austerlitz, Eckmühl, Wagram, and in the Russian campaign. As governor of Poland he was harsh and tyrannical, and incurred the censure but did not forfeit the confidence of Napoleon. After the retreat from Moscow he was governor of the Hanse towns, at Hamburg, and during the Hundred Days he was minister of war. After Waterloo he commanded the remnant of the imperial army and would have made a last desperate stand for the defence of Paris had he not been ordered to yield to the Allies. In 1819 he was made a peer of France, and commanded the esteem of men of all parties. He died on June 1, 1823. W.F.J.

DAW, a member of the crow family. See Jackdaw, Vol. XIII, p. 542.

DAWES, Henry Laurens, an American statesman; born in Cummington, Mass., Oct. 30, 1816. He graduated at Yale in 1839, became a school-teacher, and later edited the *Greenfield Gazette* and *Adams Transcript*. He studied law, and was admitted to the bar in 1842. He was a member of the Massachusetts House of Representatives in 1848, 1849, and 1852; served as State senator in 1850; was a member of the State Constitutional convention in 1853; and district attorney of the Western District of Massachusetts, 1853–57. He sat in the national House of Representatives as a member from Massachusetts from Dec. 7, 1857, to March 3, 1875. He was elected to the United States Senate as a Republican to succeed Charles Sumner (whose unexpired term had been filled by William B. Washburn) and took his seat March 4, 1875. He was re-elected in 1881 and 1887, and served until March 3, 1893. He had first gone to Congress from North Adams, but from the 38th Congress he had been located at Pittsfield. He served as chairman of the United States Commission to the Five Civilized Tribes of the Indian Territory from 1893 to 1903, on the 5th of February of which latter year he died at Pittsfield. E.E.T.



HENRY L. DAWES.

DAWES ACT. See Indian Affairs, in these Supplements.

DAWKINS, William Boyd, scientist; was born at Buttington, England, on December 26, 1838, and was educated at Oxford. He was geologist on the geological survey of Great Britain in 1861–69, curator of the Manchester Museum and lecturer in Owens College in 1870, and since the latter date has been a consulting geologist in questions of mining and civil engineering, and has lectured much in all parts of the world. He traveled in America and Australia for some years, and delivered lectures at the Lowell Institute, Boston, in 1880. He is the author of *Cave Hunting; Early Man in Britain*, and *British Pleistocene Mammalia*. W.F.J.

DAWSON, a town, the capital of Terrell Co., Ga., 25 miles N.W. of Albany, on the Central of Georgia and the Columbus Southern railroads; has a factory of railroad cars, and is the seat of the South Georgia Male Institute. Pop. 1890, 2,284; 1900, 2,926.

DAWSON. See Klondike, Vol. XXVII, p. 509.

DAWSON, George, an English lecturer; born in Saint Pancras, in 1821. He was graduated from the University of Glasgow, studied theology and became pastor of Mount Zion chapel in Birmingham in 1844. In 1847 he assumed charge of an independent congregation called "The Church of the Savior." He became widely known as a literary lecturer and in this capacity attained the very highest popularity. His extempore lectures were models of concise and strenuous style. Unfortunately he published nothing more permanent than sermons and addresses, but his fresh earnestness and unflinching honesty of belief made him one of the most influential of the early disciples of Emerson and Carlyle. He retired from the lecture platform in 1875 and died in Birmingham in 1876. A *Life of George Dawson* was published in 1882. W.M.C.

DAWSON, George Mercer, a Canadian geologist and author; born in Pictou, Nova Scotia, August 1, 1849. He was the eldest son of Sir J. William Dawson (q.v.). He was graduated from the McGill University and studied geology at the Royal School of Mines, London, England. Here he acquired the Forbes medal in palæontology, the Murchison medal in geology and held the Duke of Cornwall's scholarship. In 1873 he was appointed geologist and naturalist for the North American Boundary Commission, publishing the results of his work in 1875, under the title *Geology and Resources of the Forty-ninth Parallel*. He was engaged in explorations and surveys,

particularly in British Columbia and the Northwest Territories from 1875 to 1880, and in 1887 had charge of the Canadian Yukon Expedition. He made elaborate reports on the coal-measures of the Northwest Territories and British Columbia. In 1891 he was appointed one of the Behring Sea Commission to investigate the seal fisheries, and in 1893 went to Paris as Canadian member of the Behring Sea Arbitration Commission. In 1895 he was appointed chief director of the Canadian Geological Survey. In 1893 he was president of the Royal Society of Canada, and was decorated with the Order of Saint Michael and Saint George. He wrote for numerous scientific periodicals including the *Canadian Naturalist; The Transactions of the Royal Society of Canada*, and *The Quarterly Journal of the Geological Society of London*. He died in Ottawa, Canada, March 2, 1901. W.M.C.

DAWSON, Sir J. William, a Canadian geologist; born at Pictou, Nova Scotia, Oct. 13, 1820. He was educated at Pictou College and Edinburgh University. In 1842 he accompanied Sir Charles Lyell in his scientific explorations in Nova Scotia, where he made some valuable discoveries in palæontology. In 1843 he contributed a paper on the rocks of eastern Nova Scotia to the Geological Society of London; this was followed in 1844 by a paper on the newer coal formation. In 1845, besides exploring and reporting on the iron-mines of Londonderry, Nova Scotia, he published a paper on the coal formation plants of that province. He has discovered and described a number of fossils, of which the most important is named *Eozoön Canadense* (q.v., Vol. IX, p. 338), the oldest known form of animal life. It may be said that previous to this discovery the Laurentian rocks were regarded as devoid of animal remains, and were therefore called "azoic." For this term Dr. Dawson substituted "eozoic." From 1847 to 1849 he published *On the Triassic Red Sandstones of Nova Scotia and Prince Edward Island; On the Coloring Matters of Red Sandstones; On Erect Calamites, found near Pictou; On the Metamorphic Rocks of Nova Scotia;* and a *Handbook of the Geography and Natural History of Nova Scotia*. In 1850 Dr. Dawson became superintendent of education for his native province, and five years afterward was appointed principal of McGill University, Montreal, a position which he resigned in 1893. In 1852 he again accompanied Sir Charles Lyell in his geological researches in Nova Scotia and New Brunswick, examining the well-known Joggins mine, where he found the remains of *Dendrerpeton Acadianum* and of *Pupa Vetusta*, the former being the first reptile found in the coal formation of America, and the latter the first known Palæozic land-snail. In 1856 he prepared a description of the Silurian and Devonian rocks, visited Lake Superior, and wrote a paper and report on the copper regions of Maimanse and Georgian Bay. He devoted much attention to the study of fossil plants and Carboniferous reptiles, and to the physical and organic conditions of the more recent geological formations, and published many memoirs on these subjects in the *Transactions* of the Royal Society of Canada, of which Dr. Dawson was the first president, in the journals of the Geological Survey of Canada, as well as in many foreign scientific periodicals. He was also a large contributor to the *Canadian Naturalist*. In 1858 he published, under the title of *Archaia*, a series of *Studies on the Cosmogony* and *Natural History of the Hebrew Scriptures*, in which he went through the whole narrative of the six days of creation, and translated the language of Genesis into the modern scientific dialect. Among his later and popular works are *The Story of the Earth and Man* (1872); *The Dawn of Life* (1875); *The Origin of the World* (1877); *Fossil Men and their Modern Representatives* (1878); *The Chain of Life in Geological Time* (1880); and a *Handbook of Geology* (1884). In 1882 he received the Lyell medal of the Geological Society of London, was created companion of the Order of St. Michael and St. George, and became president of the American Association for the Advancement of science. He received the degrees of M.A. and LL.D. from the University of Edinburgh and of LL.D. from McGill University. In 1885 he was elected president of the British Association for the Advancement of Science, and an honorary fellow of the Geological Society of Edinburgh, and of the Philosophical Societies of Glasgow, Liverpool, Manchester and Leeds. His more recent works are *Modern Science in Bible Lands* (1888); *The Geological History of Plants* (International Scientific Series, 1888); *Modern Ideas of Evolution* (1890); *Salient Points in the Science of the Earth* (1893); and *The Canadian Ice Age* (1893). See Foraminifera, Vol. IX, p. 337. He died at Montreal, Nov. 19, 1899. G. Mercer Adam.

DAY, George Edward, educator, was born at Pittsfield, Mass., on March 19, 1815, and was graduated from Yale College in 1833. Five years later he was graduated from the Yale Divinity School and became an assistant instructor in Hebrew there. From 1840 to 1851 he was a Congregational pastor at Marlboro and Northampton, Mass.; from 1851 to 1866 professor of Biblical literature in Lane Theological Seminary, Cincinnati; from 1866 to 1888 professor of the Hebrew language and literature at Yale, and from 1888 to 1895 dean of the Yale Divinity School, then professor emeritus. He was secretary of the American Bible Revision committee, translated Van Oosterzee's *Biblical Theology of the New Testament*, and edited Oehler's *Biblical Theology of the Old Testament*. Died July 2, 1905. W.F.J.

DAY, Holman Francis, author; born in Vassalboro, Me., Nov. 6, 1865; received his preparatory education at the Oak Grove Seminary, Vassalboro, in 1877–82, and at the Coburn Classical Institute, Waterville, Me., in 1882–83; was graduated at Colby College in 1887; in 1889 accepted the position of manager and editor of publications for the Union Publishing Company at Bangor, Me. He held this office for two years and then became proprietor and editor of the

Dexter (Me.) *Gazette*. Afterwards he was a special writer and reporter for the Lewiston (Me.) *Journal*. He was also the Maine representative of the Boston *Herald*. Subsequently he was managing editor of the Lewiston *Daily Sun*. In 1901–04 he was major and military secretary on the staff of Gov. John F. Hill of Maine. His publications include *Up in Maine; Pine Tree Ballads*, etc. G.J.H.

DAY, James Roscoe, clergyman and educator, was born at Whitneyville, Maine, on October 17, 1845, and was educated at Bowdoin College. He entered the ministry of the Methodist Episcopal Church, and served in pastorates in Portland, Maine, Boston, and New York City, with marked success. In 1893 he was elected chancellor of Syracuse University, in which place he still remains. He has contributed greatly to the material development and educational expansion of that institution, has secured large additions to its endowment, and has taken an active part in many public affairs. He has been a delegate to several general conferences of the M. E. Church. At that of 1900 he was a prominent candidate for the office of bishop, and at that of 1904 he was elected a bishop, but immediately declined the honor, preferring to remain in the Chancellorship of Syracuse University. W.F.J.

DAY, Jeremiah, an American educator; born in New Preston, Connecticut, August 3, 1773. He was graduated from Yale College in 1795, studied theology, became a professor at Williams College, and in 1801 was elected to the professorship of mathematics in Yale College. From 1817 to 1846 he was president of the college. He published *An Introduction to Algebra* (1814), and *Navigation and Surveying* (1817). He died in New Haven, August 22, 1867. W.M.C.

DAY, Thomas, an English author; born in London, June 22, 1748. He was educated at Charterhouse School and at Oxford. He embraced the principles of Rousseau, and his manners and some of his theories were eccentric. He advocated American independence and parliamentary reform, and opposed slavery. He is perhaps best known by his boys' story, *Sandford and Merton*, which had an extraordinary vogue. He died at Wargrave, Eng., Sept. 28, 1789. E.E T.

DAY, William Rufus, American lawyer and statesman; born at Ravenna, Ohio, April 17, 1849.

WILLIAM R. DAY.

His father was Chief Justice Luther Day, for many years a prominent lawyer in Ohio; and his maternal and paternal grandfathers were Supreme Court Justices. In 1870 he graduated at the University of Michigan; he afterward studied law there, and was admitted to the Ohio bar in July, 1872. In October, 1872, he formed a partnership with William A. Lynch, and commenced practice in Canton, Ohio, where he soon formed a friendship with Major William McKinley, afterwards President. In 1886 he was elected Judge of the Court of Common Pleas of the ninth judicial district of Ohio, but, for financial reasons, resigned in 1887. In 1889 he was appointed judge of the United States District Court for northern Ohio, but declined the office in consequence of ill health. In April, 1897, he was appointed first assistant Secretary of State, and on April 26, 1898, Secretary of State. On the conclusion of the war with Spain, Judge Day was, on Aug. 26, 1898, appointed chairman of the peace commission, and with his colleagues ably conducted the nogotiations at Paris, from October 1 till the signature of the treaty on December 10. On Feb. 25, 1899, he was appointed judge of the Sixth Judicial Circuit. On Aug. 24, 1875, Judge Day was married to Miss Mary E. Schaefer, of Canton, and has had four children, all boys.

DAY–LILY, the common name of *Hemerocallis*, a genus of plants of the family *Liliaceæ*, having yellow funnelform ephemeral flowers, grassy, linear leaves, a thick pod, and roundish black seeds with a hard and brittle coat. *H. fulva* and *H. flava* are common garden forms, both natives of the Old World, the former having become naturalized in the United States.

DAYS OF GRACE, days given by law to the acceptor of a bill of exchange or the maker of a promissory note, as additional time in which to make payment. By the law-merchant, the maker of a bill of exchange is entitled to days of grace. This allowance was formerly made as a favor, but the custom grew into law. By the statute, in England, making promissory notes negotiable, days of grace were also given. This statute has been adopted in most of the states of the United States, though in some it has been since repealed. Where days of grace are allowed in the United States, the maturity of a negotiable instrument is determined by adding three days to the term for which the instrument runs. If the last day of grace is Sunday or a legal holiday, the instrument falls due on the preceding day. Days of grace are not allowed upon notes or bills payable on demand. See also Bill, Vol. III, pp. 581–583.

DAYTON, a city of Campbell Co., Ky., on the Ohio river, opposite Cincinnati; has manufactories of ropes, shoes, and cigars, and several distilleries. Population 1890, 4,264; 1900, 6,104.

DAYTON, a mining town, the capital of Lyon Co., Nev., on the Carson river, 11 miles N. E. of Carson City; is engaged in silver mining, and contains a number of quartz-mills. Population 1900, 458.

DAYTON, a city, capital Montgomery Co., Ohio. the terminus of seven railroads. It manufactures cotton and woolen goods, oil, flour, machinery, railroad cars, paper, stoves, hollow-ware, agricultural implements, furniture, carriages, etc. In 1900 it had nearly 1,100 manufacturing establishments, with a combined capital of over $28,000,000, and an annual product of $35,700,000. It has an admirable system of public schools, also a high school, two Catholic schools, several high-grade preparatory schools for boys, and Deavor's College for boys. Its public buildings are beautiful and imposing, and include the county court-house, jail, public markets, and the National Soldiers' Home. The jail is of stone, and cost $400,000. Popula-

tion 1890, 61,220; 1900, 85,333. See DAYTON, Vol. VI, p. 746.

DAYTON, a city and the capital of Rhea County, eastern central Tennessee, 34 miles N.N.E. of Chattanooga, on the Cincinnati, New Orleans and Texas Pacific railroad. It is in a coal and iron mining region, and has smelting-furnaces, brickyards, flouring-mills, machine-shops and other industries. Population 1900, 2,004.

DAYTON, a town and the county seat of Columbia County, Washington, in the south-eastern part of that state. It lies in a rich agricultural region, between the Blue Mountains and the Snake River. It is reached by the Washington and Columbia River and the Oregon railroad and Navigation Company railroads. Its population was 2,216 in 1900. W.F.J.

DAYTON, WILLIAM LEWIS, an American statesman; born in Baskingridge, N. J., Feb. 17, 1807. He graduated at the College of New Jersey in 1825; studied law in Gould's Law School, Litchfield, Conn., and commenced practice in Trenton, N. J., in 1830. He was State senator, 1836–37; judge of the supreme court from Feb. 28, 1838, to Nov. 1, 1841, when he resigned; was appointed United States senator (to take the place of Samuel L. Southard, deceased), and was subsequently elected to the seat, serving from July 6, 1842, to March 3, 1851; was nominated in 1856 for Vice-President on the Frémont ticket; was attorney-general of New Jersey, 1857–61; and was appointed minister to France by President Lincoln, March 18, 1861, a position he held until his death in Paris, Dec. 1, 1864. E.E.T.

DAZA, HILARION, a Bolivian soldier; born in Sucre in 1840. In 1857 he enlisted as a private soldier in the battalion of Colonel Balsa and won frequent and rapid promotion. On November 24, 1870, by an act of treachery, he deprived President Melgarejo of his office, and defeated him in an engagement fought in January, 1871. He was then practically the arbiter of the destinies of the country for a number of years, and on May 4, 1876, he became president in place of Frias. His administration was marked by much discord. He provoked a war with Chile in 1879, and on March 1, he set out at the head of his troops, leaving the government in charge of Senor Guerra, minister of foreign affairs. On December 27, having been called to Arica for a consultation by Admiral Montero, Daza received the news that during his absence his army had rebelled and deposed him, and on his return voyage to La Paz he heard at Arequipa, in January, 1880, of a revolution at the capital, which proclaimed General Norciso Campero as his successor. He then went to Paris, but after a few years returned to Peru and Bolivia, and in the latter country was assassinated, February 28, 1894. W.M.C.

DEACONESS, an order of women, in the early centuries, connected with the Roman Catholic Church, but abolished by that church during the twelfth century. The modern order of deaconesses is not necessarily connected with any church. The members are generally middle-aged women of some leisure who devote their time to the care of the poor and visitation of the sick. For the ancient order, see DEACON, Vol. VII, p. 3. The order of to-day found its beginning in 1836 at Kaiserswerth, Germany, where the first "Deaconess Home" was established by Theodor Fliedner, one of the most prominent of the theologians of the German Church. The order founded by him had no connection with the church. The "Home" served both as a central refuge, headquarters and training-school. Similar institutions were afterward founded by Fliedner in various parts of Europe. The first home at Kaiserswerth has remained the central mother-house. The Church of England and the Protestant Episcopal Church in the United States have established the deaconess order as a part of their church governments. The Lutheran Church in America recognizes the order. In connection with that church there is maintained at Philadelphia the Drexel Home for Deaconesses, erected in 1888 by the generosity of J. D. Lankenau of that city. Within recent years the Congregationalists, in some of their churches, have given the order recognition. Other churches, while agreeing with the purposes of the institution, do not feel justified in incorporating it in the church government. The deaconess order, on the whole, is an independent society of charitable women, and they include in their number many trained nurses. See also METHODIST CHURCHES, in these Supplements.

DEAD FREIGHT, the compensation paid by the merchant who freights a whole ship to the shipmaster for the space which is not occupied. It is rather a claim for damages for the loss of freight, and consequently, apart from positive stipulation, the shipmaster has no lien for dead freight over the goods on board. His claim must, consequently, be made effectual by a personal action against the freighter.

DEAD-LETTER OFFICE. See POST-OFFICE, Vol. XIX, p. 596.

DEADLY NIGHTSHADE. See BELLADONNA, Vol. III, p. 469.

DEAD-NETTLE, the common name of *Lamium*, a genus of herbaceous plants of the family *Labiatæ*, having a five-toothed calyx, the upper lip of the corolla arched and the lower lip three-lobed. The name is given for a certain resemblance to the true or stinging nettle. The species are natives of the Old World, but in the United States *L. amplexicaule* is a common weed, and *L. album* and *L. maculatum* are cultivated for their handsome flowers.

DEAD-OIL OR CREASOTE. See Vol. VI, pp. 492–93.

DEAD-RECKONING. See NAVIGATION, Vol. XVII, p. 271.

DEADWOOD, a city and the county seat of Lawrence County, South Dakota, on the western border of that state. It lies among the Black Hills and headwaters of the Cheyenne River in a mineral region of exceptional richness. The silver and gold deposits of the Black Hills were discov-

ered in 1875–77, and there was at once a great influx of prospectors, who founded Deadwood and many other places in its vicinity, making Deadwood, however, the center of the entire district. The Fremont, Elkhorn and Missouri Valley railroad has since been built, giving direct access to the place, and Deadwood is now the seat of considerable manufacturing and other industries. Its population was 3,498 in 1900. W.F.J.

DEAF MUTES, Education of the. In 1895 there were in the United States 80 schools, including both private and public, for deaf mutes. These schools had 9,304 mutes in attendance. See also Deaf and Dumb, Vol. VII, pp. 5–13.

DEAFNESS. See Ear, Vol. VII, p. 514.

DEAL–FISH. See Ribbon-fishes, Vol. XX, p. 546.

DEALS, a term used more in Great Britain than in the United States, and especially of the lumber of fir trees. In the United States a deal is a plank or timber 12 feet long, 11 inches wide, and $2\frac{1}{2}$ inches thick. In England a deal is lumber not exceeding 3 inches in thickness and 9 inches wide. For the various kinds of fir-deal, see Fir, Vol. IX, p. 194.

DEAN, Forest of, England, anciently occupied the greater part of Gloucestershire west of the Severn, but is now confined to a hilly area of about 22,000 acres between the River Wye and the estuary of the Severn. It was formerly a royal forest reservation and is still a crown domain, which, divided into six parochial districts, gives its name to a parliamentary division (population, 58,000). It incloses a number of plantations, locally termed "walks" of oak, beech, and other trees, and orchards yielding famous cider apples. In the days of wooden ships, the oak plantations were reserved for the use of the royal navy, but are now maintained chiefly for their yield of bark for tanning purposes. During the reign of Charles I, the forest privileges were sold to Sir John Wintour, who almost depleted the wood supply, but after the Restoration, Parliament ordered its reafforestation. Within its limits are deposits of magnetic iron ore which have been worked since the Roman occupation, and valuable coal also is mined (see Coal, Vol. VI, p. 48). Several railroads traverse the district and promote the export of its products, which also include building, milling, grinding, and other prepared stones. The inhabitants are mostly miners, once notorious for their lawlessness. The ancient privileges, now curtailed, are an interesting phase of English local customs and usages; among them were freedom from county taxes, and residence and work for a year and a day, making immigrants free miners with exclusive grants of mining privileges on the crown mines. C.L.S.

DEAN, Gilbert, jurist and legislator, was born at Pleasant Valley, Dutchess Co., N. Y., about 1821, studied at Amenia Seminary, and was graduated from Yale College in 1841. He then studied law at Pine Plains, and began practice at Poughkeepsie, N. Y., in 1844. He rose to a conspicuous place at the bar of the state, and also became a political leader. From 1851 to 1855 he was a Representative in Congress from New York state, and in the latter year became a justice of the supreme court of the state of New York. At a later date he served for a term in the State Assembly. He died at Poughkeepsie in 1870. W.F.J.

DEANE, Charles, author, was born at Biddeford, Maine, on November 10, 1813, and engaged in a mercantile career in the city of Boston, in which he was successful and amassed a fortune. In 1864 he retired and devoted himself to a literary career at Cambridge, Mass. There he produced several valuable historical works, dealing with the foundation of the Plymouth colony, Governor Hutchinson and his works, and Sebastian Cabot's geographical researches. Mr. Deane continued to reside at Cambridge until his death, which occurred on November 13, 1889. W.F.J.

DEANE, James, an American geologist; born in Coleraine, Mass., Feb. 14, 1801. He removed to Greenfield, Mass., in 1822, studied medicine, and practised there from 1831 till his death. He was a frequent contributor to the *Boston Medical and Surgical Journal*, and he made some interesting researches into the morality and hygiene of ovariotomy. In 1835 he discovered fossil footprints in the red sandstone of the Connecticut River valley, which aroused considerable scientific discussion, and a spirit of skepticism on the part of British geologists and naturalists. This doubt was dispelled by the exhibition of casts of the footprints before the English Geological Society. He died in Greenfield, June 8, 1858. E.E.T.

DEANE, John Hall, lawyer and philanthropist, was born in Canada and came to the United States in boyhood. He studied at the University of Rochester, but left it to enlist as a private in the Federal army in the Civil War. He was captured at Gettysburg and was in a military prison for some time. After being exchanged he served in the navy, then became a lawyer and settled in New York City, where he also engaged in commerce. He has given $100,000 to the University of Rochester, and other large sums to numerous Baptist institutions, including churches, schools, and asylums. W.F.J.

DEANE, Silas, an American diplomatist; born in Groton, Conn., Dec. 24, 1737. He graduated at Yale in 1758 and engaged in mercantile pursuits. He was a delegate from Connecticut to the Continental Congress, 1774–76. In March of the latter year he was sent by Congress to France as a political and financial agent, and with instructions to ascertain the temper of the French government concerning the rupture with Great Britain, and to obtain supplies of military stores. His mission was, however, ill-conducted, and he made many extravagant contracts. In September he was commissioned ambassador with Franklin and Lee, negotiated and signed a treaty with France, and secured the services of Lafayette, De Kalb, and other foreign officers. He

was recalled in 1777 (John Adams succeeding him), and, being charged with financial irregularity by Lee, an investigation of his conduct was ordered by Congress. He evaded answering several charges on the ground that his papers were in France, and, returning thither, found the French government embittered against him. He then made his way to Holland, and thence to Great Britain, where, greatly impoverished, and smarting under a sense of injustice, he died in Deal, Kent, Aug. 23, 1789. In 1842 Congress vindicated him by awarding a considerable sum of money to his heirs. E.E.T

DEARBORN, HENRY, an American soldier; born in Hampton, N. H., Feb. 23, 1751. He was engaged in the practice of medicine at Portsmouth, N. H., when on April 20, 1775, he heard the news of the battle of Lexington. Raising a company of 60 volunteers, he marched to Cambridge, 65 miles distant, and arrived there the next day. He was made a captain, served at Bunker Hill, and accompanied Arnold on his expedition against Quebec, where he was made prisoner. Being exchanged in March, 1777, he served as major under Gates at the capture of Burgoyne, and distinguished himself and his regiment by a charge at the battle of Monmouth, in 1778. He served in Sullivan's campaign against the Indians in 1779, with the army of New Jersey in 1780, at Yorktown in 1781, and in garrison at Saratoga in 1782. He was appointed by Washington United States marshal of the District of Maine in 1789; served in the United States House of Representatives, 1793–97; was Secretary of War under Jefferson, 1801–09; collector of customs at Boston, 1809–12, in which year he was appointed senior major-general in the United States Army. He commanded at the capture of York, Can., 1813, and later in the city of New York. He was minister to Portugal, 1822–24, and died in Roxbury, Mass., June 6, 1829. E.E.T.

DEATH, the cessation of life in animals or plants, when the vital functions cease to perform their work. In a human being, death may result from natural decay, as in old age, or from failure of the heart, the lungs, or the brain. See NUTRITION, Vol. XVII, p. 705.

DEATH-ADDER. See SNAKES, Vol. XXII, p. 209.

DEATH-BED DECLARATION. See WILL, Vol. XXIV, p. 605; EVIDENCE, Vol. VIII, p. 649.

DEATH, CIVIL. Death from a legal point of view, is either natural or civil: the former being the cessation both of physical life and of the legal rights which attach to it; the latter, the cessation of the legal rights whilst the physical life remains. A man was said to be civilly dead, in England, when he had been attainted of treason or felony, or had abjured the realm, or was banished, or became professed in religion by going into a monastery. In these events his property devolved as if he were naturally dead. The doctrine of civil death was abolished in England in 1870 except as to cases of outlawry, in which it seems still to be applicable.

DEATH'S-HEAD MOTH. See BUTTERFLIES, Vol. IV, p. 530.

DEATH VALLEY. See CALIFORNIA, Vol. IV, p. 618, and AMARGOZA DESERT in these Supplements.

DEATH-WATCH, a ticking or rapping noise produced by various insects, particularly *Anobium*, in houses. From the fact that the sound is, in consequence of the prevailing quietude, oftenest heard during times of sickness and anxiety, it has been regarded as indicative of approaching death. See COLEOPTERA, Vol. VI, p. 120.

DEBATABLE LAND, Great Britain, the level moorland district, bounded by the Esk and Sark, on the western border of England and Scotland, formerly claimed by both nations, hence the name. In 1542 a dual royal commission adjudged the upper half to Scotland and the lower to England. It was long a haunt of outlawed freebooters who were effectually eradicated in the 17th century by the deportation of the chief clan to Ireland. Gretna Green, the former haven of eloping lovers, is on the Sark at the border line, 9 miles northwest of Carlisle. C.L.S.

DEBAY, AUGUSTE HYACINTHE, a French painter and sculptor; born at Nantes, 1804. In 1824 he secured the grand prize of the Academy of Fine Arts. Among his more notable pictures are *The Field of the Cloth of Gold*, for the Museum of Versailles; *The Battle of Dreux*; and others of equal merit. His masterpieces in sculpture are the mausoleums of the Archbishop Affre and the Countess of Damas, and the statue of Perrault for the new Louvre; In 1843 Debay executed works for the Church of Saint Peter. at Chaillot, and in 1861 the pediment of the fountain of Saint Michel. He died in 1865.

DEBAY, JEAN-BAPTISTE-JOSEPH, a French sculptor; born at Malines, in 1779. He was a pupil of the Academy of Fine Arts, and chevalier of the Legion of Honor. His works in the Hôtel de Ville and library at Hautes are well known. Among his more important productions are an equestrian statue of Louis XIV for the city of Montpellier; *Pericles*, in the garden of the Tuileries; *Charles Martel*, in the Museum of Versailles; *Colbert*, at the Palace of the Luxembourg; *Saint Sebastian*, in the Church of Saint-Merri; *Saint Matthew*, in the cathedral of Arras. He died in 1864.

DEBLAI. See FORTIFICATIONS, Vol. IX, pp. 378, 384.

DEBORAH, the name of two Biblical characters. The first, mentioned in Genesis xxxv, 8, and xxiv, 59, lived about 1857 B.C. She left Bethuel with Rebekah, and to all indications was Rebekah's nurse. She is mentioned by name but once; on the occasion of her burial under the tree Allonbachuth, at Beth-el.

The second, of whom mention is made in Judges iv and v, lived about 1316 B.C. She was an Israelitish prophetess, called by some a judge. She it was who predicted the death of Jabin, king of Canaan, an enemy of Israel. In all probability, she was a member of the tribe of Ephraim.

DE BOW, JAMES DUNWOODY BROWNSON, journalist; was born at Charleston, S. C., on July 10, 1820, was left an orphan in childhood, but by

his own exertions was enabled to be graduated from Charleston College in 1843. He practiced law for a short time, and then devoted himself to journalism and literature. He edited the *Southern Quarterly Review;* in 1845 established *De Bow's Review* at New Orleans; in 1848 was made professor of political economy in the University of Louisiana; was superintendent of the seventh census of the United States; compiled a volume entitled *A Statistical View of the United States;* contributed to the *Encyclopædia Britannica*, and was a strong advocate of the secession of the Southern states. During the Civil War he was the agent of the Confederate government for the purchase and sale of cotton. After the war he became president of the Tennessee Pacific Railroad Company, and resumed the publication of his *Review*. He died at Elizabeth, New Jersey, on February 27, 1867. W.F.J.

DEBS, EUGENE V., an American labor leader; born in Terre Haute, Indiana, in 1855, and educated in the public schools, and when 16 years old began work as a painter and railroad fireman. When 26 years old he was chosen a member of the state legislature, where he secured the passage of several laws in the interest of labor. He was grand secretary and treasurer of the Brotherhood of Locomotive Firemen for 14 years. Always an earnest advocate of a federation of railway men, the United Order of Railway Employees was formed through his efforts, and the American Railway Union was organized by him in Chicago, June 20, 1893. It prospered, and became the largest body of railway men in the world, and won a victory in its strike against the Great Northern railway.

In July, 1894, the American Railway Union, under Debs's guidance, espoused the cause of the Pullman Palace Car Company's workmen in their strike for higher wages, and after failing to secure arbitration, ordered a boycott of all Pullman cars, which precipitated a great railroad strike, with Chicago as a storm-center. Cars were derailed or burned and trains stopped by strike sympathizers until President Cleveland ordered Federal troops to the scenes of disturbance to enforce the decrees of the United States Courts, and to prevent interference with the mail service and interstate commerce. Then traffic was gradually resumed with new men and the strike called off. Debs and his fellow-directors of the American Railway Union were indicted for conspiracy, but the trial jury disagreed. They were sentenced to six months in jail by Judge Woods of the United States circuit court, for contempt of court in violating an injunction. An appeal was taken to the United States supreme court, but the decision was confirmed. Debs was a nominee on the Socialist ticket for President in 1900, receiving 87,814 votes, and again in 1904, when he received 402,286 votes.

*DEBT, UNITED STATES NATIONAL. The principal of the public debt at the outbreak of the war was only $64,842,288; the net ordinary receipts about $55,000,000 per annum. To meet the expenses of the war, Congress passed the act of July 17, 1861, in accordance with the suggestions of the Secretary of the Treasury, under which there were issued $50,000,000 bonds, redeemable in 20 years, bearing 6 per cent interest; $139,999,750 treasury notes, called 7.30's, payable in three years, bearing $7\frac{3}{10}$ per cent interest; and $50,000,000 Treasury notes, payable on demand, not bearing interest. The latter were subsequently increased to $60,000,000. These loans were favorably received, and were taken at a little less than par in gold by the state banks, and $189,321,350 of them were refunded into 20-year 6-per-cent bonds, authorized by act of Aug. 5, 1861. When Congress convened on Dec. 2, 1861, the financial condition of the government was more alarming than at any period during the war.

The above-mentioned act of July 17, 1861, gave the Secretary of the Treasury ample authority to borrow money on the credit of the government, but he could not deal with the system of state banks then existing in the several states. He was forbidden by the Subtreasury Act of 1846 to receive notes of state banks, and was required to receive into and pay from the Treasury only the coin of the United States; but by the act of Aug. 5, 1861, he was permitted to deposit, to the credit of the Treasurer of the United States, in such solvent specie-paying banks as he might select, any moneys obtained from loans, the moneys thus deposited to be withdrawn only for transfer to the regularly authorized depositories, or for the payment of public dues, as he might deem expedient. He had, however, no authority to receive from individuals or banks any money but coin. The coin received from the Boston, New York and Philadelphia banks in payment of their subscriptions to the government loans to the amount of nearly $150,000,000, had to be sent all over the United States to meet public obligations, and when thus scattered was not readily returned to the banks, thus exhausting their resources and their ability to loan again.

Mr. Chase, the Secretary of the Treasury, in December, 1862, estimated that there would be needed for the support of the government to June 30, 1863, $277,000,000; for the following year $900,000,000. Thereupon Congress undertook to provide this vast amount, mainly by borrowing, and passed an act, approved Feb. 25, 1862,—the most important loan measure enacted during the war,—authorizing the issue of $150,000,000 United States legal tender notes, of which $50,000,000 were to be in lieu of the demand Treasury notes already described, and the issue of $500,000,000 bonds, redeemable, at the pleasure of the United States, after 5 years, and payable 20 years from date, bearing 6 per cent interest. These were what were known as the 5-20 bonds. The amount of these bonds was subsequently increased $11,000,000.

An act approved July 11, 1862, authorized an additional issue of $150,000,000 legal tender notes. The act of March 3, 1863, authorized the issue of $900,000,000 of bonds, redeemable in

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10 years, and payable in 40 years, known as the 10-40's, bearing 5 per cent interest, specifically exempt from taxation by or under state or municipal authority; also, $400,000,000 interest-bearing Treasury notes, $150,000,000 more of the legal-tender notes, and $50,000,000 of fractional notes. The act of June 30, 1864, authorized an additional loan of $400,000,000, the rate and period to be fixed by the Secretary of the Treasury. All these loans were disposed of at not less than par in the paper currency of the country, and, with the duties and taxes imposed, furnished the means for funding the floating debt and finishing the war. The ascertained debt of the country reached its highest point Aug. 1, 1865, being then, less cash in the Treasury, $2,756,431,571.

Immediately upon the close of the war, with its enormous expenditures, the receipts from taxation began to give relief, but by an act of March 3, 1865, a further issue of $600,000,000 of the so-called 7.30 notes and an indefinite amount of 6-per-cent bonds was authorized, into which might be converted maturing loans and obligations.

The refunding act of July 14, 1870, authorized the issue of $200,000,000 5-per-cent bonds, $300,000,000 4½-per-cent bonds and $1,000,000,000 4-per-cent bonds, all payable, principal and interest, in coin, into which to refund bonds bearing a higher rate of interest. The act of Jan. 20, 1871, increased the amount of 5-per-cent bonds to $500,000,000. By Aug. 24, 1876, all of these 5-per-cent bonds had been sold for refunding purposes, and on that day the sale of $40,000,000 4½'s was contracted for like purpose. On June 9, 1877, the 4-per-cent bonds were placed on the market, and met with much favor. Of the subscriptions received, $45,000,000 of gold coin was reserved to provide for the resumption of specie payments, as authorized by the act of July 14, 1875.

On the 11th of April, 1876, the Secretary of the Treasury, under the authority given in the act of Jan. 14, 1875, sold $50,000,000 of 4½-per-cent bonds for gold coin, also to be used for resumption purposes.

The immediate effect of the resumption of specie payments which followed was to advance the public credit, making it possible to rapidly fund all the bonds of the United States then redeemable into bonds bearing 4 per cent or less interest.

The act of Jan. 25, 1879, extended the process of refunding to the 10-40 bonds bearing interest at the rate of 5 per cent, amounting to $195,000,000, and the act of February, 1879, authorized the issue of ten-dollar certificates of deposit convertible into 4-per-cent bonds.

In April, the refunding operations were for the time concluded, all the 5-20 and 10-40 bonds having been refunded. On the 1st of March, 1881, a bill "to facilitate the refunding of the national debt," having passed both Houses of Congress, was sent to President Hayes, who returned it to Congress with his disapproval. The bill provided for the issue of 3-per-cent bonds, to be exchanged for maturing bonds bearing 5 and 6 per cent, and also provided that no bonds should be taken as security for bank circulation except the 3-per-cents provided for in the bill. This latter provision was the chief objection of the President to the bill, as, in his judgment, the security was insufficient. Thus Congress adjourned without making any provision for refunding the large amount of bonds that became due on or before the 1st of July. These, however, were called in, from time to time, by Secretary Windom, for payment from the surplus revenue, but permission was given the holders of the bonds to have them continued, at the pleasure of the gvoernment, with interest at the rate of 3½ per cent. Nearly all the holders preferred to retain their bonds, and thus they were refunded with an annual saving in interest of over ten million dollars.

By a provision of the National Bank Act of July 12, 1882, the Secretary of the Treasury was authorized to receive the 3½-per-cent bonds, and to exchange therefor 3-per-cent bonds. The 3½-per-cent bonds then outstanding amounted to $449,324,000. These were mostly exchanged for 3-per-cents, and all were subsequently paid, from time to time, by surplus revenue. The 4½-per-cent refunding bonds have also been paid from surplus revenue, except about $25,000,000, continued at 2½ per cent, and also a considerable portion of the 4-per-cent bonds.

The bonds sold by the Cleveland administration to reinforce the gold reserve were 5 and 4 per cents, of the description authorized by the refunding act of 1870.

The total interest-bearing bonded indebtedness of the country, March 1, 1896, was $822,615,170, not including about $25,000,000 of 4-per-cent bonds sold, but not then delivered.

See FINANCES OF THE UNITED STATES, in these Supplements. JOHN SHERMAN.

TITLE OF LOAN.	AUTHORIZING ACT.	RATE.	WHEN REDEEMABLE.	OUTSTANDING MARCH 1, 1896.
Funded Loan of 1891	July 14, 1870, and Jan. 20, 1871	4½ per cent—Cont'd at 2%	Option U. S.	$25,364,500
Funded Loan of 1907	July 14, 1870, and Jan. 20, 1871	4 per cent	July 1, 1907	559,634,300
Refunding Certificates	Feb. 26, 1879	4 per cent		48,720
Loan of 1904	Jan. 14, 1875	5 per cent	Feb. 1, 1904	100,000,000
Loan of 1925	Jan. 14, 1875	4 per cent	Feb. 1, 1925	137,567,650
Aggregate of interest-bearing debt, exclusive of United States bonds issued to Pacific railroads				$822,615,170

DEBTS OF VARIOUS COUNTRIES. The following table shows the indebtedness of foreign nations, in the years 1890 and 1900, in U. S. currency:

Names of Countries.	Net Debt.		Debt per Capita.	
	1890	1900	1890	1900
Argentina (1901).	$284,867,069	$434,921,005	$70.40	$90.40
Austria-Hungary.	2,866,339,539	2,485,817,723	70.80	56.75
Belgium (1901) .	380,504,099	530,179,630	63.10	77.55
Bolivia	14,763,367	2,009,415	12.38	1.12
Brazil	585,345,927	621,762,500	41.80	43.50
Chile	85,192,339	116,250,000	31.96	42.80
Colombia	63,451,583	18,777,061	16.36	4.70
Denmark	33,004,722	58,669,456	15.66	23.80
France (January 1, 1901)	4,564,808,000	6,019,320,500	120.65	156.00
Germany—				
Empire proper.	77,577,719	604,800,000	1.57	10.70
Bavaria.	335,503,105	365,043,304	60.03	59.00
Hamburg	59,202,946	105,570,520	94.85	137.26
Prussia (1901)	1,109,384,127	1,650,700,614	37.03	47.08
Saxony	143,897,747	219,291,862	41.11	52.21
Würtemberg	107,735,500	123,792,137	52.93	56.50
Great Britain and Ireland (1901)	3,350,719,563	3,528,619,390	87.79	84.81
India	881,003,592	1,022,217,618	3.27	3.47
Cape of Good Hope	110,817,720	157,048,775	77.56	68.83
Mauritius	8,464,662	5,946,420	22.92	16.05
Natal	22,028,424	45,095,715	45.76	48.58
Canada	237,533,212	265,493,807	47.51	49.36
New S. Wales	233,289,245	326,664,965	214.87	240.64
New Zealand (1901)	184,898,305	242,788,755	298.01	317.00
Queensland	129,204,750	179,492,070	333.46	356.65
South Australia	202,177,500	130,658,900	321.00	360.31
Tasmania	23,335,345	42,555,025	147.46	246.72
Victoria	179,614,005	241,904,295	161.63	201.43
W. Australia	6,509,736	63,547,150	150.23	348.10
Greece	107,306,518	173,795,796	49.06	71.40
Guatemala	10,825,836	26,273,468	7.59	16.66
Haiti	13,500,000	28,447,916	14.06	23.41
Honduras	63,394,267	93,808,110	146.77	159.67
Italy	2,324,826,329	2,665,024,950	76.06	81.85
Japan	305,727,816	251,483,625	7.83	5.74
Mexico	113,606,675	180,858,418	9.98	13.35
Netherlands	430,589,858	462,155,775	95.56	89.23
Nicaragua	1,711,206	4,595,474	4.28	9.19
Paraguay	19,633,013	43,528,590	59.56	69.08
Peru	382,175,655	23,795,880	145.77	51.61
Portugal	633,426,840	915,308,742	130.66	168.60
Rumania	180,145,800	286,403,103	32.75	48.44
Russia	4,010,018,074	3,282,738,820	30.79	25.44
Salvador	6,033,300	10,854,876	9.05	10.77
Servia	60,811,330	84,480,536	30.20	33.78
Spain	1,251,453,696	1,930,300,000	73.85	107.20
Sweden & Norway				
Sweden	64,220,807	87,414,405	13.53	17.01
Norway	13,973,752	62,977,020	7.13	28.11
Switzerland	10,912,925	18,484,877	3.72	5.57
Turkey (1901)	729,507,200	793,877,285	34.70	25.58
Egypt	517,278,200	513,570,900	75.88	52.29
United States	1,552,140,205	2,136,961,092	24.78	28.00

See National Debt, Vol. XVII, pp. 249–254.

DECACHORD, a sort of guitar, with ten strings, similar to the common instrument, only larger in the body and with a broader finger-board. It was generally triangular in shape, and was much used by the ancient Greeks, and is still used in some parts of Greece to-day.

DECADENCE (literally, "a falling into decay"), a term referring to those works of art produced after the school to which they belong has passed the period of its highest excellence. In the days of Pericles, art in all its branches attained its greatest perfection in Greece, and the many exquisite works produced at a later date belong, more or less conspicuously, to the decadence of Greek art. Art and literature culminated in Rome in the days of Augustus, and obvious and rapid decadence followed. The school of the Renaissance again came into perfection with Raphael; even the Caracci belong to its decadence, and the decline continued through the rococo of Louis Quinze, till throughout Europe art became almost extinct, and in England it probably reached as low a point at the beginning of the reign of George IV as it ever reached in any civilized country.

DECAGON, a plane geometrical figure of ten sides. A regular decagon is one with equal sides and equal included angles. See Geometry, Vol. X, p. 340.

DECAISNE, Joseph, botanist; was born in Belgium on March 18, 1807, and was educated as a physician and botanist. For many years he was connected with the Paris Museum of Natural History, and in 1851 was made director of the Botanical Garden in that city. There he paid much attention to the physiology of potatoes, yams, madder, and other plants of value for food or in the arts. He wrote a *Systematic Botany*, a treatise on the diseases of potatoes, and other works. He died February 8, 1882. W.F.J.

DECAISNEA, a genus of plants of the family *Berberidaceæ*. There is but one species, found in the Himalaya Mountains, where it grows at an elevation of 7,000 feet, and is the only one of the family which is not a climber. From the root project several straight branches, like walking-sticks, bearing pinnate leaves two feet in length, which stand out horizontally. The green flowers, growing in racemes, are unisexual, and the yellow fruit, having a length of about four inches and a diameter of one inch, resembles a short cucumber and contains large black seeds. The soft, milky pulp is sweet and wholesome, and is eaten by the inhabitants of the region.

DECALCOMANIA, the process of transferring designs upon various fabrics. The design is called, in the trade, "decalcomanie." The first use to which this class of work was put was the marking of glass clock-dials, some thirty years ago. An American carriage-painter was the first to use decalcomanie for the ornamentation of vehicles. The superior merit of transfers soon became known to all the trade in any way connected with the use of paints and enamels, until now they are used altogether on carriages, agricultural implements, sewing-machines, bicycles, stoves, safes, scales, typewriters, pianos, refrigerators, iron and wooden machinery, japanned and wooden articles, advertising and window signs, and a score of other articles. The lithograph is made in reverse on prepared paper, and when it is desired to make the transfer, varnish is applied to the face of the decalcomanie and it is firmly pressed upon the article to be decorated. Upon the application of moisture, the chemical preparation joining the design and the paper upon which it is fixed softens,

and the paper is withdrawn, leaving the design permanently transferred. It is then coated with varnish, or, in the case of transferring upon silk, with cement, which renders it water-proof and durable. Many hundreds of thousands of dollars' worth of these transfers are used annually in the United States, where they are now manufactured, but until recently Germany was the only source of supply.

DECALITER. See WEIGHTS AND MEASURES, Vol. XXIV, p. 517.

DE CAMP, JOHN, naval commander, was born in New Jersey in 1812, and entered the navy in 1827. He spent his life in active service, and was successively promoted to be lieutenant in 1838, commander in 1855, captain in 1862, and commodore in 1867. He was placed upon the retired list in 1868, and was made rear-admiral, retired, in 1870. Before the Civil War he served largely in foreign waters, including South American, West Indian and African, and at the New York navy-yard. In the Civil War he was attached to the Mississippi and North Atlantic squadrons and commanded the *Iroquois*. After the war he commanded the Pensacola and Philadelphia navy-yards. He died on June 24, 1875. W.F.J.

DE CANDOLLE, ALPHONSE LOUIS PIERRE PYRAMUS, a Swiss botanist, son of Augustin Pyramus De Candolle (q.v., Vol. VII, p. 18); born in Paris, Oct. 27, 1806; died April 9, 1893. In 1831 he became professor of botany in the Academy of Geneva, but resigned a few years later. He was elected president of the International Botanical Congress at London in 1866, and in the following year of the congress at Paris. He held important offices in several scientific societies. He was decorated with the cross of the Legion of Honor. He published a number of valuable treatises; among them, *Introduction to the Study of Botany* (1835); *Rules for the Nomenclature of Botany* (1867); *History of Science and Scientists* (1872); *The Beginning of Plant Cultivation* (1883); and edited his father's *Elementary Theory of Botany*, and continued his *Introduction to Natural History*.—His son, ANNE CASIMIR PYRAMUS, botanist, was born in Geneva, Feb. 26, 1836. He assisted his father in the *Introduction* and other works, and has written, as the result of his own investigation, *Production of Cork* (1860); *Structure of the Leaves of Dicotyledonous Plants* (1879); and *Recent Investigations of the Piperaceæ* (1882). He was made an honorary doctor of the University of Rostock.

DECAPITATION. See GUILLOTINE, Vol. XI, p. 233; and CAPITAL PUNISHMENT, in these Supplements.

DECAPODA. See MOLLUSCA, Vol. XVI, p. 694.

DECATUR, a village of central northern Alabama, the capital of Morgan County, situated on the Tennessee River, 75 miles N. of Birmingham, on the Louisville and Nashville and Memphis and Charleston railroads. It has an academy, churches, hotels, lumber-mills and a basket factory. Population 1890, 2,765; 1900, 3,114.

DECATUR, a small village of northwestern-central Georgia, the capital of De Kalb County; 5 miles N.E. of Atlanta, on the Georgia and Seaboard Air Line railroads, and is the home of many people who do business in that city. It has schools, churches, a furniture factory, and some agricultural trade. Population 1900, 1,418.

DECATUR, a city of eastern central Illinois, and capital of Macon County (see DECATUR, Vol. VII, p. 18). Decatur has seven lines of railway, a system of water-works, a large woolen mill, three flouring-mills, two breweries, a planing-mill, and manufactories of iron, carriages, engines and boilers, farming implements, furniture, linseed-oil, bagging, etc. It has an excellent system of public schools, a high school, a Roman Catholic academy and a convent. Population 1880, 9,547; 1890, 16,841; 1900, 20,754.

DECATUR, a city and the county seat of Adams County, Indiana, on the eastern border of that state. It lies on the St. Mary's River, a tributary of the Maumee, in an agricultural region, 22 miles southeast of Fort Wayne, and 100 miles northeast of Indianapolis. It is reached by the Erie, the Grand Rapids and Indiana, and the Toledo, St. Louis and Kansas City railroads. Its population in 1900 was 4,142. W.F.J.

DECATUR, a village of Van Buren County, southwestern Michigan, 23 miles S.W. of Kalamazoo, on the Michigan Central railroad. It has a foundry, tannery, and manufactures lumber and flour. Population 1900, 1,356.

DECATUR, a village, and the capital of Wise County, northern central Texas, situated 65 miles N.W. of Dallas, on the Fort Worth and Denver City railroad. Flour is here manufactured. Population 1900, 1,562.

DECATUR, STEPHEN, an American naval officer; born in Newport, Rhode Island, in 1751. He was the father of Commodore Stephen Decatur (q. v.). He commanded a privateer during the Revolution and in 1798 while captain of the *Delaware* captured two French ships. In 1800 he was placed in command of an American fleet of thirteen vessels. In 1801 he retired to Philadelphia, where he died November 14, 1808. W.M.C.

DECATUR, STEPHEN, an American naval officer; born in Sinnepuxent on the Chesapeake River, Maryland, January 5, 1779. He saw early service at sea on his father's ships and entered the navy at the age of nineteen, as a midshipman. He made three voyages to the Mediterranean under Commodores Dale, Morris, and Prebel. He arrived the third time just after the frigate *Philadelphia*, which had run aground on the Barbary coast, had fallen into the hands of the Tripolitans. He immediately formed the project of recapturing or destroying her, and having obtained the con-

STEPHEN DECATUR.

sent of Commodore Preble, he sailed for Syracuse, February 3, 1804, in the *Intrepid* with 70 volunteers, accompanied by the United States brig *Syren*. In a few days he arrived at the harbor of Tripoli, which he entered in the evening alone, as he was unwilling to wait for the boats of the *Syren*, which was several miles distant. The enterprise was extremely hazardous, for the *Philadelphia* was moored within half gunshot of the Turkish castle and of the principal battery. Two cruisers and several gunboats were close at hand. His object was not suspected, until he was almost alongside the frigate, when the Turks were thrown into the utmost confusion. Decatur sprang aboard with his men and the Turks were soon overpowered. About twenty men were killed; many jumped overboard; and the rest were driven to the hold. After setting fire to the ship, Decatur retreated and soon got beyond the reach of the enemy's guns which had opened a fire upon him from the batteries and castle and two corsairs. For this daring exploit the American Congress gave him a vote of thanks and a sword, and the President immediately sent him a captaincy. At the bombardment of Tripoli in the following year, he distinguished himself by the capture of two of the enemy's boats, which were moored along the mouth of the harbor and immediately under the batteries. When peace was concluded with Tripoli, Decatur returned home in the *Congress*, and afterward succeeded Commodore Barron in the command of the *Chesapeake*. In the war between Great Britain and the United States, his chief exploit was the capture of the British *Macedonian*, commanded by Captain Carden. In January, 1815, he attempted to sail from New York, which was then blockaded by four British ships; but the frigate under his command was injured in passing the bar, and was captured by the whole squadron, after a running fight of two or three hours. He was released after the conclusion of peace, and was appointed one of the Board of Naval Commissioners at Washington. During the year 1819 he had a quarrel with Commodore James Barron, resulting in a challenge from Barron. They fought at Bladensburgh, March 22, 1820. Decatur was mortally wounded and died within a few hours. Consult Waldo's *Life and Character of Stephen Decatur* (1822). W.M.C.

DECATURVILLE, the county seat of Decatur County, western Tennessee, 50 miles E. of Jackson. It is the seat of a seminary. Its industry is handling the products of the neighborhood, corn, cotton, pork and lumber. Population, 1895, nearly 500.

DECAZES, Elie, Duc de, a French statesman; born Sept. 28, 1780, at St. Martin-de-Laye. During the Consulate he moved to Paris and held several offices under Napoleon I. After the fall of Napoleon he sided with the Bourbons, was, in 1815, appointed Minister of Police, and, in 1818, Prime Minister by King Louis XVIII. Accused of complicity in the assassination of Duc de Barry, he was forced to resign in 1820, but was made a duke and appointed ambassador to London, which post he gave up in 1821. After the revolution of July, 1830, he sided with the Orleanists, and was made grand referendary of the Chamber of Peers. In 1848 he retired from active politics, and died Oct. 25, 1860, at Decazeville, which town he had founded. G.A.S.

DECEIT, a fraudulent misrepresentation by one person, whereby another, who has no means of detecting the fraud, is deceived and suffers injury thereby. An action may be maintained by one person against another, who is chargeable with deceit, to recover the damages he has suffered by reason of the misrepresentation. In an action for deceit it is necessary to show the fraudulent intent, the injury which has resulted from the act, and that the person deceived did not have the means of detecting the fraud. The intent will generally be presumed to be fraudulent if the representation was untrue, and known to be untrue by the party making it, especially if made in response to inquiries by the party to whom the representation was made, or for the apparent purpose of influencing his acts. Actions for deceit are of frequent occurrence in cases where fraudulent representations as to the financial responsibility of another induce the party deceived to extend credit, whereby he sustains a loss. In such cases the party guilty of the fraud must pay the loss. See False Pretenses, in these Supplements.

DECHAMPS, Victor Auguste Isidore, prelate; was born at Melle, Belgium, on December 6, 1810. He entered the Roman Catholic priesthood, was noted as a pulpit orator, became bishop of Namur in 1865, archbishop of Mechlin in 1867, and a cardinal in 1879. He was a leader of the Ultramontane faction of the church. He died at Mechlin on September 29, 1883. W.F.J.

DECIDUOUS TEETH or MILK-TEETH. See Mammalia, Vol. XV, p. 354.

DECIDUOUS TREES, those trees which lose and renew their leaves every year. In cold and temperate countries the fall of leaves in autumn and the restoration of verdure to the woods in spring are among the most familiar phenomena of nature. For deciduous ornamental trees, see Arboriculture, Vol. II, pp. 280, 281.

DECIMATION, a Roman military punishment, rarely inflicted at the present day. When a considerable body of troops committed some grave military offense, which would be punished with death if committed by an individual, the punishment was awarded to one-tenth of them by lot, instead of the whole number, in order that the army might not be too much weakened.

DECIPIUM, a new element discovered by Delafontaine in 1878. Its atomic weight is about 171. It is very rare and little is known about its properties.

DECIUS, Gajus Messius Quintus Trajanus, Roman emperor from 249–251 A.C.; born in 201 at Bubalia, Lower Pannonia. He was a senator under Emperor Philip, who sent him to suppress a revolt of the legions in Moesia. This accom-

plished, the troops forced him to accept the imperial crown. In the struggle for supremacy Philip lost his throne and life at Verona in 249. During his short reign Decius persecuted the Christians with the utmost cruelty. In 251 he fell against the Goths in the battle of Forum Trebonii. G.A.S.

DECIUS MUS. See Mus, Vol. XVII, p. 70.

DECKER, Sir Matthew, a political economist; born at Amsterdam toward the end of the seventeenth century; died in 1749. In 1702 he went to London and the next year was naturalized as an English subject. Having embarked in commerce, he attained much success. In 1716 he became baronet, three years after which he entered Parliament as member for Bishop's Castle. He is best known among political economists by his theory of a tax on houses, by which all revenue was to be raised. He published, in 1743, a pamphlet on the subject, which attracted much attention. He wrote, also, *Causes of the Decline of the Foreign Trade* (1744); and *Considerations on High Duties* (1743).

DECLARATION, in law, is a technical term referring to the first pleading filed by the plaintiff in a suit at law. It corresponds to the bill in a suit in chancery. It must contain, in proper legal form, a specification of the claim upon which the plaintiff relies, so stated as to apprise the opposite party of the nature of the plaintiff's demand against him. This pleading is sometimes called the complaint, especially in states which have adopted a code of procedure.

The primary meaning of the word is a statement made concerning a transaction by a party thereto, or who has some interest in the transaction. Testimony as to the declarations of a party interested in a transaction or in the fact stated is frequently admitted as evidence. Thus when the fact in question is, whether the declaration was made, evidence of the declaration is admissible. So in cases of the declarations of deceased persons nearly related to the parties in question, as to questions of pedigree. Also as to matters of public or general interest, as in case of reputation. Declarations made by a party against his interest are also original evidence. See also Declaration, Vol. VII, p. 20. As to dying or death-bed declarations, see Evidence, Vol. VIII, p. 649; and Will, Vol. XXIV, p. 605.

DECLARATION OF INDEPENDENCE. The Continental Congress, in session at Philadelphia (for an account of which see United States, Vol. XXIII, p. 785), on July 4, 1776, unanimously adopted the following:

DECLARATION OF INDEPENDENCE.

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident: that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That, to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that, whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and, accordingly, all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies, and such is now the necessity which constrains them to alter their former systems of government. The history of the present king of Great Britain is a history of repeated injuries and usurpations, all having, in direct object, the establishment of an absolute tyranny over these states. To prove this, let facts be submitted to a candid world:

He has refused his assent to laws the most wholesome and necessary for the public good.

He has forbidden his governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the legislature,—a right inestimable to them, and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved representative houses repeatedly, for opposing, with manly firmness, his invasions on the rights of the people.

He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the state remaining, in the mean time, exposed to all the danger of invasion from without and convulsions within.

He has endeavored to prevent the population of these states; for that purpose obstructing the laws for naturalization of foreigners; refusing to pass others to encourage their migration hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers to harass our people and eat out their substance.

He has kept among us, in times of peace, standing armies, without the consent of our legislature.

He has affected to render the military independent of and superior to the civil power.

He has combined, with others, to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his assent to their acts of pretended legislation:

For quartering large bodies of armed troops among us;

For protecting them, by a mock trial, from punishment for any murders which they should commit on the inhabitants of these states;

For cutting off our trade with all parts of the world;

For imposing taxes on us without our consent;

For depriving us, in many cases, of the benefits of trial by jury;

For transporting us beyond seas to be tried for pretended offenses;

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies;

For taking away our charters, abolishing our most valuable laws, and altering, fundamentally, the powers of our governments;

For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection, and waging war against us.

He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people.

He is, at this time, transporting large armies of foreign mercenaries to complete the works of death, desolation, and tyranny already begun, with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow-citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these oppressions we have petitioned for redress, in the most humble terms; our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant is unfit to be the ruler of a free people.

Nor have we been wanting in attention to our British brethren. We have warned them, from time to time, of attempts made by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them, by the ties of our common kindred, to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They, too, have been deaf to the voice of justice and consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind, enemies in war,—in peace, friends.

We, therefore, the representatives of the United States of America, in General Congress assembled, appealing to the Supreme Judge of the World for the rectitude of our intentions, do, in the name and by the authority of the good people of these colonies, solemnly publish and declare, that these United Colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved; and that, as free and independent states, they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent states may of right do. And, for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes and our sacred honor.

The Declaration was signed as follows:

New Hampshire.

JOSIAH BARTLETT.
WILLIAM WHIPPLE.
MATTHEW THORNTON.

Rhode Island.

STEPHEN HOPKINS.
WILLIAM ELLERY.

Massachusetts.

JOHN HANCOCK.
SAMUEL ADAMS.
JOHN ADAMS.
ROBERT TREAT PAINE.
ELBRIDGE GERRY.

Connecticut.

ROGER SHERMAN.
SAMUEL HUNTINGTON.
WILLIAM WILLIAMS.
OLIVER WOLCOTT.

New York.

WILLIAM FLOYD.
PHILIP LIVINGSTON.
FRANCIS LEWIS.
LEWIS MORRIS.

New Jersey.

RICHARD STOCKTON.
JOHN WITHERSPOON.
FRANCIS HOPKINSON.
JOHN HART.
ABRAHAM CLARK.

Pennsylvania.

ROBERT MORRIS.
BENJAMIN RUSH.
BENJAMIN FRANKLIN.
JOHN MORTON.
GEORGE CLYMER.
JAMES SMITH.
GEORGE TAYLOR.
JAMES WILSON.
GEORGE ROSS.

Delaware.

CÆSAR RODNEY.
GEORGE READ.
THOMAS MCKEAN.

Maryland.

SAMUEL CHASE.
WILLIAM PACA.
THOMAS STONE.
CHARLES CARROLL of Carrollton.

Virginia.

GEORGE WYTHE.
RICHARD HENRY LEE.
THOMAS JEFFERSON.
BENJAMIN HARRISON.
THOMAS NELSON, JR.
FRANCIS LIGHTFOOT LEE.
CARTER BRAXTON.

North Carolina.

WILLIAM HOOPER.
JOSEPH HEWES.
JOHN PENN.

South Carolina.

EDWARD RUTLEDGE.
THOMAS HEYWARD, JR.
THOMAS LYNCH, JR.
ARTHUR MIDDLETON.

Georgia.

BUTTON GWINNETT.
LYMAN HALL.
GEORGE WALTON.

DECLARATION OF INDULGENCE. See ENGLAND, Vol. VIII, pp. 313, 314.

DECLARATION OF RIGHTS. See BILL OF RIGHTS, Vol. XX, p. 569.

DECLARATION OF WAR, a formal announcement of the beginning of hostilities between two states. It was the custom of the Romans to issue some formal declaration acquainting the citizens of Rome with the commencement of war. Later, in the days of feudalism and knighthood, it was the practice to send a herald to the state upon which war was to be made, who made an oral declaration of the reasons for the war and of its immediate beginning. In modern times, before the invention of the telegraph and the construction of the railroad, ample notice was given not only to the enemy, but also to the neutrals engaged in commerce with the belligerents. It is now no longer customary to send the enemy a formal announcement, but notice is given neutral states, and the citizens of the governments about to engage in war are notified by their own governments. The need of such declaration no longer exists, owing to the telegraph and other modern inventions. The power of declaring war rests, in the United States, with Congress.

DECLINATION. See ASTRONOMY, Vol. II, p. 668.

DECLINATION NEEDLE, a magnetic needle which, when suspended or made to rest on a point so that it can move in a horizontal plane, rests in a line connecting two fixed points of the horizon; to which position, when turned aside in any direction, it invariably returns after several oscillations. These two points at certain places on the globe are the north and south points of the horizon, although there is usually a slight deviation from these points. A magnetic meridian is the vertical plane passing through the points on the horizon indicated by the needle; and a similar plane, passing through the north and south points, is called the astronomical meridian of the place. See MAGNETISM, Vol. XV, pp. 220, 239.

DECLINOMETER. See METEOROLOGY, Vol. XVI, p. 167.

DECOLORIMETER, an instrument by which the power of portions of bone-black, or animal charcoal, to abstract coloring matter is ascertained; a measurer of the effects of bleaching-powder. It is a graduated tube charged with a test-solution of indigo or molasses.

DECOMPOSITION, a term in chemistry signifying the separation of more simple substances from a compound. Thus the red oxide of mercury, when heated, resolves into mercury and oxygen, thus undergoing decomposition; and water under a current of voltaic electricity is decomposed into hydrogen and oxygen. See *Chemical Action*, under CHEMISTRY, Vol. V, pp. 411, 412.

DE CONINCK, PIERRE LOUIS JOSEPH, a French artist; born at Méteren, France, Nov. 22, 1828. He studied under Leon Cogniet. He exhibited at Rome in 1855, and at the Paris Salon in 1857. He obtained medals in the Salons of 1866, 1868, 1875, and at the Universal Exposition of 1889, and was made a chevalier of the Legion of Honor. Among his paintings are *Moccoli*: *The End of the Carnival at Rome* (1877); *Portrait of a Trappist* (1885); *Cornelia* (1878); and *The Gardener* (1889).

DECORAH, a city and the county seat of Winneshiek County, Iowa, in the northeastern part of that state. It lies on the Iowa River, in a level agricultural country, and is reached by the Chicago, Milwaukee and St. Paul railroad. Its population was 3,246 in 1900. W.F.J.

DECORATED STYLE. See (ENGLISH GOTHIC) ARCHITECTURE, Vol. II, pp. 372–375.

DECORATION DAY, also called MEMORIAL DAY, is an anniversary set apart on May 30, soon after the Civil War, for the decoration of the graves of soldiers with flowers, and the delivery of memorial orations. It has been made a legal holiday in most of the states, and in recent years has lost much of its solemn significance, being given up largely to out-of-door sports and merrymaking. W.F.J.

DECORATIVE ART. See MURAL DECORATION, Vol. XVII, p. 40; POTTERY, Vol. XIX, pp. 629–644; JAPAN, Vol. XIII, pp. 598–602.

DE COSTA, BENJAMIN FRANKLIN, clergyman and author, was born at Charlestown, Mass., on July 10, 1831, and entered the ministry of the Protestant Episcopal Church in 1857. He was rector at North Adams, Mass., and at Newton Lower Falls, and a chaplain in the army in the Civil War. Afterward he edited successively the *Christian Times*, the *Episcopalian*, and the *Magazine of American History*. For eighteen years he was an Episcopalian rector in New York City. Then, in 1899, he joined the Roman Catholic Church. He organized in 1884, and was first president of, the White Cross Society, was an active worker in the temperance cause, and was an officer of the Huguenot Society. He was the author of a number of books, including *The Pre-Columbian Discovery of America by the Northmen*, *The Northmen in Maine*, *The Moabite Stone*, *Verrazano, the Explorer*, and *The Rector of Roxburgh*, a novel. W.F.J.

DECREPITATION, a term applied to the crackling sound heard when a substance like common salt is thrown into the fire. A series of minute explosions occurs, owing to the water between the plates of the crystalline particles becoming expanded by the heat, and ultimately bursting them.

DECRESCENDO, in music, the reverse of crescendo; namely, gradual diminishing of the sound. The execution of the decrescendo is very difficult, whether on one or more notes. Like the crescendo, it is also frequently combined with a slight ritardando, especially in descending passages. It is indicated by *dec.* or *decres.*, or by the mark >.

DECRETALS, FALSE, a collection of forged papal decrees, compiled by a West Frankish priest in the middle of the ninth century, but erroneously ascribed to Isidor of Seville. See CANONIC LAW, Vol. V, p. 16. G.A.S.

DECUSSATION, the crossing of two nerves, rays or lines which meet in a point and then diverge. For *Decussation of the Pyramids*, see ANATOMY, Vol. I, p. 764.

DEDHAM, a suburban town and the county seat of Norfolk County, Massachusetts, 10 miles south of Boston. It lies on the Charles River, is a favorite place of residence, contains some fine public buildings, and has extensive manufacturing industries. It is reached by two divisions of the New York, New Haven and Hartford railroad. Its population in 1900 was 7,457. W.F.J.

DEDICATION, in law, is the act of setting apart land for some public use by the owner, and which the public, or the proper officer on its behalf, accepts for such uses. Thus when the owner lays out and plats a tract of land and devotes certain portions thereof to public streets and alleys, and the public, through its proper officers, accepts the same, this act constitutes a dedication and precludes the owner from exercising control over it. Dedication may be either express, as when made by deed or other formal or direct manner, or it may be implied from the acts of the owner, as when he acquiesces in the use by the public under circumstances which indicate that he intended a dedication.

DE DONIS CONDITIONALIBUS, THE STATUTE, a law passed in England, A.D. 1285, the object of which was to prevent the alienation of property by one who held a limited interest therein. Similar statutes are now enforced in many of the United States.

DEDUCTION. See A PRIORI, Vol. II, p. 187.

DEEMS, CHARLES FORGE, an American clergyman and author; born in Baltimore, Maryland, December 4, 1820. He was graduated from Dickinson College at the age of nineteen, studied theology and was ordained a minister of the Methodist Episcopal Church. He held several pastorates and in 1842 was made professor of logic in the University of North Carolina. Three years later he was appointed professor of chemis-

try at Randolph-Macon College and from 1850 to 1855 was president of Greensboro Female College. In 1866 he was called to the pulpit of the Church of the Strangers in New York city, where he remained until his death. He was well known as an editor and author and wrote among other works: *Triumph of Peace and Other Poems* (1840); *The Light of the Nations* (1870); *Weights and Wings* (1872); *Chips and Chunks for Every Fireside* (1892). At various times he was editor of the *Southern Methodist Pulpit; The Annals of Southern Methodism*, and *Frank Leslie's Sunday Magazine*. He died in New York city, November 18, 1893. W.M.C.

DEEMSTER. See MAN, ISLE OF, Vol. XV, p. 459.

DEEP BOTTOM, a point on the James River, in Henrico County, eastern Virginia, 12 miles below Richmond. It was a strategic point during the Civil War, and important battles were fought in the vicinity in the year 1864.

DEEP RIVER, a village of Middlesex County, central southern Connecticut, situated near the west bank of the Connecticut River, about 35 miles S. of Hartford, on the New York, New Haven and Hartford railroad. The chief industry is the manufacturing of hardware. Population 1890, 1,297.

DEEP RIVER, of North Carolina, rises in Guilford County, follows a southeasterly course and unites with Haw River at Haywood, to form the Cape Fear River. Deep River is about 130 miles long. In Chatham and Moore counties are found the Deep River coal-beds, a tract of land containing about 40 square miles, lying along the Deep River valley. The coal is of good quality, varying from bituminous to anthracite. Although the coal is abundant, and its location known for over a century, it has not been mined. In the same region good copper and iron ores are found.

DEEP-SEA EXPLORATION. See DREDGE, Vol. VII, pp. 398 et seq.

DEERFIELD, a historic village in Franklin County, northwestern Massachusetts, on the Boston and Maine and New York, New Haven and Hartford railroads. In 1675 it was the scene of "Bloody Brook massacre," and in 1703 the French and Indians burned the village. It is a railroad center, and possesses many attractions of scenery for the tourist. Population 1900, 1,969.

DEE RIVER. See CHESHIRE, Vol. V, p. 511.

DEER LODGE CITY, the capital of Deer Lodge County, western Montana, situated on a creek of the same name, on the Montana Union railroad, about 50 miles S.W. of Helena. The region is mountainous, and gold is found. Population 1890, 1,463; 1900, 1,324.

DEER-MOUSE OR JUMPING-MOUSE, a genus of American rodent quadrupeds, allied to mice and to jerboas. See JERBOA, Vol. XIII, pp. 636, 637.

DEER PARK, a township of Orange County, southern New York, drained by the Neversink River and intersected by the New York, Lake Erie and Western railroad. The Delaware River bounds it on the southwest. Pop. 1900, 11,317.

DEER, VIRGINIA. See CARIACOU, in these Supplements.

DE FACTO, a legal term used to denote a condition actually existing, or a thing which has been done. It is frequently used in contradistinction to *de jure*, which means, of right. Thus an officer *de facto* is one who in fact exercises the functions of the office with apparent right, but who is not actually qualified in law as such officer. A *de facto* government is one completely established, and actually exercising control, but whose control is not recognized as permanent or rightful.

DEFAULT, in law, is the failure of the defendant in a suit to appear in proper time and make his defense, or of the plaintiff to prosecute his claim against the defendant. Upon default of the defendant, judgment by default may be rendered against him, in accordance with the claim set forth in the declaration. Upon default of the plaintiff, a nonsuit may be entered against him. Usually, in suits to recover a definite liquidated sum of money, a judgment may be entered against the defendant upon his default in pleading to the action without the hearing of proofs, provided the plaintiff has filed with his declaration an affidavit of the amount due him. Default, in its general sense, means the failure of a party to perform a duty or undertaking.

DEFEASANCE, a collateral instrument, usually made at the same time or in connection with the same transaction as another conveyance, and which contains conditions which, if performed, will defeat the estate created by the other deed. Thus a bond for the reconveyance of an estate upon the payment of a certain sum at a specified time, and delivered at the same time the estate is conveyed, is a defeasance, and if the condition is performed by the payment of the money at the time agreed, the deed of conveyance will be defeated. An instrument of defeasance must be of as high a nature as the principal deed, and must be recorded, to be binding as against a stranger without notice.

DEFENDER OF THE MARRIAGE TIE, the title of a functionary of the Roman Catholic Church, the nature of whose duties is indicated by the title. In that church marriage has always been regarded as a sacrament, which is properly to be celebrated by the authorized clergy and by nobody else, and which, therefore, is not to be annulled by divorce, by the civil power, or by any power short of the Pope himself through a special dispensation, which latter has very seldom been granted, and then only for extraordinary causes. In order to maintain the sanctity of marriage against the growing practice of civil divorce, Pope Benedict XIV, in 1741, created the office of *Defensor Matrimonii*, the holder of which serves as an attorney or referee, to prevent if possible what the church regards as a violation of the sacrament. Such officers were not established in America until 1884, but since then they

nave been multiplied in numbers until each diocese contains one. They have no authoritative status under the civil law, but are often able to employ their offices with effect in dissuading Catholics from seeking divorce in the courts. W.F.J.

DEFENSE, the resistance of an attack. Self-defense, in case of an attack with force, when the person attacked cannot otherwise avoid injury, is a natural right which the law recognizes. A man is also permitted to repel force by force for the purpose of protecting his family and property. If one kills an assailant while protecting himself, his family, or even his property, and while using only means proportionate to the occasion, he will be justified, provided the act from which he attempts protection would if carried out, constitute a felony.

DEFIANCE, capital of Defiance County, northwestern Ohio, on the Maumee River, where it is joined by the Tiffin, about 50 miles S.W. of Toledo, and about 44 miles N.E. of Fort Wayne, Indiana. It is on the Wabash railroad, the Wabash and Erie canal, and the Baltimore, Pittsburgh and Chicago railroad. It publishes two weekly newspapers, and contains a seminary for women, and several manufactories. Population 1890, 7,694; 1900, 7,579.

DEFLAGRATION, a sharp, quick combustion; an example is the rapid combustion of ignited charcoal, where a nitrate, such as nitrate of potash, or a chlorate, such as chlorate of potash, is thrown thereon. As chlorates do not occur naturally, it follows that deflagration with a natural salt indicates a nitrate; and if the deflagration be accompanied by a violet flame, it is characteristic of nitrate of potash (ordinary niter or saltpeter); and if by a strong yellow flame, it is indicative of a nitrate of soda (cubical niter).

DEFORCEMENT, in English law, an abatement, intrusion, disseisin or discontinuance, or any other wrong whatsoever, whereby he that has the right to the freehold is kept out of possession.

DE FOREST, John William, author, was born at Humphreyville, Conn., on March 31, 1826, studied privately, and spent many years in foreign travel. He served in the Civil War and rose to the rank of major in the volunteer army. Since 1850 he has been a prolific writer, chiefly of novels but also of some historical works and of many magazine articles. Among his works are a *History of the Indians of Connecticut*, *Miss Ravenel's Conversion*, *Kate Beaumont*, *The Wetherell Affair*, *Justine Vane*, *A Lover's Revolt*, and *The Bloody Chasm*. W.F.J.

DEFREGGER, Franz von, a noted German *genre* painter; born at Stronack, Tyrol, April 30, 1835. He studied at Innsbruck, Munich and Paris, and became a pupil of Piloty in 1867. The most famous among his pictures are *The Last Levy* (1874); *The Tyrolese Landsturm in the War of 1809*, *Returning Home* (1876). Appointed professor at the Munich Academy, 1878. G.A.S.

DE FUNIAK SPRINGS, a town and the county seat of Walton County, Florida, is the seat of an important summer school, and is reached by the Louisville and Nashville railroad. Its population was 1,661 in 1900. W.F.J.

DEGENERATION, Animal. See Zoölogy, Vol. XXIV, p. 850. In Plants. See Botany, Vol. IV, p. 116.

DEGER, Ernst, a German historical painter; born at Bockenheim, April 15, 1809; died Jan. 27, 1885, at Düsseldorf. He was a pupil of Schadow at the Düsseldorf Academy. The greater part of his work was in Scriptural illustration, especially in church decoration, notedly at the Church of St. Apollinaris at Remagen, and the Chateau at Stolzenfels. He was one of the group of artists known as "Nazarites," and was a member of the Munich and Berlin academies.

DE GIERS, Nicholas, statesman; was born in Russia on May 21, 1820, entered the service of the ministry for foreign affairs in 1838, and for many years was connected with Russian interests in Turkey, the Balkan States and Egypt. In 1875 he returned to St. Petersburg as an undersecretary of foreign affairs, and in 1882 succeeded Prince Gortchakoff as foreign minister. In that office he pursued a policy of peace and friendship with Germany and Austria-Hungary. He died on January 26, 1895. W.F.J.

DE GOEJE, Michael Jan, a Dutch Orientalist; born in Dronryp, Aug. 13, 1836. He began the study of Arabic under the tuition of his father, and afterward under the famous Arabist, Dosy, professor at the University of Leyden. He himself was appointed, in 1869, professor of Arabic at the University of Leyden. He has published numerous new editions of Arabic texts, with translations and glossaries. Among these may be mentioned *Jakubi*, a description of Africa and Spain; *Belâdhori*, a history of the conquest of Syria; and a series of historical and geographical notes on the Orient. He retired in 1906.

DEGOLLADO, Santos, soldier and statesman, was a native of Mexico and came to the fore at the downfall of Santa Anna and the first rise of Benito Juarez to power. In 1858 he became minister of war in the cabinet of Juarez, having formerly been "minister of government." In the fall of the same year he took the field as chief commander of the Juarist forces against Miramon and the reactionary party, and captured Guadalajara after a month's siege but was soon driven out of it again. The next spring he inflicted a defeat upon Miramon, but was in turn himself defeated and his army dispersed. Again, in November, 1859, he was signally defeated, and the Liberal cause seemed lost. The genius of Juarez, however, saved the day, in spite of the incompetence of Degollado, and even inspired the latter to renewed exertions. In the early part of 1861 Degollado took a leading part in the crushing defeat of Marquez and Mejia, and the reactionary forces were reduced to mere bands of marauders. One of these bands, however, in June of that year, captured him and put him to death in a manner equivalent to simple murder. W.F.J.

DEGREE, in music, expresses the intervals of notes from one another on the stave. When on the same line or space they are in the same degree. The interval of a second note is one degree, the interval of a third two degrees, and so on, irrespective of the steps being tones, or semitones, or whether they are natural, flat, or sharp, so long as they represent a further line, or space, on the stave. They are in different degrees when, though the same note on an instrument, they are called by different names, as F sharp and G flat.

W.R.B.

DEGREES, Academical. See Examinations, Vol. VIII, p. 680.

DE HAAS, Maurice Frederick Hendrick, painter; was born in Holland on Dec. 12, 1832, and became a pupil of Louis Mayer, the celebrated marine painter, under whose instruction he made rapid progress. In 1854 he visited England, and in 1859 came to the United States and opened a studio in New York, where he spent the rest of his life. He ranked among the best marine painters of his time, and examples of his work are to be found in the best public and private art galleries. He was a member of the Rotterdam Academy and of the Academy of Design in New York. He died on Nov. 23, 1895. W.F.J.

DE HAAS, William Frederick, painter, and elder brother of M. F. H. De Haas (q. v.); was born at Rotterdam, Holland, studied art, and came to America, where most of his work was done. He especially excelled in seacoast landscapes, and painted some notable pictures of the New England and Nova Scotian coasts. He died in 1880. W.F.J.

DE HAVEN, Edwin John, an American explorer and naval officer; born in Philadelphia, Pennsylvania, in 1819. He entered the marine service when a boy and in 1839 accompanied Commodore Wilkes' expedition to the South Seas. Later he was in command of the first expedition sent to the Arctic in search of Sir John Franklin. He died in Philadelphia, October 2, 1865.

W.M.C.

DEIANIRA, the daughter of Œneus, king of Calydonia, and Althaia, sister of Meleagros, became the wife of Hercules, after his victory over her wooer, Acheloos. See Hercules, Vol. XI, p. 649. G.A.S.

DEI GRATIA (Lat., "by the favor of God"), a formula taken from several apostolical expressions in the New Testament. It is believed to have been first formally used by the bishops at the Council of Ephesus, A. D. 431. Afterward it came to be appended by archbishops, bishops, abbots, abbesses, deans, monks, and even chaplains, to their titles, in letters and other documents, as an humble expression of dependence on the Most High. After the middle of the thirteenth century, the higher clergy wrote *Dei et Apostolicæ Sedis gratia*, "By the favor of God and the Apostolic See." In the British Islands this style was generally dropped about the time of the Reformation, but it was occasionally given to the archbishops of Canterbury and York, even after the beginning of the seventeenth century. It has also been used by monarchs, having in their minds a special significance as expressing the idea of the "divine right of kings."

DEJAZET, Virginie, a French actress; born in Paris, Aug. 30, 1798. From 1831–43 she played at the theatre of Palais-Royale. In 1859 the Boulevard Theatre of Les Folies Nouvelles was named after her, and was the scene of her triumphs up to 1865. She died in Paris, Dec. 1, 1875. In her best period she was a model of delivery, expression and manner of representing. G.A.S.

DE KALB, a city and the county seat of De Kalb County, Illinois, in the northern part of the state. It lies on a branch of the Kishwaukee River, about 60 miles west of Chicago, on the Chicago and Northwestern railroad, and is the seat of considerable manufactures, chiefly of agricultural implements and other supplies for the rich farming region which surrounds it. Its population was 2,579 in 1890, and 5,904 in 1900.

W.F.J.

DE KALB, John, Baron, a Bavarian general who entered the French army, and, accompanying Lafayette to America, fought under Washington and Gates; born July 29, 1721, in Hüttendorf, Bavaria; killed in battle at Camden, South Carolina, Aug. 19, 1780. He was induced by Silas Deane to join the American forces, and upon his arrival in America was made a major-general by Congress. He was under Washington at Valley Forge and in New Jersey until 1780, when he was sent to aid General Gates in the South. He was mortally wounded, Aug. 16, 1780, while heading his forces in resisting an attack by Cornwallis. A statue has been erected to his memory in Annapolis, Maryland.

DE KAY, Charles, an American novelist and journalist; born July 25, 1848, at Washington, District of Columbia, a grandson of the poet, Joseph Rodman Drake. He became literary editor of the New York *Times* in 1877, and held that position until 1894, when he was appointed United States consul to Berlin. He has published *The Bohemian* (1878); *Hesperus*, and Other Poems (1880); *Love Poems of Louis Barnaval* (1883); and *Barye: Life and Works* (1889).

DE KAY, James Ellsworth, physician and naturalist, was born in Portugal, the son of American parents, in 1792, and studied medicine in New York and Edinburgh. He practiced in New York, and was one of the founders of the Academy of Medicine. He devoted much attention to natural history, and wrote a monumental work in five volumes on the zoölogy of the state of New York, the data for which he secured by personal investigations in all parts of the state. He visited Turkey and wrote a book of his impressions of that country. He was a close friend of Halleck, Drake, Eckford, and other prominent men of his day. He died at Oyster Bay, Long Island, on November 21, 1851. W.F.J.

DEKKER, Eduard Douwes, was born in Amsterdam in 1820, and served the Dutch government in the East Indies. He then became a

novelist, essayist and publicist, under the pen-name of "Multatuli." In his story, *Max Havelar*, he exposed the abuses of Dutch administration in the Indies. He died in 1887. W.F.J.

DE KOVEN, JAMES, clergyman, was born at Middletown, Connecticut, on September 19, 1831, and was educated at Columbia College (1851) and at the General Theological Seminary of the Protestant Episcopal Church (1854). He entered the priesthood of the Protestant Episcopal Church, had charge of the church at Delafield, Wisconsin, and in 1859 was made warden of Racine College in that State. There he introduced the wearing of caps and gowns, as in the English universities, and organized the first surpliced choir in the west. He was successful in his administration of the college, and enlarged its buildings and enhanced its prosperity. His extreme High Church views and practices, however, involved him in some controversies, and caused the house of bishops to refuse to confirm his election as bishop of Illinois in 1875. He was a man of fine scholarship, marked eloquence, and exceptional charm of conversation and manner. He died at Racine on March 19, 1879. W.F.J.

DE KOVEN, REGINALD, an American musical composer; born in Middletown, Conn., April 30, 1859. After several years spent in study at Stuttgart under Speidl, and at Paris under Mathias and Durand, he attended King's College, Oxford, and was graduated in 1879. He again went to Stuttgart and studied under Lebert and Pruchner. His original idea had been to become a professional pianist, but he gave this up and devoted himself to composition, in which he took a front rank among opera and song writers. His first composition was a song, *Margery Daw* (1882). He afterward published over one hundred songs; among them, *Oh, Promise Me; Winter's Lullaby; Indian Love Song; Ask What Thou Wilt;* etc. But it is perhaps for his operas that Mr. De Koven is best known. Among them are *Robin Hood* (1890); *Don Quixote* (1889); *The Fencing-Master* (1892); *Rob Roy* (1894); and *The Mandarin* (1896). He became musical critic for the New York *World*.

DE KROYFT, SUSAN HELEN (born Aldrich), was born at Rochester, N. Y., on October 29, 1818, was educated at the Lima, N. Y., Seminary, and married Dr. William De Kroyft, who was killed by an accident upon their wedding day. She became blind through grief and entered the New York Institution for the Blind, where she served as organist. She has written a number of books, including *A Place in Thy Memory*, *The Story of Little Jakey*, *Mortara*, and *The Foreshadowed Way*. W.F.J.

DELABORDE, HENRI, a French historical painter; born at Rennes, May 2, 1811; a pupil of Delaroche; a member of the Institute, an officer of the Legion of Honor, and perpetual secretary of the Academy of Fine Arts, and gained a high reputation as a writer and art critic. Among his paintings are *The Confessions of St. Augustine* (1853); *The Death of St. Monica* (1838); and *The Taking of Damietta* (1841). He contributed to the *Revue des Deux Mondes*, and his published works include *Studies of the Fine Arts in France and Italy* (1864); *The Collections of Engravings in the National Library* (1875); and *A Compendium of the Origin, History and Processes of Engraving* (1882). He died in 1899.

DELAFIELD, EDWARD, physician, was born in New York City on May 17, 1794, and was educated at Yale (1812) and at medical schools in New York, London and Paris. He was a prominent member of his profession in New York for many years, was one of the founders of the New York Eye and Ear Infirmary in 1821 and of the New York Ophthalmological Society in 1865. He was for a time president of the College of Physicians and Surgeons, and of Roosevelt Hospital. He died in New York on February 13, 1875. W.F.J.

DELAFIELD, FRANCIS, physician, son of Edward Delafield (q.v.), was born in New York City on August 3, 1841, and was educated at Yale (1861), the College of Physicians and Surgeons, New York (1863), and in London, Paris and Berlin. He has long been connected with Bellevue Hospital, in New York, and with the College of Physicians and Surgeons. He was the first president of the Association of American Physicians and Pathologists. W.F.J.

DELAFIELD, RICHARD, soldier, a member of the family of that name which has given many men of eminence to New York, was born in New York City on September 1, 1789, and was graduated from West Point in 1818. He served on the boundary commission under the treaty of Ghent, was engaged in fortification work and harbor improvement for some years, and in 1838 was made superintendent of the West Point Academy, where he did an invaluable work. From 1845 to 1855 he was again engaged in fortification and harbor works, and then went abroad to observe and report upon the Crimean War and European methods of warfare. On his return home he was again in charge of West Point. During the Civil War he was chiefly engaged in staff duties in New York and Washington. He was brevetted major-general in 1865, retired in 1866, and died on November 5, 1873. W.F.J.

DELAGOA BAY. For over half a century there have been intermittent attempts to establish communication between the Transvaal and Delagoa Bay. All failed, however, till 1887, when a company was formed in London to work a concession from the Portuguese government for the construction of a railway from Delagoa Bay to the Transvaal frontier. The line was partly opened in 1888, and in July, 1895, was finished to Pretoria, in the Transvaal, a distance of 350 miles, and to Johannesburg, four hundred miles from the bay. See DELAGOA BAY, Vol. VII, p. 36.

DE LANCEY, JAMES, jurist, son of Stephen De Lancey, founder of the family in America, was born in New York City in 1703, and was educated in England, at the University of Cambridge. He was admitted to the bar in London, and then returned to America and settled in New York. He became a member of the colonial

council in 1729, and in 1730 was the chief author of the "Montgomery Charter" of the city of New York. In 1733 he was made chief justice of New York. He was made colonial governor in 1753–55, and again in 1757, serving on the latter occasion until his death, which occurred in 1760. His name is borne by one of the streets of New York City. W.F.J.

DE LANCEY, WILLIAM HEATHCOTE, clergyman, was born at Mamaroneck, N. Y., on October 8, 1797, and was graduated from Yale College in 1817. He entered the Protestant Episcopal ministry in 1819, and in 1822 went to Philadelphia as the chief aid and "adopted son" of Bishop White. In 1828 he became provost of the University of Pennsylvania, and filled the place for six years. He then returned to the ministry, and in 1839 was chosen first bishop of the new diocese of western New York. In 1852 he visited England and was the first American bishop to take part officially with English bishops in services in St. Paul's cathedral and Westminster Abbey. He died on April 5, 1865. W.F.J.

DE LAND, Florida, a town, the seat of Volusia County, and the terminus of a branch line of the Savannah, Florida & Western, and Silver Springs, Ocala & Gulf railroad, 108 miles south of Jacksonville. It is a winter resort, the seat of the John B. Stetson University, and a sugar-cane, orange, peach, melon, etc., and lumber growing center, with supplemental manufacturing industries. Population, 1900, 1,449. C.L.S.

DELAND, MARGARETTA WADE (CAMPBELL), author; born in Allegheny, Pa., Feb. 23, 1857; was educated at Pelham Priory, New Rochelle, N. Y., and afterward studied in Cooper Union, New York city. In 1878–79 she was a teacher of industrial design in the Girls' Normal College, New York. She was married in 1880 to Lorin F. Deland, of Boston, Mass. Her prose works were *John Ward, Preacher* (1888); *Florida Days* (1889); *Sidney* (1890); *Philip and His Wife* (1894); *Old Chester Days*, a series of sketches, etc. G.J.H.

MARGARETTA W. DELAND.

DELANE, JOHN THADEUS, a British editor; born in London, Oct. 11, 1817; died there, Nov. 22, 1879. He was graduated at Oxford in 1839. He made starts in several professions, and finally drifted into journalism. He became a member of the staff of the London *Times*, and in 1841 its editor. His connection with that paper and his influence are given under NEWSPAPERS, Vol. XVII, p. 428.

DELANO, COLUMBUS, statesman, was born in Vermont in 1809, removed to Ohio, practiced law, was elected to Congress in 1844, was commissary-general of Ohio in 1861, member of the Ohio legislature in 1863, was elected to Congress in 1864 and 1866, in 1869 was appointed Commissioner of Internal Revenue, and in the same year was made Secretary of the Interior. He held the latter office until 1875, after which he became a banker and farmer. Died Oct. 23, 1896. W.F.J.

DE LA RAMÉE, LOUISE, best known by her pen-name of OUIDA, novelist; was born in England in 1840. She has written many romances of great but unequal power. Among her earlier and melodramatic ones are *Strathmore; Chandos; Under Two Flags; Idalia*, and *Tricotrin*. Others dealing with social intrigues were *Moths; In a Winter City; Wanda*, etc. Among her later works are *Don Gesualdo; Moufflou; The Tower of Taddeo; The Silver Christ*, and *The New Priesthood*. She has devoted much attention to humanitarian work. Some of her romances have been dramatized. W.F.J.

LOUISE DE LA RAMÉE.

DELATOR, an informer or accuser. The original use of the term was for any kind of a carrier, but soon it was applied only to those who brought evil reports. In Rome the delatores held sway for a time and were paid for their services by the government. They apprehended assassins and accused persons of crimes. They brought accusations against various public officials, a great many times wrongfully. They became such an evil under Domitian that the next emperor, Nerva, ordered them to be driven out.

DELAUNAY, CHARLES EUGÈNE, a French astronomer; born April 9, 1816, at Lusigny, professor of higher mechanics at the Polytechnical School of Paris and at the Sarhonne; was drowned Aug. 5, 1872, at Cherbourg. See Vol. XVI, p. 827, and Vol. X, p. 201. G.A.S.

DELAUNAY, EMANUEL. See ANTRAIGUES, COMTE D' in these Supplements.

DELAUNAY, LOUIS ARSÈNE, a French actor, probably the greatest of the French actors of his day. He was born in Paris, March 21, 1826. He began his stage life in 1846, at the Odéon. He was chosen by many of the French playwrights for the first presentation of their work. He created the part of Hernani, in Hugo's play of that name, and the part of Télémaque, in *Ulysse*. Was made a chevalier of the Legion of Honor, and in 1877 professor of dramatic oratory at the Conservatory. Retired in 1887. Died Sept. 22, 1903.

DELAVAN, a railroad town of Tazewell County, northern central Illinois, about 157 miles S.W. of Chicago, on the Chicago and Alton and the Peoria, Decatur and Evansville railroads. It has a variety of manufactories and a population (1890) of 1,176 (1900), of 1,304.

DELAVAN, a village of Walworth County, Wisconsin, in the southeastern part of the state.

It lies on Lake Delavan, and is reached by the Chicago, Milwaukee and St. Paul railroad, 48 miles S.W. of Milwaukee, and 75 miles N.W. of Chicago. It contains a state asylum for the deaf and dumb. Population, 1900, 2,244. W.F.J.

DELAVAN, EDWARD CORNELIUS, reformer, was born in Schenectady County, New York, in 1793, became a wine merchant and hotel proprietor, the well-known Delavan House at Albany, N.Y., having been built by him. After a prosperous career in such businesses he became converted to the temperance cause, and joined Dr. Eliphalet Nott, of Union College, and others in organizing the first state temperance society in New York. He lectured and wrote much in behalf of temperance, and spent in that interest freely the fortune he had made in wine selling. He was involved in numerous law suits on account of his zeal in attacking the liquor dealers, but was invariably successful in them. He was the founder of the *Journal of the American Temperance Union*. He died on January 15, 1871. W.F.J.

DELAWARE. For general account and history up to 1870, see Vol. VII, pp. 39, 40. The

STATE SEAL OF DELAWARE.

climate of Delaware is mild and healthful, except in the extreme south, where some fever is occasioned by the swamps. The temperature ranges from 30° to 38° in winter, and from 69° to 74° in summer. The average rainfall is about fifty inches. Agriculture is the chief industry in the middle and southern portions of the state, while manufacturing is the prevailing occupation of the inhabitants in the northern part. The census reports of 1900 give the following facts relative to the principal agricultural products of Delaware. The number of acres in cereals, etc., was 473,962.

	Bushels.	Value.
Indian corn	4,736,580	$1,725,452
Wheat	1,870,570	1,247,055
Oats	131,960	43,337
Potatoes	414,610	221,411
Hay and forage (tons)	128,193	989,848

The total number of farms is given as 9,687, their acreage as 1,066,228, with a total valuation of $34,436,040. The farm implements and machinery were valued at $2,150,560, and the live-stock at $4,111,054. The estimated value of farm products was $9,190,777. In 1900, the number of farm-animals, with their value, was as follows: Horses, 28,132, value $1,725,515; mules, 4,635, value $339,951; milch cows, 32,591, value $993,972; oxen, 21,589, value $346,913; sheep, 11,764, value $43,588; swine, 46,732, value $234,472. The soil, climate and proximity to market all combine to make fruit-growing profitable, and peaches, apples and the small fruits all yield large crops and find a ready market in New York and Philadelphia. In 1900, the peach crop was a greatly reduced one in contrast with former years, apples and pears, in part, taking their place. Immense quantities are canned, this industry being one of Delaware's most profitable lines of export. The strawberry crop also adds largely to the aggregate of the annual value of agricultural products.

The census returns show Delaware to have (in 1900) 1,417 specified manufacturing industries, with an aggregate invested capital of $41,203,239, employing 22,203 hands, paying in wages $9,263,661,

STATE CAPITOL, DOVER, DELAWARE.

and producing $45,387,630 worth of goods. The principal industries were the manufacture of cotton goods, car-building, the manufacture of chemicals and fertilizers, foundries and machine-shops, flouring-mills, iron and steel works, leather goods, etc. Over eighteen hundred hands were employed in ship-building, the shipyards at Wilmington being especially extensive. In sea-fisheries large capital is invested and many persons engaged. The oyster industry alone has some five hundred vessels and boats constantly employed throughout the season.

The number of miles of railroad in operation in 1905 was 335, with a capital of more than $7,500,000. The mileage was a little less than 18 per 100 square miles of territory.

At the beginning of 1900 the total state assets were $1,118,509, the total liabilities $769,750. The school fund was $115,442, having been much depleted during the three years preceding by the expenditure of $42,187 for the purchase of free textbooks for the schools of the state. In 1895 there were six thousand colored children of school age in the state, who had never had the privileges of attending a public school. The total number of children within the school age (5 to 18 years) was, at the time of the enumeration in 1900, 40,400; enrolled in the schools, 22,254; average daily attendance, 15,938. The state college at Newark is conducted at an expense of about forty thousand dollars per year. The agricultural ex-

periment station, in connection with the college, receives as government aid about $35,000 annually. There is also a college at Wilmington, and a separate institution for colored students.

Among state institutions are the State Hospital for the Insane, at Farnhurst, with about 250 patients, the Industrial School for Girls, and the Industrial School for Boys. The deaf and dumb, the blind, and feeble-minded children are maintained in institutions outside the state, their support being provided for by annual appropriations.

There are about 300 churches in the state, the Methodist denominations leading in point of numbers. Of the 43 newspapers published in the state at the beginning of 1899, 6 are daily, 1 semi-weekly, 29 weekly, 3 semimonthly, and 4 monthly.

Wilmington, the principal city of Delaware, had a population (1900) of 76,508; Dover, the capital, 3,329; Newcastle, 3,380. Important towns and villages are Smyrna, Middletown, Milford, Seaford, Lewes, Delaware City, and Newark. Population of State 1890, 168,493; 1900, 184,735, of which 153,977 were white, 30,697 colored, 51 Chinese and 9 Indians.

A new state constitution went into effect on June 10, 1897.

The nickname given Delaware is the "Blue Hen State" and the state flower adopted is Peach Blossom.

The following is a list of the governors of Delaware from 1789:

Joshua Clayton	1789–96	William B. Cooper	1840–44
Gunning Bedford	1796–97	Thomas Stockton	1844–46
Daniel Rogers	1797–98	Joseph Maul	1846
Richard Bassett	1798–1801	William Temple	1846–47
James Sykes	1801–02	William Thorp	1847–51
David Hall	1802–05	William H. Ross	1851–55
Nathaniel Mitchell	1805–08	Peter F. Causey	1855–59
George Truett	1808–11	William Burton	1859–63
Joseph Haslett	1811–14	William Cannon	1863–67
Daniel Rodney	1814–17	Gove Saulsbury	1867–71
John Clarke	1817–20	James Ponder	1871–75
Jacob Stout	1820–21	John P. Cochran	1875–79
John Collins	1821–22	John W. Hall	1879–83
Caleb Rodney	1822–23	Charles C. Stockley	1883–87
Joseph Haslett	1823–24	Benjamin T. Biggs	1887–91
Samuel Paynter	1824–27	R. J. Reynolds	1891–95
Charles Polk	1827–30	J. H. Marvil	1895
David Hazzard	1830–33	W. P. Watson	1895–97
Caleb P. Bennett	1833–36	E. W. Tunnell	1897–1901
Charles Polk	1836–37	John Hunn	1901–05
Cornelius P. Comegys	1837–40	Preston Lea	1905–08

DELAWARE BAY is the broad estuary of the Delaware River (q. v.), opening into the Atlantic Ocean between Cape May, New Jersey, and Cape Henlopen, Delaware, these being called the Capes of the Delaware. It is nearly 30 miles long, from the capes to Ship John Light, and nearly 30 miles wide at the widest part. It contains many shoals, which are marked with lights, but has a good ship channel 30 feet deep, leading from the river to the ocean. A great breakwater has been built at Cape Henlopen, sheltering the bay from storms. W.F.J.

DELAWARE OR DE LA WARR, THOMAS WEST, BARON, was born in England on July 9, 1577, and was educated at Oxford. In 1597 he entered Parliament and later served valiantly in the army in Holland and in Ireland. In 1602 he succeeded to the barony of De la Warr, and became a privy counsellor of Queen Elizabeth. He was one of the founders of the colony of Virginia, and in 1609 was appointed its governor and captain-general for life. In the summer of 1610 he reached the colony with succor just in time to save it from ruin and abandonment. His governorship was wise, but brief, for he went home with shattered health in 1611. In March, 1618, he started back to Virginia, but died on the way. The state and river of Delaware were named for him. W.F.J.

DELAWARE CITY is a village in Newcastle County, Delaware, in the northern part of the state. It lies on the Delaware River, twelve miles from Wilmington, at the terminus of the Chesapeake and Delaware canal, opposite the city of Salem in New Jersey, and is reached by the Philadelphia, Wilmington & Baltimore railroad. Its population in 1900 was 1,132. W.F.J.

DELAWARE INDIANS. For history, see INDIANS, Vol. XII, p. 870. The Delawares, with the exception of a scattered remnant in Ontario, Canada, are a part of the Cherokee Nation, in the Indian Territory, and number about 1,700.

DELAWARE RIVER, a river which rises in Delaware County, southern New York, flows westward till it reaches Pennsylvania, when it becomes the eastern boundary of that state. Its general course is southward, though it makes several turns toward the east and west. Near Shroudsburg, Pennsylvania, it breaks through the Kittatinny Mountains, at the Delaware Water Gap (q.v.), a place of remarkable beauty of scenery. Trenton and Philadelphia are the most important points on the river, Trenton being the head of navigation.

DELAWARE RIVER OR GRASSHOPPER CREEK, a river of northeastern Kansas, rises in Nemaha County, flows south-southeast and empties into the Kansas, 12 miles above Lawrence. Its length is about 75 miles. Its valley is very fertile and coal is found in the vicinity.

DELAWARE WATER GAP, one of the most beautiful bits of natural scenery in America, is the point where the Delaware River breaks through the Kittatinny range of the Appalachian Mountains, between Mount Minsi and Mount Tammany, through a gorge 1,000 feet deep. The name is also borne by a village. W.F.J.

DE LA WARR, EARLS OF, a family of the British nobility, whose family name is West. The De la Warrs succeeded the Gresleys in the manorial rights of the town of Manchester, England. The title of Baron De la Warr was first given Sir Reginald West in the thirteenth century. The title was changed to Baron West in 1343, but reverted to De la Warr in 1579. The present (1896) Earl of De la Warr is Reginald Windsor Sackville. His eldest son and heir, bears the courtesy title of Viscount Cantelupe.

DELBRÜCK, MARTIN FRIEDRICH RUDOLF, statesman; was born in Berlin on April 16, 1817, and was educated at Magdeburg, Halle, Bonn and Berlin. He practiced law with distinguished

success, and then entered the civil service of the Prussian government. He was connected with the ministry of finance, and also that of commerce. In 1864 he negotiated important commercial treaties, and in 1867 was made president of the federal chancellery of the North German Bund. In this office he gained great influence among all the German states, and was thus enabled to induce them to unite in the present German Empire during the war of 1870–71. He was the principal author of the imperial constitution, and was chancellor of the empire from 1871–76. He remained a prominent member of the Reichstag until 1880, when he retired. Died Feb. 1, 1903.

DELCASSÉ, THÉOPHILE, French statesman and minister for foreign affairs, was born at Pamiers, March 1, 1852. He began his career as a journalist on the staff of *La Republic Française*, writing chiefly on foreign affairs. In 1889 he was elected to the French chamber; in 1894 he became minister for the colonies; in 1898 minister for foreign affairs; and again, in 1899, he was selected for the same office in the Waldeck-Rousseau Cabinet, succeeding M. Hanotaux. He advocated French colonial expansion, dealt skilfully with affairs in Africa, in the Nile Valley, and at Fashoda. He resigned as foreign minister, June 6, 1905, owing to the Anglo-French-German disturbance over Moroccan affairs and disapproval of his policy.

DELEGATED GENERAL CONFERENCES. See METHODIST CHURCHES, Vol. XXVIII, p. 79.

DELEGATION, in law, means the transfer of a power or right by one or more persons to another. Any person capable of acting for himself may delegate the authority to another to act for him in most matters which concern his own rights. But when a bare power has been given to one, he cannot, as a rule, delegate it to another, for the reason that his principal has relied upon his ability and skill in granting the power. The question of the right of an agent to delegate his authority as an agent so as to bind his principal is a question frequently before the courts, and its determination depends chiefly upon the character of the agency.

DELESCLUZE, LOUIS CHARLES, a French communist, was born at Dreux, Oct. 2, 1809. His extreme political opinions made him obnoxious to the authorities, and he was repeatedly imprisoned, fined, and on one occasion banned from the country. His journal, *Le Réveil*, started in 1868 to advocate the doctrines of the International, brought him again into trouble. In the infamous history of the Paris Commune he played a prominent part, and upon his head rests, in great part, the guilt of its most execrable atrocities—the murder of the hostages. He was killed on the last barricade, May 28, 1871.

DE LESSEPS, FERDINAND. See LESSEPS, FERDINAND DE, in these Supplements.

DELFSHAVEN OR DELFTSHAVEN, Netherlands, a fishing and shipbuilding town of South Holland, on the Maas, 2 miles west of Rotterdam. Here on July 22, 1620, the Pilgrim Fathers embarked for Southampton to proceed to America. Since 1886 incorporated into Rotterdam.

DELFTWARE. See POTTERY and PORCELAIN, Vol. XIX, p. 651.

DELGADA OR PONTA DELGADA, the largest town of the Azores Islands, on the island of São Miguel. Lat. 37° 40′ N., long. 25° 36′ W. The anchorage here in the roadstead has been greatly improved by the building of the breakwater, and the town has a considerable trade, exporting wheat, maize and oranges. Population, 17,620.

DELHI, a village and the capital of Delaware County, southern New York, on the west branch of the Delaware River, on the New York, Ontario and Western railroad. It contains manufactories of sash and blinds, carriages and woolen goods. Population 1890, 1,564; 1900, 2,078.

DELIBES, CLÉMENT PHILIBERT LÉO, French composer; born Feb. 21, 1836, at St. Germain-du-Val, Sarthe; entered the Paris Conservatoire in 1848, and in 1855 produced an operetta, *Deux Sacs de Charbon*. At the Grand Opéra, where he became second director in 1865, his music for the ballet *La Source* (1866) met with great success, and his ballet music for *Coppélia* (1870), his finest work, secured his position as a composer. He wrote music for a third ballet, *Sylvia* (1876), and for three light operas, *Le Roi l'a Dit* (1873), *Jean de Nivelle* (1880), and *Lakmé* (1883), his chief success. In 1880 he was appointed professor of composition in the Conservatoire, and became a member of the Académie des Beaux-Arts and an officer of the Legion of Honor. Died in Paris, Jan. 17, 1891.

DELIQUESCENCE (Lat., *deliquesco*, to melt down). When certain saline substances are exposed to the air, and absorb a sufficient quantity of moisture to dissolve them into a liquid, they are said to be *deliquesce*. W.R.B.

DELIRIUM TREMENS, see DELIRIUM, Vol. VII, p. 45. W.R.B.

DELITESCENCE (Lat., *delitescere*, to lie hid). In surgery when a tumor very suddenly and unexpectedly subsides, it is said to terminate in *delitescence*. W.R.B.

DELISLE, GUILLAUME, a French geographer; born in Paris, Feb. 28, 1675; died there, Jan. 25, 1726. He was directed to the study of geography by his father, Claude Delisle, himself a noted geographer. In 1700 he completed the work for which he is famous, the change of the then existing system of geography. This work directed public attention to him, and in recognition of his services he was made "Geographer to the King" by Louis XV. See also GEOGRAPHY, Vol. X, p. 168.—His brother, JOSEPH NICHOLAS DELISLE, a noted astronomer. See LISLE, Vol. XIV, p. 700.

DELITZSCH, ADOLF FRANZ, theologian; born in Leipsic, Germany, Feb. 23, 1813; educated at the University of Leipsic in theology and the Oriental languages. He became a professor at Rostock, and made himself widely known while there by his *History of the Poetry of the Jews* and his translation of the pastoral drama *Il Pastor Fido* into Hebrew. He accepted in 1850 the chair of theology at the University of Erlangen, where he wrote commentaries on some of the Scriptural

books, etc. He died at Leipsic in March, 1890. G.J.H.

DELITZSCH, FREDERIC, Assyriologist; born in Erlangen, Germany, Sept. 5, 1850; a son of the preceding. He took high rank among German Assyriologists, and occupied at the University of Leipsic the first chair created in Germany for that field of study. Works are: *Assyrian Studies; Assyrian Lectures; Where Was Paradise?; Assyrian Dictionary*, etc. G.J.H.

DELIUS, NICOLAUS, a German Shakespearean critic; born Oct. 19, 1813, at Bremen; studied at Bonn and Berlin, and in 1855, became professor of Romance, Sanskrit and English at the University of Bonn, where he died, Nov. 18, 1888. His works on Shakespeare mark a departure in literature. Among them are *The Works of Shakespeare* (7 vols., 1854–65); *Pseudoshakespearean Dramas* (1856–74); *Shakespeare Lexicon* (1852); *Studies on Romance Literature of the Middle Ages*. G.A.S.

DELLA CRUSCAN ACADEMY, an institution founded in 1582, in Florence, Italy, with a view to purifying and perfecting the Tuscan tongue. See ACADEMY, Vol. I, p. 71.

DELLA CRUSCAN SCHOOL. About the year 1785 there was published *The Florence Miscellany*, a collection of verses written by a number of English residents at Florence as an amusement during their idle hours. The insipidity, affectation and fantastic silliness of the productions transcend all belief, but at that period poetry was at so low an ebb that a crowd soon admired and began to imitate them. The Della Cruscans, taking their name from the academy at Florence, now began to print their works in England, mainly in two daily newspapers, called *The World* and *The Oracle*. These effusions were published in great numbers until 1794, when the keen satire of William Gifford, in his *Baviad*, made the writers appear so ridiculous that their enthusiasm was soon spent. Prominent among these writers were Mrs. Hannah Cowley ("Anna Matilda"), Robert Merry ("Della Crusca"), and Edward Jerningham ("The Bard").

DELMAR, ALEXANDER, author, was born in New York City on August 9, 1836, was educated at New York University, and became a journalist, on the *American Daily Times*, *Hunt's Merchants' Magazine*, *The Financial and Commercial Chronicle*, *The National Intelligencer*, and other periodicals. He founded *The Social Science Review* in 1864. He was director of the U. S. Bureau of Statistics in 1865, and U. S. representative to the international statistical congress in 1872. He has devoted much attention to public finance, and has written a number of books upon that and other topics, besides many essays and pamphlets. W.F.J.

DEL NORTE, the capital of Rio Grande County, southern Colorado, on the Rio Grande River, and on the Denver and Rio Grande railroad. It is one of the chief towns of southwestern Colorado, and is situated at an elevation of 7,807 feet, amid fine picturesque scenery. This place is the base of supplies for the San Juan mines. Population 1890, 736; 1900, 705.

DE LONG, GEORGE WASHINGTON, naval commander and Arctic explorer, was born in New York City on August 22, 1844, and was educated at the United States Naval Academy, from which he was graduated in 1865. By 1879 he had become lieutenant-commander. In the fall of that year he was selected to command the Arctic expedition sent northward by way of Behring Strait in the ship *Jeannette*, at the instance and at the expense of James Gordon Bennett. (See POLAR REGIONS, Vol. XIX, p. 338. The expedition met with disaster, and after heroic struggles and great suffering De Long died in the Delta of the Lena River, in Siberia, on October 30, 1881. His widow, Emma De Long, published *The Voyage of the Jeannette*, in 1883, and an account of his struggles and death, and of the heroic search for the few survivors of his party, is given by Admiral Melville, who led the relief expedition, in his *In the Lena Delta*. W.F.J.

DELORME, MARION, a Frenchwoman who became notorious in the seventeenth century. She made her house the rallying-point of the chiefs of the "Frondeurs" during the first disturbances of that party, and for this Mazarin was about to imprison her, when she suddenly died. Previous to the time of the Frondeurs she had held sway over the Duke of Buckingham, Cardinal Richelieu, the Duc de Brissac, and others almost as prominent. She was a woman of great beauty and brilliant wit. Victor Hugo made her the subject of one of his historical novels, and her character was represented in the drama *Cinq Mars* (1826), by Alfred de Vigny.

DELORME, PHILIBERT, a French architect; born in Lyons, about 1518; died in 1577. He attracted attention while still in Lyons, and was soon called to Paris, where he designed the Tuileries, the chateaux at Meudon and Anet, and aided in building the chateau at Fontainebleau. He studied in Rome, and, upon his return to France, strove to replace the Gothic styles with those of the Romans. He published one work, *New Inventions for Building Well at Little Expense*.

DELPHI, Indiana, the seat of Carroll County, at the junction of Deer Creek with the Wabash River, and on the Wabash & Erie Canal, the Wabash, the New Albany & Chicago, and the Louisville railroads, 66 miles northwest of Indianapolis. Paper, strawboard, flax, cement, etc., are manufactured. Pop., 1900, 2,135. C.L.S.

DELPHIN CLASSICS. See BIBLIOGRAPHY, Vol. III, p. 568.

DELPHINIDÆ. See MAMMALIA, Vol. XV, p. 401.

DELPHINIUM. See HORTICULTURE, Vol. XII, p. 263.

DELPHINUS, a constellation in the northern hemisphere, near Aquila. It is commonly called "Job's Coffin," on account of its shape; however, the derivation of the name, meaning *a dolphin*, would indicate that the ancients likened it to that fish. Its brightest star is one between the

third and fourth magnitudes, and four others are of the fourth magnitude.

DELPHOS, a city of Allen County, northwestern Ohio, situated on the Miami canal, and on the Northern Ohio, Pittsburg, Fort Wayne and Chicago, and Toledo, St. Louis and Kansas City railroads. It contains a Franciscan convent, and manufactories of barrels, staves and wheels. Population 1900, 4,517.

DELPIT, ALBERT, a French dramatist and novelist; born Jan. 30, 1849, at New Orleans, Louisiana; originally a contributor to the journals *Musquetaire* and *L'Artagne*, founded by Alexander Dumas. His first poems, *L'apothéose de Lamartine; L'invasion; Le Repentir, ou Récit d'un Curé de Campagne*, obtained the prize of the French Academy. Of his dramas *Le Fils de Coralie* (1880) is the best known. His novels *Les Compagnons du roi* (1873); *La Vengeresse* (1874); *Le Mystère du Bas Meudon* (1876); *Les Fils de Joie* and *Le Dernier Gentilhomme* (1879); *Solange* (1885); *Thérésine* (1888); *Toutes les Deux* (1889); *Belle-Madame* (1892), and *Le Mariage d'Odette* portray Parisian high-life most effectively. His patriotic *Poésies* obtained a prize at the French Academy. He died in Paris, Jan. 4, 1893. G.A.S.

DEL RIO, Texas, the seat of the southwestern Valverde County, on the Sycamore tributary of the Rio Grande, 30 miles south of Brackettville by the Houston to El Paso division of the Southern Pacific railroad. It is in a fruit raising region, and has important irrigation and other works, besides undeveloped mineral resources. Population of precinct (1900), 2,128. C.L.S.

DELSARTE, FRANÇOIS ALEXANDRE NICOLAS CHÉRI, a French teacher of elocution; born in Solesmes, Dec. 19, 1811; died at Paris, July 19, 1871. He studied for the operatic stage, but his voice failed him, and he was obliged to devote himself to giving instruction in elocution. He gave much time to the study of dramatic art, which he carried to the point of asserting the existence of art in all human emotions and motions. His system is known as the DELSARTE SYSTEM. He was the recipient of many honors.

DELSARTE SYSTEM, the name given to a method of general physical training by which the æsthetic and emotional nature of man in its relations to the art of expression is elaborately portrayed. From a somewhat vague statement of its author, François Delsarte, it is possible to detach certain fundamental principles deduced from the scientific postulate that "every outward manifestation is the expression of an inner state,"—a truism to the average understanding. The dominating ideas of the system may be summarized in a series of psychophysical exercises, comprising movements tending to restore debilitated nervous energy, movements calculated to augment nerve-force, movements calculated to harmonize the physical and intellectual powers, the general result being improved health, even and normal development and natural expression. The practical benefit derived from the Delsartean system has been frequently demonstrated, and to dramatists, orators and elocutionists has proved of undoubted efficacy in inculcating methods of vocal utterances and qualities of tone, gestures and expression in keeping with the highest elocutionary art. In the United States the system has gained wide acceptance and study.

DELTA. See GEOLOGY, Vol. X, p. 246.

DELUNDUNG, the native name of the spotted weasel-cat (*Prionodon gracilis*), found in the Malayan regions. It belongs to the civet family (*Viverridæ*). The name *linsang* is often applied. The color is white, with black bands and spots.

DELVINO, a town in the province of Albania, S.E. European Turkey, 47 miles W.N.W. of Janina, in an orange and olive district. Pop., 4,000.

DELAYANNIS, THEODORE P., a famous Grecian statesman; born at Kalavryta, in the Peloponnesus in 1826, and died at Athens, June 13, 1905, from the effects of a stab by a gambler enraged at the former's opposition to gambling houses. M. Delayannis studied law in Athens at an early age, entered the government service in 1843, and dating from the revolution of 1862, held many important political positions. He was holding his fourth term of premiership at the time of his death. A.R.R.

DEMAND AND SUPPLY. See VALUE, Vol. XXIV, pp. 53, 54.

DEMAVEND, MOUNT, Persia, a solfatara peak of the Elburz Mountains, the highest in the range, about 35 miles N.E. of Teheran, midway between the capital and the Caspian Sea. It is 19,400 feet high, conical shaped, and its crater-shaped summit yields large quantities of pure sulphur and pumice, which, carried in bags to the town of Demavend at the base, are exported to Amol and the port of Mahmudabad on the Caspian. The highway route from the interior to the Caspian winds through a pass at the eastern base of Mount Demavend. C.L.S.

DEMBEA, TANA, OR TSANA, LAKE, Abyssinia, the main feeder of the Bahr-el-Azrek or Blue Nile, on the Abyssinian Plateau, 6,100 feet above sea-level, is 60 miles long with an average breadth of 25 miles. It contains several islands; Dek Island, the largest, is inhabited. C.L.S.

DEMERARA. See GUIANA, Vol. XI, 221–222.

DEMESNE, in the law of England at the present day, the right which the owner in possession of lands in fee-simple has in his estate. But the original signification of "demesne" was that portion of the lands of a manor which the lord of the manor reserved for his immediate use and occupation. In ancient English law it was a tenure by which all manors belonging to the crown, in the reign of William the Conqueror, were held. See DOMESDAY BOOK, Vol. VII, pp. 303, 304.

DEMETRIUS THE FALSE. See RUSSIA, Vol. XXI, pp. 102, 103.

DEMETZ, FREDERICK AUGUSTE, philanthropist; was born in France on May 12, 1796, and became a lawyer and police judge. His work in the latter office led him to take an interest in the rescue and reformation of juvenile waifs and criminals, and through his efforts a system of agricultural colonies, or farm reform schools, was

established, which proved fruitful of good results. Demetz visited America in 1836 with De Tocqueville. He died in 1873. W.F.J.

DEMI-BASTION, in fortification, a kind of half-bastion, which frequently terminates the branches of a crownwork or hornwork, and which is also occasionally used in other places. See FORTIFICATION, Vol. IX, p. 383.

DE MILLE, JAMES, author, was born at St. John, New Brunswick, in August, 1837, and was educated at Brown College. He was professor of Greek and Latin at Acadia College in 1860–65, and professor of history and rhetoric at Dalhousie College, Halifax, from 1865 to 1880. He wrote a text-book on rhetoric, a number of boys' books, and several successful novels. These included *Andy O'Hara*, *The Arkansas Ranger*, *A Comedy of Terrors*, *Lost in the Fog*, *The Boys of Grand Pré School*, *The Lady of the Ice*, *Cord and Creese*, *The Living Link*, *The Cryptogram*, and *A Castle in Spain*, the last-named a delightfully humorous and melodramatic extravaganza. His *Dodge Club*, published in 1866, was an inimitable satire upon the experiences of American tourists in France and Italy, and deserves to rank as a classic. All his stories possess the quality of interest in a high degree. He died at Halifax, during his professorship at Dalhousie College, on January 28, 1880. W.F.J.

DEMILUNE OR RAVELIN. See FORTIFICATION, Vol. IX, p. 392.

DEMING, a city of Grant County, southwestern New Mexico, situated on the south bank of the Rio de los Mimbres, about fifty miles below Silver City, on the Southern Pacific and Atchison, Topeka and Santa Fé railroads. It was founded in 1881, in the center of an extensive stock-range. Lead and silver are found in the vicinity in abundance. A United States custom-house is located here, and there is a thriving trade with the mining camps of the district and with Mexico. Population 1900, 1,341.

DEMIURGE. See GNOSTICISM, Vol. X, p. 627; MARCION, Vol. XV, pp. 541, 542.

DEMOCEDES, a Greek physician of Croton, practiced his profession first at Athens and then in Samos. He came as slave to the Persian court, attaining the rank of a physician to King Darius. Sent in 510 B. C. on an expedition for reconnoitering the Greek coast, he effected his escape to Croton. At an uprising against the Pythagorean aristocracy to which he belonged, he was killed in 504. G.A.S.

*DEMOCRATIC PARTY. When the constitution of the United States became the supreme law of the land, the duty of putting in motion the machinery of the new government devolved on its friends, the Federalists. This they did, and in the course of time funded the debt contracted by the Continental Congress, assumed and funded the Revolutionary debts of the states, established a national bank, and began a system of internal taxation. Each of these measures was stoutly opposed as unnecessary, inexpedient or unconstitutional, because power to do them was not expressly given by the constitution. Taken together, they were declared to have a nationalizing tendency, very dangerous to democratic government, and showing a strong leaning toward monarchy. So bitter was the feeling aroused, that Jefferson, with the aid of Madison, began the formation of a party, which they called the *Republican*, and established the *National Gazette* (1792) at Philadelphia, to set forth the principles of the new party.

So far, the Republican party was based on opposition to the domestic policy of the administration. But in 1793 Washington issued his proclamation of neutrality between France and her enemies, and added a new element to popular discontent. Thenceforth the Republican, or as it began to be called, the Democratic-Republican, party was the warm friend of France, and its policy of a decidedly French cast. In 1794 it attempted to provoke war with England, and forced Washington, in the interest of peace, to send John Jay to England to negotiate a treaty. When the treaty was made it was denounced, its negotiator was burned in effigy, and the President attacked with a violence beyond description. In these sentiments a large part of the Republicans did not share, and so long as Washington was willing to serve as President, the people were willing to have him. But in 1796, when he declined a third term, the Republicans formally brought forward Jefferson as a candidate, and succeeded in electing him Vice-President.

The insults from France, and the excitement over the X Y Z Mission and the quasi war (1798–1800), checked their success for the time being. But the Federalists passed (1798) the Alien or Sedition acts. The Republicans replied with the Virginia and Kentucky resolutions, and in 1800 swept the country, elected Jefferson and Burr, and for 24 years retained control of the Federal government. During this period they repealed all internal taxes, bought Louisiana from France (1803), reduced the national debt from $83,000,000 in 1801 to $45,000,000 in 1812, laid the famous embargo of 1807–09, and fought the War of 1812. By these acts the party showed that it was rapidly departing from its old doctrine of strict construction of the constitution, and that it was under the control of a new generation, led by Clay, Adams, Calhoun, Crawford, Grundy and Lowndes.

The disastrous experience of the War of 1812 modified the old policy yet more, and in 1816 the Republicans established the second national bank and laid a protective tariff, which was made more protective still in 1824, and showed a strong desire to spend public money on roads and canals. But against these changes the South revolted. The cotton-growing, tobacco-raising, rice-producing states cared nothing for manufactures,—nothing for internal improvements; and in 1824 the Republican party split into four factions, led by John Q. Adams, Henry Clay, Andrew Jackson and W. H. Crawford. The result was, no election by the electoral colleges; a coalition of the

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Adams and Clay men (both friends to internal improvements and the tariff) and the election of Adams by the House of Representatives; and the rise of two new and unnamed parties,—the "Adams men" and "Jackson men."

With the election of Jackson in 1828 the second wing of the Republican party came into power, and soon took the name of Democratic. It was the old Republican party purged of its progressive element. It stood, therefore, for strict construction of the constitution, and was antibank, antitariff, and against internal improvements at Federal expense. During Jackson's first term, the party as a whole was not ready to accept all these principles, and he was therefore forced to make an unprecedented use of the veto power, in order to defeat internal improvement bills passed by the National Republicans with the aid of Democratic votes. By the close of his administration these had been driven from the party, which then took and held the strict construction views of the constitution.

The memorable events of Jackson's "reign" are his war on the national bank; his defeat of the nullifiers; the passage of the compromise tariff of 1833; the payment of the national debt; the gold act of 1834; the specie circular; the removal of the deposits; the vote of censure by a Whig Senate, and the expunging of it by a Democratic Senate; the distribution of the surplus revenue; and the introduction, in 1832 and 1835, of the national nominating convention as a political institution. At the former (held at Baltimore, in May, 1832), Jackson and Van Buren were nominated; and at the latter (held at Baltimore, in May, 1835), Van Buren and R. M. Johnson.

The wild era of speculation on which the people entered in 1830, aided by the removal of the government deposits from the Bank of the United States, the specie circular and the distribution of the surplus, brought on the panic of 1837, and added to the principles already held by the Democrats the new one of "divorce of bank and state." The pledge was made good by the establishment of the subtreasury system on July 4, 1840.

The political principles which had thus been accepted in the course of 12 years were taken up in 1840 by the national convention of the party, and set forth in its first party platform. A few planks may be mentioned:

1. That the Federal government is one of limited powers.
2. Congress has no power to carry on a general system of internal improvements.
3. Congress has no power to charter a bank.
4. The divorce of bank and state.
5. No protective tariff.

On this platform Van Buren was nominated in 1840, and beaten by the Whigs in the famous "Log-Cabin-Hard-Cider" campaign. For a moment the Democrats seemed to be driven from power; but the death of Harrison (April 4, 1841) put Tyler in the chair, and for four years they continued to defeat Whig measures. In 1844 it again went into power, and elected James K. Polk and G. M. Dallas. Then came the annexation of Texas; the settlement of the Oregon boundary line; the re-establishment of the subtreasury system destroyed by the Whigs; the war with Mexico; the acquisition of new territory; the split in the party on the question of extending slavery into the new territories; and the defeat, in 1848, of Lewis Cass and W. O. Butler. The compromise of 1850 closed the breach, and in 1852 Franklin Pierce and W. R. King were elected; but the Kansas-Nebraska Act of 1854 re-opened it, and, though the party elected James Buchanan and John C. Breckenridge in 1856 (the nominating convention met at Cincinnati, June 2d), the division grew wider, and in 1860 two sets of candidates, John C. Breckenridge and Joseph Lane, and Stephen A. Douglas and H. V. Johnson, with two platforms, were put before the people. The one, the Breckenridge or Southern platform, set forth,—1. That slavery in a territory could not be forbidden by Congress, nor by the territorial legislature, nor by the people in an unorganized territory; 2. That the Federal government was bound to protect slave-owners in their property in slaves in the territories; 3. That the right of the people to decide the question of slavery could not be exercised till they were making their first state constitution. The Douglas platform announced the principle of "popular sovereignty," or the right of the people in a territory to settle for themselves whether that territory should be slave or free.

With its defeat in 1860, the Democratic party lost control of national affairs for a period of 24 years. The party candidates during this period were G. B. McClellan and G. H. Pendleton in 1864; Horatio Seymour and F. P. Blair in 1868; Horace Greeley and B. Gratz Brown in 1872. The war had settled forever the old issues of slavery, and in the 11 years which had since elapsed new economic questions had arisen. On these the Democratic party took its stand, and in 1876 declared for universal amnesty and against negro suffrage, against a protective tariff, and for the payment of the national debt in legal-tender paper (greenbacks), except when expressly made payable in coin. In 1876 it nominated Samuel J. Tilden and T. A. Hendricks, obtained a majority of the popular vote, a majority of the members of Congress (42 out of 76 in the Senate; 149 out of 293 in the House), and claimed to have elected Tilden. This the Electoral Commission decided against the Democrats.

In 1880 the party convention (held at Cincinnati June 22d) placed Winfield Scott Hancock and W. H. English in nomination on a platform whose brevity and tameness mark a transition from old issues to new. At the election, 4,447,888 Democratic votes were cast, and 19 states, with 155 electoral votes, were carried. The Republicans secured 214 electoral votes. The long and specific platform of 1884 set forth the new issues very clearly. They were: Economy; lower taxes; tariff reform; honest money, "and a currency convertible into such money without loss": civil

service reform; no more land grants to corporations; an "American policy"; and the "revival of American shipping." The candidates were Grover Cleveland and Thomas A. Hendricks, who were elected by a plurality of 62,683 votes.

Four years later, June 5, 1888, Cleveland was again nominated. Hendricks was then dead, and Allen G. Thurman was nominated for the second place by the convention sitting at St. Louis. The platform was a *résumé* of what the party had done since 1884, and made few pledges for the future. This time the Republicans won, though the Democratic plurality was 100,476

When the national convention met again (at Chicago, June 21, 1892), the great issues before the country were the tariff, the silver legislation of 1890, reciprocity and trusts. The platform of that year, therefore, calls for a tariff for revenue only; a repeal of the McKinley Act and of the Sherman Act; more legislation against trusts; repeal of the ten-per-cent tax on state bank issues; the improvement of waterways; and the protection of railway employees. Again the candidate was Grover Cleveland, with whom was now associated Adlai E. Stevenson, and again the Democrats won, with a plurality of 382,956. Of 444 electoral votes, Cleveland received 277, Harrison 145, Weaver 22.

The party was now in control of the Presidency, the Senate and the House, but the panic of 1893, the Hawaiian policy of the President, the income tax, the Wilson tariff, the action of the party in the Senate on the repeal of the silver-purchasing clause of the Sherman Act, turned the popular feeling against the Democrats, and at the fall elections of 1894 the Republicans regained the House by an immense majority

At the next national convention. which met in Chicago, July 7, 1896, the paramount issue, as presented by a majority of the delegates, was the demand for free and unlimited coinage of silver at the ratio of 16 to 1. The other planks of the platform—tariff for revenue only; income tax; early admission of all territories as states; opposition to bond issues, to government by injunction and to life tenure in the civil service; the demand for Federal control of pools and trusts, etc.,—all these were overshadowed by the dominant cry of "free silver." The debate on this subject culminated in the eloquent speech of William J. Bryan of Nebraska, who was accordingly nominated as the Democratic candidate for President, with Arthur Sewall of Maine for Vice-President. A considerable minority of the delegates, especially those from the Eastern states, stood for the gold standard, and refused to indorse the "free silver" plank of the platform. On August 8th, representatives from thirty-three states met at Indianapolis and issued a call for a "sound money" convention, in the name of the national Democratic party, to be held at Indianapolis, Sept. 2, 1896. The Populist convention at St. Louis (July 27th) also nominated Bryan for President, but refused to accept Sewall, and nominated Thomas E. Watson of Georgia for Vice-President. In November the Democrats were defeated.

J. B. McMaster.

The platform of the Democratic party, in the contest for the Presidency in 1900, was that adopted at the Democratic National Convention held at Kansas City on July 5 of that year. The paramount issue declared was imperialism, which was defined to be "the war of criminal aggression against the Filipinos," together with militarism, construed to be "conquest abroad and intimidation and oppression at home." The other planks in the platform were denunciation of trusts, or private monopolies, which "destroy competition, control the price of all material and of the finished product, thus robbing producer and consumer"; disapproval of the alliance with England, as an entangling alliance and involving the American nation in so-called world politics; the election of senators by the direct vote of the people; repeal of the war taxes; and the immediate restoration of the free and unlimited coinage of silver and gold at the present legal ratio of 16 to 1. The ticket nominated was William J. Bryan, of Nebraska, for President, and Adlai E. Stevenson, of Illinois, for Vice-President. At the Democratic National Convention held early in July, 1904, at St. Louis, Judge Alton B. Parker, of New York, was nominated for President, and Henry G. Davis, of West Virginia, for Vice-President. Each of the tickets was defeated in the respective elections following.

DEMOGEOT, Jacques Claude, man of letters; was born in Paris on July 5, 1808, and adopted a literary career. He was a lecturer at Beauvais, Rennes, Bordeaux and Lyons, and in 1843 was appointed to the chair of rhetoric in the College of St. Louis in Paris, which he filled for the rest of his life. He was the author of *Letters and Men of Letters of the Nineteenth Century* (1856); *History of French Literature* (1857); *French Literature in the Seventeenth Century* (1859), and *History of Foreign Literature* (2 volumes, 1880). He died in Paris on January 9, 1894. W.F.J.

DEMOS. See Nobility, Vol. XVII, p. 540.

DENARIUS. See Numismatics, Vol. XVII, pp. 669, 673.

DENDRITE, the name given to a peculiar branching mineral crystallization on the surfaces of the fissures and joints, or in the surfaces of rocks, having the appearance of moss, and often mistaken for fossil plants. The hydrous oxide of manganese is the mineral that generally assumes this form, occurring frequently in great abundance in limestone, steatite, trachyte and other substances.

DENDROLITES, petrified stems of trees or shrubs found in all parts of the world in the formations called secondary, especially in the coal formation. They vary in size, and may be considered the remains of a former creation. In some instances gigantic stems occur, which often contain branches, fruit and even the impressions of leaves; and in other places mere fragments are found, which bear no resemblance to the trees now growing in the same regions, the fossil stems of beautiful palms having been discovered at Chemnitz, in Saxony, and other similar places. Such woods, when preserved in ancient strata altered by volcanic fire, are changed into agate, or into pitchstone. Opinion is divided regarding their origin.

DENGUE or BREAKBONE FEVER, also called Dandy and Bucket Fever, a disease known in the Southern states of North America, and in the West Indies and Africa, where it was first

described as having appeared in 1827 and 1828. It is seldom fatal, though very violent in its access, mainly consisting of an attack of inflammatory fever, accompanied by pains of the limbs and muscles. The acute stage lasts seven or eight days. This fever is said to be infectious.

DENATURED ALCOHOL, is alcohol rendered nonpotable by admixture of certain ingredients, and on that account only useful for industrial purposes. The denaturing can be done by the addition of 5 or 10 per cent. of methyl alcohol or wood alcohol, or by an admixture of pyridin, jodoform, oil of turpentine, or vinegar. As alcohol which does not burn when diluted is now extensively used as a substitute for gasoline, and even petroleum, and as there is no internal revenue on the product, its manufacture ought to assume large dimensions. It is now used for the making of varnish, shellac and in the rubber industries. A gallon is worth about 38 cents.

DENISON, a town and the capital of Crawford County, central western Iowa, 64 miles N.N.E. of Council Bluffs, situated on the Boyer River, and on the Chicago and North-Western railroad. It has thriving manufactories and a normal college. Population 1890, 1,782; 1900, 2,771.

DENISON, a city of Grayson County, Texas, in the northeast part of the state, near the Red River. It is sixty-seven miles north of Dallas. It is the center of a rich agricultural and fruit raising region, and has extensive manufactures and railroad commerce. It is also the seat of a convent and a commercial school, and of railroad car and engine shops. It is reached by the Missouri, Kansas and Texas, the Houston and Texas Central, and the Denison and Washita Valley railroads. Its population was 10,958 in 1890 and 11,807 in 1900. W.F.J

DENISON, EDWARD, a British philanthropist; born in 1840; died in Australia, Jan. 26, 1870. He was the son of Edward Denison, bishop of Salisbury, and by reason of his position in society was of great influence in the work to which he devoted his short life—the relief of the poor of London. He lived for eight months in East London, associating with the poor and criminal classes. He organized a school and began the system of education of the poor which has developed into the "university settlements" and "commons." His influence brought about the organization of the present Associated Charities Societies. His health failed him and he died while on a voyage to regain it. See also CHARITY ORGANIZATION, in these Supplements.

DENISON, GEORGE ANTHONY, an English ecclesiastic; born in 1805, in Ossington, Nottinghamshire, England; became vicar of East Brent in 1843, and archdeacon of Taunton in 1851. On a charge of teaching the doctrine of the real presence he was condemned by an ecclesiastical court in 1854 to be deprived of his preferments; but the judgment was quashed by the Courts of Arches and the Privy Council. He became a leader of the High Church party, an opponent of secular education, and an advocate of the confessional. He was for many years editor of the *Church and State Review*, and was chairman of the committee of convocation which condemned Bishop Colenso's works. His principal literary productions are his delightful *Notes of My Life* (1878) and *Mr. Gladstone* (1885).

DENISON UNIVERSITY, an institution for the instruction of men, located at Granville, Ohio. It was organized under the auspices of the Baptist Church in 1831 as a manual-labor school, under the name of Granville Literary and Theological Institute, which in 1845 was changed to Granville College and in 1856 to its present name. Affiliated with it are Granville Academy, a preparatory school, and Shepardson College, a school for women. Denison University had, in 1904, a faculty of 35, with 480 students, and a library of 21,000 volumes. Since the organization 990 have been graduated. It has an endowment of $650,000, and an annual income of $40,000.

DENIZLI, Turkey in Asia, a town in the vilayet of Smyrna, 115 miles by rail east of Smyrna, occupying a slight elevation in a fertile valley surrounded by beautiful gardens. It manufactures morocco and other leather, and has an agricultural trade. Population, 16,900. C.L.S.

DENMAN, GEORGE, an English jurist, the fourth son of Thomas, first Baron Denman (q.v., Vol. VII, p. 70), was born in London, Dec. 23, 1819. He was educated at Repton Grammar school, whence he went to Trinity College, Cambridge, of which he became a scholar and a fellow, taking his B.A. degree in 1842. He was called to the bar in 1846, at Lincoln's Inn. In 1857 he was appointed one of the Cambridge University counsel. He unsuccessfully contested the University in 1856; but was subsequently elected for Tiverton, which he represented, with one interval, until 1872. He promoted and carried bills for assimilating the laws relating to evidence, and for abolishing the disqualifications of witnesses for want of religious belief, and on other grounds. In 1872 he succeeded to a vacancy in the Court of Common Pleas, and on the passing of the Judicature Act in 1875, became a judge in the High Court of Justice. In 1893, after twenty years' service, he retired from the bench; in 1893 was sworn a Privy Councilor, and became a member of the judicial council of the Privy Council. He published a translation, into Greek elegiacs, of *Gray's Elegy* (1871); and a Latin elegiac revision of the first book of *Pope's Homer*. He died in London, Sept. 21, 1896.

DENMARK. For the early history, climate, productions, commerce, etc., of the kingdom of Denmark, see Vol. VII, pp. 70–82. According to the last decennial census, taken Feb. 1, 1901, the total area of Denmark was 15,360 square miles, and the total population 2,464,770. The population in 1870 was 1,794,733, and in 1880 1,980,259. The capital of the kingdom is Copenhagen. Population (1901), with suburbs, 476,806. In Denmark proper the town population has increased from 722,244 in 1890 to 936,565 in 1901, or at the rate of 29.7 per cent; while the rural population has increased

from 1,450,136 in 1890 to 1,512,975 in 1901, or at the rate of 4.3 per cent. The population is almost entirely Scandinavian. Out of every 1,000 persons 469 live exclusively by agriculture, 229 by manufacturing industries, 68 by trade, and 27 by seafaring and fishing.

The revenue for 1901 was $20,002,557 and the expenditure $19,576,740. The financial budget of 1902 provided for a total revenue of $20,204,467 and a total expenditure of $19,203,144. An important feature in the administration of the finances of the kingdom is the maintenance of a reserve fund of a comparatively large amount. On March 31, 1901, the fund stood at $6,855,767. The object of the reserve fund is to place means at the disposal of the government in the event of sudden emergencies. The public debt of Denmark, which was incurred in part by large annual deficits in former years, before the establishment of parliamentary government, and in part by railway undertakings and the construction of harbors, lighthouses and other works of public importance, amounted at the close of the fiscal year, March 31, 1901, to $59,275,556. The investments of the state, including the state railways, amount to about $67,071,194.

The army consists of all the able-bodied young men of the kingdom who have reached the age of 22 years. They are liable to service for eight years in the regular army and its reserve, and for eight years subsequent in the extra reserve. The total peace strength of the army in 1900 was 824 officers and 9,000 men; the total war strength is about 65,000 men.

About eighty per cent of the total area of Denmark is productive. According to latest returns, the total area under corn crops was 3,029,404 acres; potatoes, 128,849 acres; clover, 456,585 acres; bare fallow, 638,116 acres; grass, meads, etc., 2,625,865 acres. The leading crops in 1894 were: Oats, 28,900,000 bushels; barley, 21,760,000 bushels; rye, 15,670,000 bushels; wheat, 4,035,000 bushels; potatoes, 15,900,000 bushels; other roots, 85,453,952 bushels; besides vegetables, hay, and clover. The total value of the produce in 1894 reached $70,971,925. The total imports for the year 1900 amounted to $115,227,665, and the exports to $77,189,424. On July 16, 1893, there were in Denmark proper 410,639 horses, 1,696,190 head of cattle, 1,246,552 sheep, 25,266 goats, and 829,131 swine.

In 1906 there were in Denmark a total length of 2,083 English miles of railway open for traffic, of which 1,167 miles belonged to the state.

The Lutheran remains the established religion. There is complete religious toleration. In 1900 four-fifths of the population belonged to the Lutheran Church. Of the remainder, 4,080 were Jews, 3,647 Roman Catholics, 4,556 Anabaptists, 2,301 Methodists, etc. Education, which is compulsory, has progressed rapidly. In 1892 an agricultural and veterinary college was established at Copenhagen. There are also 22 other agricultural schools, 70 high schools, 31 Latin schools, a college of pharmacy, 99 commercial schools, various art colleges, and the University of Copenhagen, which has about 1,300 students. The colonial possessions of Denmark are Iceland, Greenland, and the West Indian Islands of St. Croix, St. Thomas and St. John.

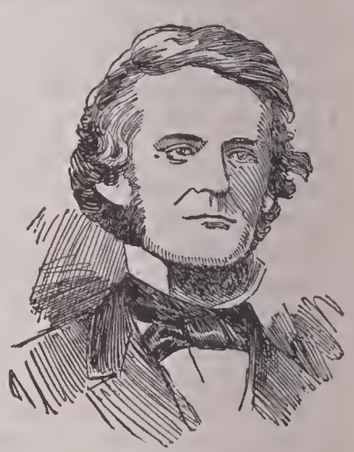
DENNERY OR D'ENNERY, ADOLPHE PHILIPPE, a French dramatist of Jewish extraction; born in Paris, June 17, 1811. He was decorated with the Legion of Honor, Dec. 10, 1847, and made officer, Aug. 16, 1859. He produced about 200 pieces from 1831 to 1881, and was the creator of Cabourg, a watering-place in Normandy. Among his dramas are *The Bohemians of Paris* (1842–43); *Marie Jeanne* (1845); *Don César de Bazan* (1849); *Uncle Tom's Cabin* (1853); *Round the World in Eighty Days* (1871); *The Two Orphans* (1875); and *Michael Strogoff* (1880). Died in Paris, Jan. 25, 1899.

DENNEWITZ, a village of Brandenburg, Prussia, 41 miles S.W. of Berlin, where, in 1813, a battle was fought. See AUSTRIA, Vol. III, p. 117.

DENNIE, JOSEPH, an American writer; born in Boston, Mass., Aug. 30, 1768. He graduated at Harvard in 1790, studied law, and commenced practice at Walpole, N. H., but soon abandoned the profession. In 1795 he made an engagement with *The Farmer's Weekly Museum*, a then popular periodical, in which his series of articles entitled *The Lay Preacher* attracted considerable attention. On the failure of the publication he became a candidate for Congress, but was defeated. For a few months he was secretary to Timothy Pickering, Secretary of State; but in 1800, with Asbury Dickins, he commenced the publication, in Philadelphia, of *The Portfolio*. He died in Philadelphia, Jan. 7, 1812. E.E.T.

DENNISON, a village of Tuscarawas County, central eastern Ohio, 28 miles S. of Canton, on the Pittsburg, Cincinnati, Chicago, and St. Louis railroad. It has machine-shops, carshops, and pipe foundries. Population 1900, 3,763.

DENNISON, WILLIAM, statesman, was born at Cincinnati, Ohio, on November, 23, 1815, was graduated from Miami University in 1835, and settled at Columbus as a lawyer in 1840. He became a banker and railroad president, member of the legislature and organizer of the Republican party, and was governor of Ohio in 1860–62. In the latter office he was notably energetic in his support of the national government in the Civil War, sometimes resorting to heroic measures the constitutionality of which were questioned. In 1864–66 he was Postmaster-General of the United States. He was a benefactor of the university which bears his name, at Granville, Ohio. He died on June 15, 1882, leaving the memory of a pure and noble patriot. W.F.J.



WILLIAM DENNISON.

DENS, PETER, a Roman Catholic theologian;

born near Antwerp, at Boom, in 1690; died at Malines, Feb. 15, 1775. He was parish priest of Saint Rumold's, and president of the College of Malines for forty years. His work, *Theologia Moralis et Dogmatica*, is extensively used as a textbook in the Roman Catholic theological schools.

DENSIMETER, an apparatus for determining the relative density of a substance. In one form, made for testing salt-water, it consists of a pair of opposed telescopes, which are mounted on a frame and pointed toward each other. Between them is placed, in a prism, the salt-water to be tested. The refracting power of the water varies in proportion to the strength of the saline solution, and the exact refraction may be found by noting the angle at which the telescopes have to be swung to come into the line of vision.

C. H. Cochrane.

DENSITY OF THE EARTH. The density of a body is the ratio of its mass when compared with the same bulk of water. Astronomy and the laws of gravitation have furnished the data for ascertaining the density of the earth, which is now assumed to be about five times that of water. See Astronomy, Vol. II, pp. 693, 694; Geology, Vol. X, pp. 198, 199.

DENTAL FORMULA. See Mammalia, Vol. XV, p. 355.

DENTALIUM. See *Scaphopoda*, under Mollusca, Vol. XVI, p. 688.

DENTARIA or TOOTHWORT, a genus of plants of the family *Cruciferæ*, with white or rose-colored flowers and a toothed rootstock, from which it derives its name. The rootstock is pungent, and was formerly dried and used as a remedy for toothache. Other common names are *pepper-root* and *crinkle-root*.

DENTATUS, Manius or Marcus Curius, a Roman consul noted for his integrity as well as for martial exploits. He was consul with P. Cornelius Rufinus, 290 B.C. He was consul in 275 and 274, and during his three terms of service conquered the Samnites, Lucanians, Sabines and Bruttians. He was censor in 272 B.C., and while in office did much to improve the public works of the Roman domain. He began the Anio viaduct and built the Velinian canal. See Terni, Vol. XXIII, p. 206. He died 265 B. C.

DENTEX, a genus of marine fishes, resembling the perch, found in Europe. It reaches a large size, and is an important food-fish.

DENTIL. See Architecture, Vol. II, p. 406.

DENTINE. See Digestive Organs, Vol. VII, p. 203.

DENTIROSTRES, an artificial group of birds established by Cuvier. It included those forms with notched upper mandible, such as thrushes, warblers and shrikes.

DENTON, the capital of Caroline County, central eastern Maryland, situated on the Choptank River, 53 miles S.E. of Baltimore. It has an academy. Population 1890, 641; 1900, 900.

DENTON, a city and the county seat of Denton County, Texas, in the northeastern part of the state, about 25 miles north by west from Dallas, and the same distance north by east from Fort Worth. It has some manufacturing industries, and is reached by the Missouri, Kansas and Texas and the Missouri Pacific railroads. Its population was 2,558 in 1890 and 4,187 in 1900. W.F.J.

D'ENTRECASTEAUX ISLANDS, a group off the eastern end of New Guinea, at lat. 10° S., long. 151° E., belonging to Great Britain. The largest is Fergusson; next, Normanby and Goodenough. Area, 1,214 square miles; population, about 12,000.

DENUDATION, in Geology. See Geology, Vol. X, p. 331.

DENVER, a city and the capital of Arapahoe County, central eastern Colorado, and also the capital of the state. It is situated 5,224 feet above sea-level, 12 miles eastward from the foot of the Rocky Mountains, on the south branch of the Platte River, where that stream is joined by Cherry Creek. Denver was settled in 1858 by a party of miners under Green Russell, and by a colony under Gen. J. W. Denver, from whom it received its name. The discoveries of gold, silver and other minerals caused an influx of settlers into the district, of which Denver is the commercial center. A rapid growth increased the population of the city from 4,759 in 1870 and 35,629 in 1880 to 106,713 in 1890. Pop. 1900, 133,859.

Denver is a city of great natural beauty, which has been enhanced by broad avenues, lined with beautiful shade-trees, and fine public buildings and parks. Among the public buildings are the State Capitol, a magnificent structure of gray granite; the County Courthouse, City Hall, the United States Government Building, the Tabor Grand Opera House, and a number of beautiful cathedrals and business blocks. The city has, in addition to one of the most complete public-school systems, Denver University; Wolfe Hall, a seminary for young women; Brinker Institute, a collegiate institution for young men; and a number of lesser private establishments. Large public libraries are established at various accessible points.

Denver is primarily a railroad center, as it is the gateway to the mountains of the West, the mining camps of which obtain all supplies from the city, and the summer resorts cause all travelers in the West to make Denver a starting-point. Sixteen distinct railway systems enter the city. Large ore-refining works, and manufactories to the number of 1,475 are located there, with a capital of over $30,000,000. The city public works have made it perhaps the best drained and watered city in the United States. Over two hundred artesian wells furnish the water-supply. All modern rapid-transit systems and an excellent system of lighting are in use.

DENVER, James William, soldier and legislator; born in Winchester, Va., Oct. 23, 1817. He studied engineering and law, and in 1847 raised a company for the Mexican War, in which he served under General Scott as a captain in the 12th United States Infantry. In 1850 he crossed

overland from Missouri to California, and in 1851 was elected state senator by the people of Trinity County. In 1852 the governor of California selected him to take charge of the train of supplies sent to the destitute emigrants on their way to the Pacific coast, and through his aid hundreds of lives were saved. He was appointed secretary of state of California in 1853; elected to Congress in 1854; and in 1857 was appointed by the President commissioner of Indian Affairs. He was subsequently made governor of Kansas, then in a state of almost civil war, and in less than a year's time succeeded in restoring order. When the territory of Kansas was organized in 1858, its capital city was named Denver, in his honor. He served in the Civil War as brigadier-general of volunteers. He died Aug. 8, 1894. G.J.H.

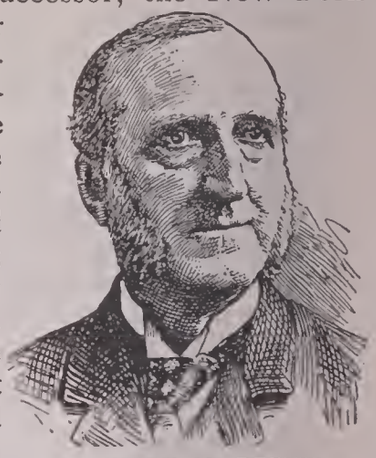
DEODATUS. See St. Die, Vol. XXI, p. 170.

DE PAUW, Washington Charles, manufacturer and philanthropist, was born at Salem, Indiana, on June 4, 1822, of Huguenot ancestry, and grew up in frontier life and work. He became interested in lumber and flour mills, in banks, in army contracts during the Civil War, in woolen mills, and in glass manufacture, and thus amassed a fortune. In 1884 he began giving his wealth to the Indiana Asbury University, the name of which was changed to De Pauw University, and in time it received practically all of his great fortune. He died on May 5, 1887. W.F.J.

DE PAUW UNIVERSITY, an educational institution at Greencastle, Indiana, organized in 1837 under the auspices of the Methodist Episcopal Church. It was originally known as the Indiana Asbury University and changed its name owing to the liberal endowments made the institution by Washington Charles De Pauw (q. v.) At his death he bequeathed the sum of $1,500,000 to the university. In 1908 the institution had 41 professors and instructors and 742 students, and a library containing 35,000 volumes. The president is Edwin H. Hughes. The college campus contains 150 acres. There have been 2,500 graduates since the organization of the institution. There are special schools of law and theology and also a post-graduate school. The school allows elective studies and courses. W.M.C.

DE PERE, a city of Brown County, Wisconsin, in the eastern part of the state, on the eastern bank of the Fox River, a few miles above the entrance of that stream into the head of Green Bay. It has considerable manufacturing industries, and also an extensive commerce by rail and by water, being on the Chicago, Milwaukee and St. Paul railroad, and having lines of steamships on Lake Michigan. Its population was 4,038 in 1900. W.F.J.

DEPEW, Chauncey Mitchell, an American politician and railroad man; born in Peekskill, N. Y., April 23, 1834. He graduated at Yale in 1856; studied law, and was admitted to the bar in 1858. He was elected to the New York Assembly, 1861–62; and Secretary of State in 1863. In 1866 he was appointed attorney to the New York & Harlem Railroad, and later became general counsel to its successor, the New York Central & Hudson River Railroad and the connecting roads of the Vanderbilt system. He was elected regent of the State University and appointed one of the Capitol commissioners in 1874; and appointed boundary commissioner in 1875. He was president of the New York Central & Hudson River Railroad Co., 1885–99, in which latter year he resigned to become chairman of the board of directors of the allied New York Central, Lake Shore & Michigan Southern, Michigan Central, and the New York, Chicago, & St. Louis railroads. He was a candidate for the Presidency in 1888, but received only 99 votes; was delegate-at-large to the Republican convention in 1892–96, and 1900; was elected to the U. S. Senate in 1898, and re-elected in 1905. He has considerable reputation as a public speaker. E.E.T.



CHAUNCEY M. DEPEW.

DE PEYSTER, Abraham, an American Colonial statesman; born in New York, July 8, 1658. He was mayor of New York between 1691 and 1695, and subsequently became chief justice of the Province and president of the King's Council, in which latter capacity, in 1701, he acted as Colonial governor. He was also colonel of the forces of the city and county of New York, and treasurer of the Provinces of New York and New Jersey. He died in New York, Aug. 10, 1728 E.E.T.

DE PEYSTER, Johannes, an American colonist; born in Haarlem, Holland, in the beginning of the 17th century. He was of Huguenot stock, and held many offices of trust and honor under Dutch and English colonial rule, including those of alderman and mayor. He died in New York, one of the richest citizens in the colony, about 1685. See De Peyster, Abraham, *supra*, and De Peyster, John Watts, his descendants. E.E.T.

DE PEYSTER, John Watts, soldier and author, was born in New York City on March 9, 1821, and spent much of his early life in Europe, pursuing military and other studies. In 1845 he entered the military service of New York, and later was sent to Europe as special agent to study military organization. Ill health prevented him from serving in the Civil War, but he did much toward the organization of troops and wrote much on military topics. In 1869 he was commissioned brevet major-general by the State of New York. He has been identified with many benevolent works, and has written much on history and military matters. Died May 5, 1907.

DEPHLEGMATOR. The principle of all dephlegmators, as used in fractional distillation, is

based on the fact that when a mixture of two liquids of different boiling-points is distilled, the distillate, at all stages of the process, contains both liquids, the more volatile first predominating, and later the other liquid. Le Bel's dephlegmator consists of a tube with three bulbs or enlarged portions, and a vapor-tube at the top leading to the condenser. It is fitted with several baskets of platinum gauze, in which the liquid collects more rapidly than it can run through into the flask to which the apparatus is fitted. The vapor passing through being brought into contact with the condensed liquid, only the most volatile constituents pass into the condenser. The accumulation of liquid in the gauze baskets necessitates the regular removal of the heating apparatus, and in this respect Henniger's dephlegmator is better. It provides side-tubes for conveying the accumulated liquid from bulb to bulb downward, until it is delivered into the flask. Linnemann's dephlegmator is similar to Le Bel's, the only difference being in the position of the bulbs. Glynsky's dephlegmator makes use of hollow glass balls in place of wire-gauze baskets.

C. H. Cochrane.

DEPOSIT, a village of Broome County, southern New York, on the Delaware River, and on the Erie railroad. It is situated partly in Broome County and partly in Delaware County. It has flour and planing mills, and stockyards. Population 1890, 1,530; 1900, 2,051.

DEPOSITION, the testimony of a witness set down in writing, and taken by a judge, or by a commissioner specially appointed by him for that purpose. The depositions are answers to questions generally put by the legal representatives of the parties to the suit, under the control of the court or commissioner, and the answers are taken down by the clerk of court, or by a clerk specially appointed for the purpose. By act of Congress, and by statute in the various states, rules have been provided, permitting the taking of depositions in civil cases, where the witness is sick, aged, about to leave the state, or where he resides at a great distance from the place of trial or outside of the state, and in other cases, where it would be impossible or very inconvenient for the witness to attend the trial. This may generally be done by serving the opposite side with reasonable notice of the time and place of taking the depositions, and by obtaining a commission from the court wherein the cause is pending. In criminal cases depositions cannot be taken without the consent of the accused, as the constitution gives him the privilege of requiring the presence of the witnesses.

DEPPING, Georg Bernhard, a German-French historian; born at Münster, May 11, 1784, settled in Paris in 1803, where he died Sept. 6, 1853. His works include *History of the Norman Expeditions* (1826); *History of the Jews during the Middle Ages* (1834); *History of the Normans* (1835), and *Romancero Castellano* (1844). G.A.S.

DEPRETIS, Agostino, an Italian statesman, born near Stradella, Italy, Jan. 31, 1813; died there, July 20, 1887. He became a lawyer and writer for liberal newspapers, and in 1849 civil governor of Brescia. He became pro-dictator of Sicily in 1861, and in 1862 entered Ratazzi's Cabinet. In 1866 he was Minister of Marine, and after the death of Ratazzi, led the opposition in the Chamber. In 1876–77, again in 1879–81, and in 1881 he was Premier of Italy.

DEPREZ, Marcel, a French engineer and electrician; born in Châtillon-sur-Loing, Dec. 19, 1843. He studied at the Lyceum of St. Louis and at the École des Mines. His first success in transmitting $1\frac{1}{4}$ horse power over wire from Meisbach to Munich, 35 English miles, excited universal attention at the second International Electro-Technical Exposition of Munich, in 1882. In *La Lumière Électrique* he had demonstrated that the appliance of higher tensions of electricity than hitherto applied would be necessary for long distance transmission of electrical power, for industrial purposes, and was the originator of the above described invention. His researches on dynamos have appeared in all principal works. The electro-technics are further indebted to him for the curve, named by himself Characteristic, and for the galvano-meter, called after him Deprez-D'Arsonval. In 1886 he was elected member of the Academy, and in 1890 appointed professor of applied electricity at Paris Conservatory des Arts et Métiers. G.A.S.

DE PROFUNDIS (Lat., "Out of the depths"), the first words of the 130th Psalm, which form a portion of the liturgy of the Roman Catholic Church, and are sung when the bodies of the dead are committed to the grave. It is one of the seven "penitential psalms."

DEPUTY, one appointed by a ministerial officer to exercise the functions of the officer appointing him. A deputy is usually required to take the oath of office, and his acts are of equal force with those of the officer himself. He must act in the name of the officer under whom he is appointed. Sheriffs, marshals, clerks of courts and other ministerial officers are generally authorized to appoint deputies, and are liable for the acts of a deputy performed by him as deputy, or for his neglect. Special deputies are those appointed as deputy for some particular act.

DERAH (dirâ), the unit of measure of length in Egypt=22.37 inches. Its subdivisions are the *kadam*=one-half of a derah, the *adbat*=one-sixth of a derah, and the *kerat*=one-twenty-fourth of a derah. See also Weights and Measures, Vol. XXIV, p. 518. W.R.B.

DERBY, a village of New Haven County, Connecticut, at the junction of the Housatonic and Naugatuck rivers, and on the New York, New Haven and Hartford railroad. It is an important manufacturing center. Its population in 1900 was 7,930. W.F.J.

DERBY, Earls of. See Man, Isle of, Vol. XV, p. 461.

DERBY, Edward Henry Smith Stanley, Earl of, the fifteenth of the title, a British statesman; born in Knowsley, England, in July, 1826; died there, April 21, 1893. He entered Parliament in 1848; in 1852 was appointed Under-Secretary for the Colonies, during the first premiership of his father. During his father's second premiership he was Colonial Secretary, Secretary of State for India and Secretary for Foreign Affairs. He was opposed to an active war policy. While Secretary for India he brought about the transfer of that empire from the East India Company to the crown. He became Minister of Foreign Affairs for the second time, under Disraeli, in 1874, but resigned in 1878 on account of differences with the Prime Minister. He had been until this time a Conservative, but now joined the Liberals, and became Colonial Secretary under Gladstone in 1886. He could not agree with Gladstone's home-rule ideas, and, resigning, joined the Liberal-Unionists in the same year, 1886. He took no further leading part in politics. In addition to his political work, Lord Derby took an active interest in educational institutions in London, and was a promoter of many charitable organizations.

DERBY, Elias Hasket, merchant, was born at Salem, Mass., on August 16, 1739, and became a shipping merchant in succession to his father. By the beginning of the Revolution he was a wealthy man and owner of a fleet of seven ships, which he devoted to the patriot cause. He was the chief shipbuilder of those days, and did much for American naval architecture. He pushed American commerce to all parts of the earth, his ships first carrying the American flag to India and China and the Cape of Good Hope. He materially aided in the organization of the United States Navy Department in 1798, and in building a navy, and more than any other man deserves to be regarded as the founder of the American merchant and naval marine. He had a fine home in Salem on the ground now known as Derby Square, and died there on September 8, 1799. His business was left to his son, who bore his name and who had been the commander of one of his ships. The younger Derby also became interested in woolen manufactures and was a pioneer of that industry in America, and the first importer of merino sheep into this country. W.F.J.

DERBY, Elias Hasket, lawyer and author, son and grandson of eminent Massachusetts merchants of the same name, was born at Salem, Mass., on September 24, 1803, and was graduated from Harvard College in 1824. He became a leading lawyer, and president of the Old Colony Railroad Company, and was identified with the building of the Hoosac tunnel. During the Civil War he promoted the construction of iron-clad warships. He wrote much for publication, especially for *The Atlantic Monthly* and *The Edinburgh Review*, and was the author of several books and reports. He died in 1880. W.F.J.

DERBY, Frederick Arthur Stanley, Earl of, the sixteenth of the title, an English statesman; born in London in 1841; created Baron Stanley of Preston in 1886, and succeeded his brother as Earl of Derby in 1893. He was educated at Eton, and from 1858 to 1865 served in the army. He entered Parliament from the Preston district of Lancashire in 1865, and has held the following offices as a Conservative: Financial Secretary for War, 1874–77; Secretary of State for War, 1878–80; Secretary of State for the Colonies, 1885–86; president of the Board of Trade, 1886; and Governor-General of Canada, 1888-93. He married the eldest daughter of the Earl of Clarendon in 1864. Died in 1908.

DERBY, George Horatio, an American soldier; born in Dedham, Mass., April 3, 1823. He graduated at the United States Military Academy at West Point in 1846; was assigned to the ordnance department, and in 1847 was transferred to the topographical engineers. He was severely wounded in the battle of Cerro Gordo; rose to the rank of captain, and was employed on lighthouse-erection duty in the South. Sunstroke incurred in this service shortened his life. He wrote many humorous articles under the titles of *Phœnixiana* and *The Squibob Papers*. He died in New York, July 15, 1861. E.E.T.

DERBY, Orville Adelbert, geologist; born in Niles, N. Y., July 23, 1851; educated at Cornell University, making two vacation trips with Professor Hardtt to the Amazon. He returned to Brazil as assistant to Professor Hardtt in 1875, and was director of the geological and mineralogical department of the National Museum of Rio de Janeiro from 1880 to 1891. He is a member of the Geological Society of London, associate editor of the *Journal of Geology*, and author of memoirs on the geology of Brazil. G.J.H.

DERBY, Samuel Carroll, educator, was born at Dublin, N. H., on March 3, 1842, was graduated from Harvard College in 1866, and pursued post-graduate studies at Harvard and Johns Hopkins universities. He taught in public schools in 1866–67, and in Dixwell's Latin School, Boston, in 1867–70; and was a professor at Antioch College in 1870–76, and president of that institution in 1877–81. Since the last-named year he has been professor of Latin in the Ohio State University, at Columbus. W.F.J.

DERCYLLIDAS, a Spartan general in the employ of the Asiatic Greeks, 399 B.C. He succeeded Thimbron, and was superseded by Agesilaus in 396 B.C. He was given command of an army to protect the Asiatic Greeks from the Persians. He was successful, and during his term of office captured Atarneus and conquered nine cities of Æolia.

DERELICT, a term, in law, signifying anything forsaken or left unoccupied, or willfully cast away. Where the sea has receded from the shore, the land thus left uncovered is styled derelict. The most common use of the term is its application to a ship which has been wrecked, and has been abandoned by the master and crew without hope of recovery. The mere quitting of a ship for the purpose of procuring assistance from the shore, or other temporary cause, with

the intention of returning to her again, does not make her derelict.

DERENBOURG, HARTWIG, a French Arabist, son of the following; born in Paris, June 17, 1844. He received the degree of doctor of philosophy from Göttingen University in 1864. He was employed in the French National Library, in the department of manuscripts, from 1866 to 1870. In 1870 he was placed in charge of the courses in Arabic at the College of Oriental Languages, and in 1879 was made professor there. Since 1887 he has been in charge of the department of religious knowledge. Among his writings are *Notes on Arabic Grammar* (1873); *The Science of Religions and Islamism* (1886); and *Literary History of the Old Testament*, a translation (1873). Died April 14, 1908.

DERENBOURG, JOSEPH, a French Hebrew scholar, father of the preceding; born in Mayence, Aug. 21, 1811; studied at the universities of Giessen and Bonn, taking his degree at the former. He studied at Paris under Quatremere, Reinaud and Perceval. In 1856 he became reader of Oriental texts for the National Bureau of Printing. In 1871 he was elected a member of the Academy of Belles-Lettres. In 1877 he became director of Semitic languages in the College for Practical Higher Studies. Among his published works are *Two Hebrew Versions of the Lives of Kalilah and Dimnah* (1881); *A History of Palestine* (1867); and a number of other works on kindred subjects. Died July 29, 1895.

DE RESZKE, JEAN, a Polish tenor singer; born in Warsaw, Poland, Jan. 14, 1852. He made his *début* in 1874 at Venice. He began as a baritone, but in 1879 came out as a tenor, and as such made a reputation that entitles him to rank foremost among the tenors of his time. He sang at Drury Lane in 1874, and afterward throughout Europe, and in 1891–92 and again in 1896 in United States with the Metropolitan Opera Company.— His brother, EDOUARD DE RESZKE, was born in Warsaw, Poland, Dec. 23, 1856. He began his operatic career under the auspices of his brother, Jean, in Paris, in 1876, at the Théâtre Italien; then in Italy with the Royal Italian Opera Company, and with the French Opera. In 1896 made a successful visit to the United States with the Metropolitan Opera Company. In many of the French, Italian and German operas he sustained leading parts, and established a reputation in the minds of many critics as being the best lyric actor and bass singer on the stage.

JEAN DE RESZKE.

DERG, LOUGH. See DONEGAL, Vol. VII, p. 313.

DERMATOLOGY. See MEDICINE, Vol. XV, p. 806.

DERMATOPHYTA. See VETERINARY SCIENCE, Vol. XXIV, p. 223.

DERMESTES, a genus of beetles including several species, the most common of which is *D. lardarius*, sometimes called the bacon beetle. In both larval and adult forms they are extremely voracious, feeding upon meat or carrion; in both forms also they simulate death. R.W.C.

DERMOPTERA. See MAMMALIA, Vol. XV, p. 405.

DE ROSNY, LEON LOUIS LUCIEN, a French ethnologist and Orientalist; born in Loos, Aug. 5, 1837. He has been a constant and active student of the Oriental languages, especially the Japanese. He has been, to a large extent, instrumental in the organization of the society for the study of American ethnology. He was an attaché of the French Department of Foreign Affairs, in the capacity of interpreter. Since 1886 he has been one of the directors of the College for Higher Study. Among his numerous publications are *An Introduction to the Study of the Japanese Language* (1856); *A Japanese-French-English Dictionary* (1858); and *The Religion of Japan* (1881).

DÉROULÈDE, PAUL, a French writer and politician; born in Paris, Sept. 2, 1846. He first attracted public attention as a writer of patriotic songs. He took part against the Commune in 1870. He next attempted dramatic writing and produced several popular plays. But it is on account of his political actions that he is best known in France. He joined the Boulanger movement, and as chairman of the Patriotic League took a prominent part in all the events which led up to the exile of Boulanger. He had by that time succeeded in being elected to the Chamber of Deputies, and in 1890 attempted to impeach the member who took the seat of Boulanger, and was himself temporarily suspended from the Chamber. He returned to literature, traveled in Italy, and wrote a romance before he again resumed his seat in the Chamber. Among his writings are *Songs of the Soldiers; National Education* (1882); and his romance, *History of Love* (1890).

DERRICK, a form of hoisting-machine often confused with the crane, which it very much resembles. Its peculiar feature, which distinguishes it from other similar machines, is that it has a boom stayed from a central post, which is usually stayed by guys. In its capstan, or winch, it resembles the crane, but in its double set of tackles, one for the load and the other for the boom, it differs from that machine. See CRANE, Vol. VI, p. 485.

DERVISH PASHA, a Turkish statesman and soldier; born at Eyaub, near Constantinople, in 1817, and was considered the first of living Turkish statesmen. He was sent to England and France to study engineering, and when he returned to Turkey in 1842, became chief of the Keban mines and professor of physics and director of the Constantinople Military School. He was for several years employed in the diplomatic service in Persia and the neighboring principalities. He was appointed general of division, and as such served in the war against

Russia in 1878, taking an active part in the defense of Batoum. The siege was effectually resisted, but it was stipulated by the treaty of peace that Batoum should be ceded to Russia. The civil governor of Batoum, however, incited by the Lazis, refused to surrender it to the enemy, and it became the task of Dervish Pasha to put down the Lazis and to deliver Batoum over to the Russians. Two years later he was called upon to perform a very similar act in the case of Dulcigno and the Albanians. He was the sultan's special commissioner to Egypt in 1882. Died June, 1896.

DERWENTWATER. See CUMBERLAND, Vol. VI, p. 218.

DERWENTWATER, JAMES RADCLIFFE, EARL OF; born June 28, 1689, in Northumberland; grandson of Charles II of England; was one of the leaders of the rebellion of 1715. He was taken prisoner at Preston, and conveyed to the Tower of London; at his trial in Westminster Hall he pleaded guilty and threw himself upon the mercy of the king, but his appeal was rejected and he was beheaded on Tower Hill, Feb. 24, 1716. He was the last earl of Derwentwater.

DERZAVIN, GABRIEL ROMANOWICZ, a popular Russian lyric poet; born July 14, 1743, in Kazan, Russia; died July 21, 1816, at Svanka, Russia, near Novgorod. See RUSSIA, Vol. XXI, p. 114.

DESAGUADERO, the name applied to that part of the largest tributary of the Colorado River, in the Argentine Republic, which lies between Lake Silvero and the mouth of the Tunuyon River. It flows southward, separating the states of San Luis and Mendoza. This section of the river is about eighty miles in length.

DESAGUADERO, the name given to the great valley formed by the dividing of the Andes into two great chains, extending from lat. 13° S. to lat. 23° S., in Peru and Bolivia. It is drained by the lakes Titicaca and Andamarca and their tributaries. It is over 12,000 feet above the sea, the most elevated plateau in the world excepting Tibet. The land is rich in grains and grasses, and has considerable silver, copper and tin ore. The river connecting the two great lakes of the plain is 200 miles in length, and takes its name from the plain.

DE SANCTIS, FRANCESCO, an Italian author, educator and statesman; born March 28, 1817, in Morra Iripino; died Dec. 29, 1883, in Naples. He began his active life as a teacher in Naples, but soon incurred the censure of the government, on account of his political utterances, and was imprisoned for three years, and afterward banished. He returned to Naples in 1860 and engaged in teaching again, but continued his political work more actively than before. He was appointed Minister of Public Instruction. He was a ready writer and speaker. Chief among his published writings is *History of Italian Literature.*

DE SANCTIS, LUIGI, born in 1808, a distinguished prelate of Rome. In 1847 he renounced the Catholic religion, fled to Malta, and commenced to evangelize Italy. In 1852 he was minister at the Waldensian church of Turin, and from 1864–69, the time of his death, professor of the Waldensian faculty of theology at the University of Florence, and editor of the Waldensian periodical *Eco Della Verita.* He wrote *Roma Papale Descritta in Una Serie di Lettere* (1865). Died, 1883. G.A.S.

DESCARTES'S RULE OF SIGNS. See ALGEBRA, Vol. I, pp. 480, 481.

DESCENT, the hereditary succession to the title to property. Title by descent is the title which one takes, by operation of law, in the estate of a deceased person as the heir of such person. According to the principles of the ancient feudal system of England, under which much of the common law was developed, the right to the use of land upon the death of a tenant always descended to his issue; hence the term *descent* is applied to any title by inheritance, although, by statute, in many states of this country, the title is sometimes made to ascend. The English rule of primogeniture, whereby the eldest son inherits all the real estate, has been universally abolished in this country, and by statutory provisions of the various states the estate of the parent descends to his issue, both male and female, in equal shares. The rules of descent do not apply to personal property, and this class of property passes to the executor or administrator, by whom the residue, after payment of the debts of the deceased, the costs of administration, and the dower interest, if any, is distributed in equal shares among the heirs. The rules governing descent in the various states are provided by statute, and follow much the same general principles, but differ widely in detail. See INHERITANCE, Vol. XIII, pp. 83, 84.

DESCHAMPS, DE SAINT AMAND EMILE, a French poet and critic; born Feb. 20, 1791, at Bourges, established his fame in 1818 by his brilliant comedies *Selmours* and *Le Tour de Faveur.* He later became the leader of the Romantic School. In 1822–35 appeared from his pen *Études Françaises et Étrangères*, containing original poetry and translations of Schiller's, Goethe's and Shakespeare's works. Died at Versailles, April 22, 1871. G.A.S.

DESCHANEL, ÉMILE AUGUSTIN ÉTIENNE, a French educator and writer, member of the Senate; born in Paris, Nov. 14, 1819. He became professor of rhetoric at the Normal College. He afterward edited, successively, *La Revue Indépendante*, *La Revue des Deux Mondes* and *Le National.* He became interested in the socialism of the time, and for a work on *Catholicism and Socialism*, in 1850, was deprived of his office in the college, and the next year exiled. He lived in Brussels until 1859, when he returned to France and devoted himself to literature, in connection with Victor Hugo. He was elected to the Chamber of Deputies in 1876 and to the Senate in 1881, and became professor of modern literature in the College of France. Among his collected writings are a number of papers on conversation and society, and in a more serious vein, *The Works of Aristophanes* (1867); *Benjamin Franklin* (1882); *The Romanticism of the Classics:* and the *Theater of Voltaire* (1886). He died January 26, 1904.

D'ESCLOT, BERNARD, a Catalan historian of the fourteenth century; left an interesting chron icle treating on life and deeds of Peter III of Arragonia to the year of his death in 1325. This work, the oldest document of Catalan literature, and as such very valuable, was published by Buchon in the *Chroniques Étrangères Relatives aux Expéditiones Français Pendent le XIII Siècle* (Paris, 1840). G.A.S.

DESERT. See SAHARA, Vol. XXI, p. 157; GOBI, Vol. X, p. 635.

DESERTION, in criminal law, is the offense of abandoning public service in the army or navy. In the United States, any soldier who is guilty of desertion in time of peace is liable to serve for such unexpired period of the term of his enlistment as still remained at the time of his desertion, and may be tried by court-martial and punished in any manner except by death. In time of war, any soldier who has been duly enlisted or has received pay in the army of the United States, and who deserts the service, is subject to the penalty of death, or such other penalty as the court-martial shall direct. The rules as to desertion in the United States navy are much the same. Desertion, in the law of domestic relations, generally refers to the act of a man in abandoning his wife or children. In case of desertion the courts have power to grant alimony to the wife or children, and compel the payment thereof by the husband. Desertion is also ground for divorce, but usually only when continued for such time as the statute may fix. In some states desertion is an offense for which the courts may inflict punishment. See DIVORCE AND MARRIAGE, in these Supplements.

DESJARDINS, PAUL, journalist and reformer; was born in Paris, and became professor of rhetoric in the College of St. Stanislaus and also one of the editors of the *Journal des Debats*. He has devoted much study to social problems, and a compilation of his essays on those topics has been published under the title *Contemporary Notes*. His work and writings along lines of social betterment led some years ago to the organization of the "Union for Moral Action" in Paris, a body which has exerted considerable influence for good. He is a member of a family many of whose members have become distinguished. W.F.J.

DESIMA, ISLAND. See NAGASAKI, Vol. XVII, p. 170.

DESMAN, an insectivorous quadruped, and one of the animals known as the musk-rat. There are two species, *Myogale pyrenaica* and *M. moschata*. R.W.C.

DESMIDIACEÆ OR DESMIDS, a family of one-celled green Algæ, abundant everywhere in fresh waters. The cells are mostly divided into symmetrical halves by a constriction in the middle, or there is at least a symmetrical division of the protoplasmic contents. They multiply by division, sometimes remaining in long filaments, or, by conjugation, they form zygospores. They are of many beautiful forms and markings.

DES MOINES, a city of Iowa, capital of the state and of Polk County (see Vol. VII, p. 112). Having four trunk lines of railway, besides other shorter lines, its traffic facilities are unsurpassed by any other city in the state. For local transportation there are fifty miles of electric-railway trackage and eighty miles of motor-railway trackage. Among the principal public buildings are the United States Federal Court and Post-Office Building, a marble edifice costing $385,000, and the State Capitol, an imposing and commodious structure costing nearly three million dollars. The Young Men's Christian Association has erected a building at a cost of $75,000. The State Agricultural Society has purchased 260 acres of land within the city limits for a permanent location of the Iowa State Fair, upon which it has expended, for the improvement of the ground and the erection of permanent exhibition buildings, $135,000. There are forty public schools, and numerous private schools of high order. The Catholics and Hebrews have each parochial schools, and the Des Moines College (Baptist), the Drake University, Callanan College and the Highland Park Industrial College are located here, and two excellent business colleges. The state library contains 40,000 volumes, and the public library 10,000 volumes. The city is the center of one of the most productive coal areas of the state, there being 29 mines within or near the city limits, from which the output in 1889 was 659 tons. The principal industrial enterprises are flouring and grist mill products, patent medicines and compounds, etc. In 1900 there were 494 manufacturing establishments, with an invested capital aggregating about $7,911,764, and employing over 4,557 workmen. The city enjoys an extensive wholesale trade. Population 1890, 50,067; 1900, 62,139.

DESMONCUS, a tropical American genus of climbing palms, like the rattans of the East Indies. They have alternate pinnate leaves, with long, hooked spines.

DESMOND, EARLS OF. See IRELAND, Vol. XIII, pp. 266, 270, 271.

DE SOTO, a city of Jefferson County, central eastern Missouri, 45 miles S.S.W. of St. Louis, on the St. Louis, Iron Mountain and Southern railroad. Lead and zinc are mined here, and the city exports these products and grain in large quantities. Population 1890, 3,960; 1900, 5,611.

DE SPENSER, HUGH. See EDWARD II, Vol. VII, p. 593.

DESSALINES, JEAN JACQUES, emperor of Hayti; born in Guinea, Africa, about 1760. On the revolt of the blacks in Hayti in 1791 he became adjutant-general to François, and later joined Toussaint L'Ouverture. As lieutenant general he led a successful campaign against Rigaud, and his activity and brutality so attracted the attention of L'Ouverture that he was assigned to the most important movements. He conducted a bloody guerrilla warfare against the French under Leclerc, remarkable in which was his defense of St. Marc. When unable to hold the town, he set it on fire and butchered all the white inhabitants. After

the treaty of peace Dessalines was created a French general and governor of the southern part of the island, and, it is said, betrayed L'Ouverture to the French, besides butchering his nephew Belair and 300 of his followers. When Rochambeau tortured to death the negro general Maurepas and his family, Dessalines hung, on 500 gibbets, half a regiment of French soldiers. In December, 1803, aided by an English squadron, he definitively expelled the French from the island, and in January, 1804, his army elected him governor-general of the republic. On Oct. 8, 1804, he assumed the imperial crown and plunged into a dissolute career, in which massacre of the whites played a large part. He was killed by his own soldiers, Oct. 17, 1806. E.E.T.

D'ESTRÉES, GABRIELLE. See ESTRÉES, GABRIELLE D', in these Supplements.

DETAILLE, JEAN BAPTISTE EDOUARD, a French military painter; born in Paris, Oct. 5, 1848. He studied under Meissonier. His first exhibition was in the Salon of 1867, with *A Corner of the Workshop.* This did not bring out the commendation evoked by his *Halt of the Infantry* in 1868. His *Repose During the Drill* and *An Engagement Between the Cossacks and Guards of Honor* gave him a high reputation, and prepared the way for the honors accorded him for his *Retreat* (1873), *Salute to the Wounded* (1877), and *The Passing Regiment* (1874), works executed after the war of 1870 had afforded him ample opportunity for the study of soldiery.

DETAINER. See FORCIBLE ENTRY AND DETAINER, in these Supplements.

DETERMINANTS. See ALGEBRA, Vol. I, p. 455; and HEREDITY, in these Supplements.

DETERMINISM. See SCHOLASTICISM, Vol. XXI, p. 447.

DETINUE, a legal term meaning a form of action which may be maintained against a person for the recovery of personal property which came lawfully into his possession, but which he unlawfully detains, together with the damages which the plaintiff may have suffered by reason of such unlawful detention. It is distinguished from the action of replevin, which can be maintained when the possession of the property was unlawful from the beginning. Like replevin, the action of detinue can only be maintained for such goods as may be fully identified and distinguished from such other goods as may be found with them.

DETMOLD, CHRISTIAN EDWARD, engineer, was a native of Germany, being born in Hanover on February 2, 1810, and was educated in a military academy there; but came to America in early life and practiced the profession of a civil, military, and mining engineer. He was employed by the government in planning and constructing forts, laying the foundation of Fort Sumter, and was one of the architectural engineers of the New York Crystal Palace, in which the first American world's fair was held. Later he was interested in coal mining and metallurgy, and also in politics and literature. He died in New York in July, 1887. W.F.J.

DETMOLD, WILLIAM, surgeon, was a native of Germany, who came to America in early life and devoted himself to surgery, largely orthopædic. In the Civil War he gave his services to the nation as an army surgeon. He was the inventor of several instruments for surgical use, and was a prolific writer for the medical and surgical press. He also interested himself in benevolent works. He died on December 26, 1894. W.F.J.

DE TROBRIAND, PHILIP REGIS, soldier; was born at Tours, France, on June 4, 1816. Dropping his title of Baron, and his family name of De Keredern, he came to America in 1841, and became the editor of the *Revue du Nouveau Monde* and the *Courrier des États-Unis.* At the outbreak of the Civil War he entered the Federal service as colonel of a New York regiment. (He had been educated for a military career in his youth.) In 1862 he was made commander of a brigade; in 1864 he was made brigadier-general, and in 1865 brevet major-general of volunteers. He took a gallant part in the battles of Yorktown, Williamsburg, Fredericksburg, Chancellorsville, and Gettysburg. After the war he entered the regular army; in 1867 was made brigadier-general by brevet, and commanded the district of Dakota, and on March 20, 1879, was retired. He was the author of several volumes. He died on July 15, 1897. W.F.J.

DETROIT, the largest and most important city of Michigan, and the capital of Wayne County. For situation and general description see Vol. VII, p. 115. The city increased in population from 21,019 in 1850, to 205,669 in 1890, and to 285,704 in 1900. Detroit maintains its position among the most important of the lake ports. It is an important port of entry and customs office. Its docking facilities for vessels are among the best on the Great Lakes. Its marine traffic, which in 1873 amounted to nine million tons had grown to twenty-nine million tons in 1895. From 1890 to 1896 many important municipal enactments, involving the rights of corporations, attracted general attention to Detroit. The manufacturing interests of the city are large. In 1900 there were 2,847 distinct establishments, giving employment to over 45,707 persons. The features which have given Detroit a prominent place among the large cities of the United States, and for which it is noted, are its system of parks and boulevards and its cleanliness. The latter attribute might be called an unavoidable one, as the gentle rise of the ground from the river inland affords a natural system of drainage. This has, however, been augmented by a perfect sewerage system, so that Detroit is the best-drained city of its size in the United States. The system of parks, the largest of which is Belle Isle, a beautiful park of over seven hundred acres, presents an appearance equaled by few cities. Commanding the city and the river is Fort Wayne, designed to be one of the principal fortifications on the northern frontier of the United States.

DETROIT CITY, a village and the county

seat of Becker County, Minnesota, in the northwestern part of the state, in the lake country, on the Northern Pacific railroad. Its population in 1900 was 2,060. W.F.J.

DETROIT RIVER. See ST. LAWRENCE, Vol. XXI, p. 188.

DÉTROYAT, PIERRE LÉONCE, a French naval officer and journalist, born in Bayonne, Sept. 7, 1829. After his graduation from the Naval College in 1845, he took part in the Crimean and Chinese wars, and was decorated with the cross of the Legion of Honor for his services. He afterward took part in the Mexican campaign; was detailed to the staff of Maximilian and to accompany the Empress Charlotte to France. Trouble with the government caused him to resign his commission. He served during the Franco-Prussian war. Devoting his time mainly to journalism, he edited successively *La Liberté*, *Le Bon Sens*, and *L'Estafette*, and published *The Court of Rome and Emperor Maximilian* (1868) and *French Intervention in Mexico* (1868), etc. Died in Paris, Jan. 19, 1898.

DETTINGEN, on the Main, a village in the Bavarian governmental district of Lower Franconia, on the right bank of the Main, has a population of 900, and an ancient Catholic Church. It is known for the victory of the so-called Pragmatic army over the French, led by Marshal Noailles, on June 27, 1743. The victorious forces were commanded in person by King George II of England. See FRANCE, Vol. IX, p. 516. G.A.S.

DEUTZIA, a genus of Asiatic shrubs, belonging to the family *Saxafragaceæ*. They bear numerous panicles of white flowers, and the under surface of the leaves, branchlets and calyx are covered with stellate hairs or scurf. *D. gracilis*, *D. crenata* and *D. scabra* are common species in cultivation.

DEVA. See ZOROASTER, Vol. XXIV, p. 860.

DEVENS, CHARLES, soldier and jurist, was born at Charlestown, Mass., on April 4, 1820, and was graduated from Harvard in 1838. He was admitted to the bar and soon rose to eminence. In 1848–49 he was a member of the Massachusetts senate, and in 1853 was U. S. marshal for that state. In 1861 he went to the front as major of a battalion. He was badly wounded at Fair Oaks, had a horse shot under him at Antietam, distinguished himself at Fredericksburg, and was brevetted major-general for good conduct at the capture of Richmond. In 1867 he was appointed a judge of the superior court of Massachusetts, and in 1873 a justice of the supreme court. In March, 1877, he became attorney-general of the United States in the cabinet of President Hayes and served until 1881, when he was reappointed to the bench of the supreme court of Massachusetts, and remained there until his death. He was noted as an orator. He died on January 7, 1891. W.F.J.

DE VERE, SIR AUBREY, an Irish poet, the son of the first baronet De Vere; born at Curra Castle, Ireland, in 1788; died there, in 1846. He wrote little until he was 30 years of age, when he published two dramatic poems, *The Duke of Mercia* and *Julian the Apostate*, and subsequently produced several songs; among them, *The Song of Faith*.

DE VERE, AUBREY THOMAS, Irish poet, born Jan. 10, 1814, at Curra Castle, Ireland. He began to write poetry at an early age, his productions attaining considerable popularity. In 1854 he became honorary professor of political and social science in the Roman Catholic University of Dublin. Among his writings are *The Waldenses* (1842), a lyrical tale; *The Search after Proserpine*, a metrical description of his travels in Greece; *Legends of St. Patrick* (1872); and a number of critical essays under the titles *Essays on Poetry* (1887); and later, *Essays Ethical and Literary*. His latter works were a volume of *Poems* (1890) and *Religious Poems of the Nineteenth Century* (1893). He died Jan. 1902.

DE VERE, MAXIMILIAN SCHELE, educator; was born near Wexiö, Sweden, on November 1, 1820, and was for some years engaged in the military and diplomatic services of Prussia. In 1844 he came to America, and was made professor of modern languages and *belles-lettres* in the University of Virginia. He also devoted himself to literature, writing upon a great variety of topics, historical, literary and scientific, and contributing frequently to the best magazines and reviews in America and England. He published *Outlines of Comparative Philology* in 1853 and *Stray Leaves from the Book of Nature* in 1856. W.F.J.

DEVEREAUX, JOHN HENRY, railroad manager, was born in Boston, and in early manhood became engaged in railroad work in the Ohio Valley. During the Civil War he was superintendent of the military railroads for the Union army, until 1864. He was elected president of the Cleveland, Columbus, Cincinnati and Indianapolis railroad in 1873, and of the Atlantic and Great Western railroad in 1874. While in this position in 1877 he distinguished himself by the firm and successful stand which he took against the great railroad strikes of 1877, when more than eight hundred of his men were, through his personal efforts, restrained from joining the strikers and were kept loyally at work. He was elected president of the Indianapolis and St. Louis railroad in 1880, and died on March 17, 1886. W.F.J.

DEVIATION OF THE PLUMB-LINE, a physical phenomenon, the explanation of which is, to a large extent, a matter of conjecture. The phenomenon is, that the plumb-line at some points on the earth's surface is drawn out of the perpendicular. It is thought by some to be due to the attraction of mountains, or large masses of earth, in the vicinity of which the deviation has been noted to occur, but a similar deviation has been noticed on level prairies. The conclusion reached by authorities in geodesy is, that wherever a deviation is noticed, near that point are located large masses of the earth which are of greater density than the earth surrounding them.

DEVIL'S COACH-HORSE. See COLEOPTERA, Vol. VI, p. 118.

DEVIL'S LAKE, the name of a body of water

and of a small village in the northeastern part of North Dakota. The village is on the Great Northern railroad, 90 miles N.W. of Grand Forks, and is the capital of Ramsey County. The lake, formerly known as Minne-Wakan, forms the boundary between Benson and Ramsey counties. It is 40 miles long, about 10 miles wide, and its surface is 1,467 feet above sea-level. It has no visible outlet, and its waters are saline. Population, 1900, 1,729.

DEVIL WORSHIPERS OR YEZEEDEES, an ancient sect of unknown origin, living in the vicinity of Mosul, Asiatic Turkey. This obscure race appears to be a relic of the ancient Chaldeans, but their creed is a compound of Christianity, Chaldean superstitions and Mohammedanism. They believe in one Supreme God respecting whom they preserve great mystery. They also believe in Satan as chief of the angelic host, and that he is to be propitiated both on account of his present power to do harm and his future power to do good. They believe in the existence of seven archangels next in order after Satan, and that Christ was an angelic being in human shape, but that he did not die on the cross. On New Year's Day the Yezeedees hold a festival in propitiation of Satan. W.R.B.

DE VINNE, THEODORE LOW, printer; was born at Stamford, Connecticut, on December 25, 1828, and at an early age learned the trade of a printer in a country newspaper office. In 1848 he settled in New York city, and was employed in a printing office, of which he soon became foreman and then junior partner. In 1883 he became the head of the firm of T. L. De Vinne and Co., now known as The De Vinne Press, and since that time has made it one of the foremost printing houses in the world. He has been president of the New York Typothetæ, and has written *The Invention of Printing; Historic Types; Plain Printing Types; Correct Composition*, and *Title Pages*.

THEODORE L. DE VINNE.

W.F.J.

DEVONIAN AGE. See GEOLOGY, Vol. X, p. 301.

DEVONSHIRE, SPENCER CAVENDISH, EIGHTH DUKE OF, and MARQUIS OF HARTINGTON, son of William Cavendish, Duke of Devonshire, and Count of Burlington, born July 23, 1833. He studied at Eton and Cambridge, and in 1857 entered the House of Commons where he in 1859 effected the downfall of Derby's cabinet. In 1863 he became lord of admiralty under Palmerston, in 1866 under-secretary of state for war under Gladstone-Russell; in 1868 postmaster-general, and in 1871 chief secretary for Ireland under Gladstone. In 1865 he was elected unanimously leader of the Liberal party, when he again served as secretary of state for India from 1880–82, and as secretary of war in 1882. Having resigned in 1885 he seceded from his old party and became head of the Liberal Unionists, which sided with the Conservatives and held the cabinet of Salisbury in power by their support in Parliament. In 1895 he became lord president of council in the third cabinet of Lord Salisbury.

G.A.S.

DEVONSHIRE, WILLIAM CAVENDISH, DUKE OF, born April 27, 1808; died in Milnethorpe, Dec. 21, 1891. He was the seventh Duke of Devonshire, succeeding to the title in 1858. Although a member of the House of Commons, and, later by accession to the title, of the House of Lords, he never took a prominent part in politics, devoting himself to business and the manufacture of iron. Possessed of one of the largest estates in England, he was able to carry out large plans, and thereby greatly benefit the industries of the country. The towns of Eastbourne and Barrow-in-Furness are mainly of his building.—His son, LORD FREDERICK CHARLES CAVENDISH, an English statesman, was born at Eastbourne, Sussex, Nov. 30, 1836. He was private secretary to Lord Granville from 1859 to 1864; sat in Parliament for several years; was private secretary to W. E. Gladstone from 1872 to 1873; and financial secretary of the Treasury from 1880 to 1882. Then, as Gladstone's olive branch to Ireland, he was appointed chief secretary to the Lord Lieutenant, but was assassinated, with Under-Secretary Burke, in the Phœnix Park, Dublin, within a few days of his landing, May 6, 1882. His brutal murder excited the indignation of the civilized world, for his qualities had endeared him to many people.

DEW. See METEOROLOGY, Vol. XVI, pp. 125, 126.

DEWDNEY, EDGAR, a Canadian statesman; born in Devonshire, England, in 1835. He removed to British Columbia in 1859 and became an engineer on the Canadian Pacific Railway Survey. In 1868 he was elected to the provincial parliament from Kootenay, and from 1872 to 1878 served in the Dominion Parliament. In 1879 he was appointed Indian commissioner, and in 1888 was minister of the interior. In 1892 he was appointed governor of British Columbia.

W.M.C.

DE WET, CHRISTIAN, a Boer general who figured prominently in the closing months of the Boer War as a leader of a guerrilla band of the Orange Free State burghers. His movements in the field were characterized by great mobility, which enabled him and his band of scouts and raiders to elude capture for several months, and to harass British columns in the attempt to run him and his following to earth. His aptitude for guerrilla warfare and ubiquity in turning up at unexpected places were very tantalizing as well as embarrassing to the British.

DEWEY, CHESTER, educator; was born at Sheffield, Mass., on October 25, 1784, and was graduated from Williams College in 1806. In 1808 he became minister of a Congregational Church, and also a tutor at Williams College, and two years later became professor of mathematics and natural philosophy for seventeen years. After filling other professorships he became from

1836 to 1850 principal of the Collegiate Institute at Rochester, N. Y., and when the University of Rochester was organized he was made its professor of chemistry and natural philosophy. This place he resigned in 1860, because of failing health, but was able thereafter to give much time to scientific research and to the writing of books, chiefly on botany and zoölogy. He died on December 5, 1867. W.F.J.

DEWEY, GEORGE, American admiral. He was born Dec. 26, 1837, at Montpelier, Vt., being the third son of Julius Gemano Dewey, M.D., who was the 9th in descent from the founder of the family, which, originating in Sandwich, England, settled in Dorchester, Massachusetts, in 1633. In 1852 he went to the Norwich Military Academy, Vermont, where he formed the desire of going to Annapolis, which was realized through Senator Foote's nomination. He entered the academy in 1854, where he became known as the "quiet fellow who could do things," graduating in 1858, fifth in his class, excelling in seamanship. As a midshipman he was sent on a two-year trial cruise, on the *Wabash*, to the Mediterranean. On the outbreak of the war he was assigned as lieutenant to the *Mississippi* (Commander Melancthon Smith), which had been Commodore Perry's flagship in the Japan expedition (1852–53). Dewey took a leading part in forcing the passage past Forts Jackson and Phillips, below New Orleans and in sinking the *Manassas*. He displayed that characteristic coolness and confidence that was to stand him and his country in such good stead in 1898. During the attack on Fort Hudson, March 8–9, 1863, the *Mississippi* grounded, and he set fire to her and secured the escape of his men. He was made first lieutenant of Farragut's dispatch-boat. He was present at other operations; and at Fort Fisher, on the *Agawam*, Dec.–Jan., 1864–65, again displayed superior judgment and decision.

GEORGE DEWEY.

In March, 1865, he reached the rank of lieutenant-commander, and served two years in European waters, on the *Kearsarge* and the *Colorado*. In 1868 he was attached to the Naval Academy; in 1870 received his first command — the *Narragansett;* in 1872 became commander; and later (1875–1882) acted on the Lighthouse Board. In 1882 he was put in command of the *Juanita*, of the Asiatic squadron. Promoted to captain in 1884, he was assigned to the *Dolphin*, the first of the "new navy" known as the "White Squadron"; and in 1885 to the *Pensacola*, the flagship of the European squadron. In 1889 he was chief of the Bureau of Equipment and Recruiting; and, afterward, again on the Lighthouse Board. On his advance to commodore, in 1896, he headed the Board of Inspection and Review.

Then came his appointment, in the end of 1897, to the command of the Asiatic squadron, upon receiving which he remarked that he would be the first commodore in Asiatic waters since Perry. For a full account of the events leading up to, and including, the destruction of the Spanish fleet, see MANILA, BATTLE OF, in these Supplements. The result of that engagement is best told in the words of the dispatch he sent to President McKinley: "Manila, May 1.—Squadron arrived at Manila at daybreak this morning. Immediately engaged, and destroyed the following Spanish vessels: *Reina Christina*, *Castilla*, *Don Antonio de Ulloa*, *Isla de Luzon*, *Isla de Cuba*, *General Lezo*, *Marquis del Duero*, *Cano*, *Velasco*, *Isla de Mindanao*, a transport and water battery at Cavité. The squadron is uninjured, and only a few men are slightly wounded." This dispatch was received by the President, May 7, and he at once sent his thanks to the Commodore, notifying him, also, that in recognition of his "splendid achievement" he had been appointed acting rear-admiral. On May 9, the President, in a message to Congress, recommended that the thanks of Congress be awarded to "Acting Rear-Admiral George Dewey for highly distinguished conduct in conflict with the enemy, and to the officers and men under his command." A joint-resolution of thanks was passed, a sword of honor voted to the Admiral, and medals voted to commemorate the victory.

Theodore Roosevelt, in 1889, said that Dewey "partly grasped and partly made his opportunity"; but added, "it was not a fact that it was an accident that he was sent there in 1897, for he was selected as a man who could go into Manila, if necessary." The victory electrified the world, for its startling suddenness and decisiveness. His country could then well recall the Dewey family motto: "A crown to the conqueror is due."

After the battle Dewey proved equal to dealing with the representatives, at Manila, of the foreign powers; and his subsequent action secured for his country the untithed fruits of victory. The results were far reaching, the most important being the raising the prestige of American arms to the highest point, throughout the world. He was created full admiral, March 2, 1899. On his way home, in the fall of 1899, he received ovations wherever he touched with his unscathed squadron; and after his arrival at New York, Sept. 26, 1899, was given a triumph by the city, which was repeated throughout the country, with honors galore. He was spoken of for the Presidency in 1900, but after contemplating the candidacy, discouraged the idea. He presided at the Schley Court-Martial, 1901, and his disagreement with the majority report was perhaps the most notable incident of that affair. In 1905 he declined the invitation to sit on the International Commission convened at Paris to inquire into the firing upon innocent British trawlers by the Russian squadron on its way down the channel. R.C.A.

DEWEY, Melvil, an American librarian; born in Adams Center, New York, December 10, 1851. He was graduated from Amherst College in 1874, and became acting librarian there. In 1877 he went to Boston where he organized the American Library Association and the Library Bureau. He also established the American Metric Bureau for introducing the metric system of weights and measures, the Spelling Reform Association, and founded the *Library Journal* of which he was the editor from 1876 to 1881. In 1882 he removed to New York city and became librarian of Columbia College. In 1884 he was made director of the Columbia College School of Library Economy, and in 1886 was appointed secretary and treasurer of the University of the State of New York. In 1889 he removed to Albany to become director of the New York State Library. He later organized a library school in Albany. He has published *Educational Laws of New York State* (1892) (revision); *Library School Rules* (1884), and *Decimal Classification and Relative Index* (1885). W.M.C.

DEWEY, Orville, an American clergyman; born in Sheffield, Massachusetts, March 28, 1794. After graduating from Williams College in 1814 he entered the theological seminary at Andover, and completed his course at that institution in 1819, shortly after which he united himself with the Unitarian sect. He had previously been a member of the Congregational Church and had acted as an agent of the American Educational Society in Massachusetts. From 1835 to 1858 he was pastor of the Church of the Messiah, New York city. He published *The Old World and the New; Letters on Revivals; Discourses on Human Nature; Discourses on Human Life; Discourses on the Nature of Religion; Discourses on Commerce and Business; Miscellaneous and Occasional Discourses; The Unitarian Belief*, and *Discourses and Reviews*. He died in Sheffield, Massachusetts, March 21, 1882. W.M.C.

DEWINDT, Harry, English traveler and writer; born in Paris, April, 1856. In 1876–78 he was aide-de-camp to his brother-in-law, Raja Brooke of Sarawak, Borneo; in 1887 he traveled from Pekin to France by land; in 1889 he rode from Russia, through Persia, to India; in 1890 he inspected the prisons of western Siberia; in 1894 he visited the mines and political prisons of eastern Siberia; in 1895, while attempting to travel overland from New York to Paris he nearly lost his life in Bering Strait, but was rescued by a whaler; in 1897 he explored the gold districts of the Klondike and Alaska. He has written *On the Equator* (1882); *From Pekin to Paris by Land* (1887); *A Ride to India* (1890); *Siberia as It Is* (1892); *The New Siberia* (1895); *A Queer Honeymoon* (a novel); and *Through the Gold Fields of Alaska to Bering Straits* (1898).

DEWING, Maria Richards (Oakey), an American artist; born in New York city, October 27, 1855. She studied at the National Academy of Arts in New York and under John Lafarge and Thomas Couture. She is the wife of Thomas Wilmer Dewing (q. v.). Her works include portraits and figure and flower pieces, among them *Violets* (1878); *The Sleeping Child* (1878), and *Mother and Child* (1880). W.M.C.

DEWING, Thomas Wilmer, an American artist; born in Boston, Massachusetts, May 4, 1852. In 1876 he went to Europe and studied under Boulanger and Lefebure in Paris. He returned to the United States in 1879 and settled in New York city where he became widely known as a painter of portraits and figure compositions. His picture *The Days* gained the Clarke prize at the National Academy in 1887. He was elected an associate of the Academy in 1887 and was made an academician in 1888. He is also a member of the Society of American Artists. Among his best known paintings are *The Young Sorcerer* (1877); *A Musician* (1878); *The South Wind* (1878); *Morning* (1879); *The Prelude* (1883); *A Garden* (1884), and *Tobias and the Angel* (1887). He has also painted portraits of leading society women of New York. W.M.C.

DE WINT, Peter, English water-color landscape painter; born of Dutch descent, at Stone, Staffordshire, Jan. 21, 1784. In 1802 he began his training as a mezzotint engraver under John Raphael Smith, the engraver and crayon painter, but he soon took to painting, and in 1807 he entered the Academy schools and exhibited three landscapes. In 1810 he became an associate exhibitor at the Water-Color Society, at whose exhibitions during the next forty years his pictures were among the most attractive features. He was a fine colorist, and his style was broad and individual. He never used body color, and seldom signed his pictures. He also, though rarely, painted in oil. Among his most famous paintings are *The Cricketers; Lincoln Cathedral; Hay Harvest; Nottingham; Richmond Hill; Cows in Water;* and several views of *Lowther Castle*. His *Cornfield* and *A Woody Landscape*, both in oil, are in the South Kensington Museum, where also, as well as in the British Museum and the National Gallery, are many of his water-colors. Died in London, June 30, 1849. See *Memoir*, by Armstrong (1888), and Redgrave's *David Cox and Peter de Wint* (1891).

DE WITT, a post village, capital of Arkansas Co., Ark., on the Arkansas river, 70 miles S.E. of Little Rock; has 3 churches, 3 newspaper offices, and 2 mills. Population 1890, 246; 1900, 318.

DE WITT, a post village in De Witt Co., Ill., 9 miles E. by N. of Clinton; has 2 churches, a newspaper office, and a saw-mill. Population 1900, 253.

DE WITT, Iowa, a city of Clinton County, 19 miles west of Clinton, at a junction of the Chicago, Milwaukee & St. Paul and Chicago & Northwestern railroads. It is an agricultural center and has some supplemental manufactures. Population, 1900, 1,383. C.L.S.

DE WITT, a post village of Clinton Co., Mich., on Lookingglass River, 8 miles N. of Lansing; has 2 churches, a high school, a plough factory, a foundry, a grist-mill and 2 steam saw-mills. Pop., about 400.

DE WITT, a post village of Carroll Co., Mo., on the Missouri River, 83 miles E.N.E. of Kansas

City; has 5 churches, a newspaper office, a bank, and several factories; has large sandstone quarries in the neighborhood, and ships building stone and farm produce. Population 1900, 550.

DE WITT, a post village of Saline Co., Neb., on the Big Blue River, 13 miles N.W. of Beatrice; has 5 churches, banks, 2 newspaper offices, 2 grain elevators, and 2 grist-mills. Population 1900, 662.

DE WITT, JOHN, educator and classical scholar, was born at Albany, N. Y., on November 29, 1821, and was graduated from Rutgers College in 1838. He studied theology at New Brunswick, N. J., and from 1842 to 1863 was engaged in pastoral work in New Jersey, New York and Michigan. In 1863 he became professor of Oriental literature in the New Brunswick Theological Seminary, and in 1884 professor of Hellenistic Greek and New Testament exegesis. He was also a member of the American committee on the revision of the Old Testament. He is the author of several religious books, including *The Sure Foundation*, *What is Inspiration?* and *Praise Songs of Israel: A New Translation of the Psalms*. W.F.J.

DE WITT, JOHN, an American theologian; born in Harrisburg, Pennsylvania, October 10, 1842. He was graduated from Princeton in 1861, studied law and afterward studied theology at the Princeton Theological Seminary and the Union Theological Seminary. He was ordained in 1865 and held several pastorates. From 1882 to 1888 he was professor of ecclesiastical history at Lane Seminary, Cincinnati, and from 1888 to 1892, was professor at the McCormick Theological Seminary, Chicago. In 1892 he was appointed professor of church history at the Princeton Theological Seminary. He has written *Sermons on the Christian Life* (1885). W.M.C.

DE WITT, SIMEON, an American topographer; born in Ulster County, New York, December 25, 1756. He was graduated from Rutgers College in 1776 and joined General Gates' army during the Revolution. From 1777 to 1780 he was assistant chief topographer in the American army. In 1784 he was appointed surveyor-general of New York state, which office he held for nearly fifty years. He was made regent of the New York State University in 1798, vice-chancellor in 1817 and chancellor in 1829. He died in Ithaca, New York, December 3, 1834. W.M.C.

DE WITTE, SERGIUS, Russian statesman; born in 1849, at Tiflis, of German parentage; began life in a railway office. He became director of the railway, afterward attaining the position of an imperial privy councilor. From 1892–3 Minister of Finance, he enacted great reforms in the administration of railways, and introduced the gold standard. In 1905, he, as plenipotentiary concluded the peace treaty of Portsmouth with Japan. In the same year appointed President of the Ministry, he resigned from his post in 1906.

DEW-POINT. See HYGROMETRY, XII, 604, 605.

DEXILEUS, a young Athenian soldier, who was killed before Corinth, 394 B. C.

DEXIPPUS, PUBLIUS HERENNIUS, a Greek historian and general. At the time of the invasion of Greece by the Goths in A.D. 262, he was one of the highest officers of Athens. He took command of the Greek forces, and succeeded in driving the Goths out of the country. He afterward wrote an account of this war; also two histories, one of Macedonia from the time of Alexander, and the other a general history from the mythical ages to Claudius Gothicus, A.D. 268. His countrymen erected a statue in his honor.

DEXTER, in Heraldry, is the side of a shield or armorial figure which is to the right of the bearer and to the left of the spectator.

DEXTER, an incorporated post town in Dallas Co., Iowa, 36 miles W.S.W. of Des Moines; has 4 churches, a graded school, a bank, and a newspaper office. Population 1890, 607; 1900, 795.

DEXTER, a post city in Cowley Co., Kansas, on Grouse Creek; has 3 churches, a high school, and a bank. Population 1890, 371; 1900, 380.

DEXTER, a post village in Penobscot Co., Maine, on a small lake, 40 miles W.N.W. of Bangor; has 7 churches, 2 banks, a newspaper office, 5 woolen-mills, 2 foundries and machine shops, and several factories. Population 1890, 2,732; 1900, 2,941.

DEXTER, a post village in Washtenaw Co., Mich., on the Huron river, 9 miles N. W. of Ann Arbor; has 4 churches, a union school, a bank, a newspaper office, 2 flour-mills, a woolen-mill, and a sash and blind factory. Pop. 1890, 879; 1900, 900.

DEXTER, a post village in Stoddard Co., Mo., at a railway junction, 49 miles W.S.W. of Cairo, Ill.; has 4 churches, a public school, a bank, 2 newspaper offices, a flour- and a saw-mill. Pop. 1900, 1,862.

DEXTER, a post village in Jefferson Co., N. Y., on Lake Ontario, at the mouth of the Black River, 7 miles W.N.W. of Watertown; has 4 churches, 4 pulp-mills, 2 paper-mills, 3 wood factories, and a sulphite factory. Population 1900, 945.

DEXTER, EBENEZER KNIGHT, merchant and philanthropist; born at Providence, R.I., April 26, 1773; died there, Aug. 10, 1824. For ten years, including the trying period of the war of 1812, he ably and honestly filled the office of United States marshal for Rhode Island district. He accumulated a fortune in business, and on his death bequeathed to his native city, for the benefit of the poor, the bulk of his property, then valued at $60,000, as a permanent fund, besides forty acres of land on Providence Neck, on which Dexter Asylum, completed in 1830, still stands. He also devised, for use as a training-ground, a large field, on which, in 1894, was erected a statue of the donor, the gift of Henry C. Clark.

DEXTER, HENRY, sculptor, was born at Nelson, N. Y., on October 11, 1806, and worked at the trade of a blacksmith. In 1840 he became a sculptor, and achieved great success, particularly in the execution of portrait busts. He made busts of Longfellow, Agassiz, Dickens, and other eminent men, and of thirty-one of the thirty-three governors of states holding office in 1860, the two exceptions being the governors of California and Oregon. He produced some other pieces of statuary, and painted some pictures. He died at Cambridge, Mass., on June 23, 1876. W.F.J.

DEXTER, Henry, newsdealer, was born in Cambridge, Mass., on March 14, 1813. In 1864 he founded the American News Company, of New York, and was its president for many years. He has long been interested in a multitude of religious, philanthropical and educational works. W.F.J.

DEXTER, Henry Martyn, clergyman, editor and author, was born at Plympton, Mass., on August 13, 1821, and was educated at Brown University and at Yale (1840). He was graduated from Andover Theological Seminary in 1844, and for six years was engaged in preaching. In 1850 he became a contributor to, in 1851 associate editor, and in 1856 editor of, the *Congregationalist*. He resigned his editorial work in 1866, but resumed it in 1867 and resigned his pastoral charge. He was one of the founders of the *Congregational Quarterly*, and wrote much for its pages. Among his published books are a *History of Old Plymouth Colony*, *Street Thoughts*, *Future Punishment*, *Congregationalism*, *The Polity of the Pilgrims*, *New England Ecclesiastical Councils*, *Pilgrim Memoranda*, *Roger Williams and His Banishment from Massachusetts*, and many others. He edited an exact reprint of *Mourt's Relation*, in which he took a personal interest, being himself a descendant of George Morton, its supposed author. He died on November 13, 1890. W.F.J.

DEXTER, Samuel, an American statesman; born in Boston, Mass., in 1761. He graduated at Harvard in 1781; studied law, and was admitted to the bar in 1784. He practised in Lunenburg, Chelmsford, Billerica, and Charlestown, Mass., and later removed to Boston. He was a member of the Massachusetts legislature, 1788–90; served as Federalist Representative, 1794–95; was United States Senator from 1799 to 1800, when he resigned to take the office of Secretary of War, which later he exchanged for that of Secretary of the Treasury. In 1802 he retired from political life and resumed the practice of his profession. In 1814 he was a candidate for governor as a Republican, though he repudiated connection with the party. He was beaten by only 2,000 out of 47,000 votes. He died at Athens, N. Y., May 3, 1816. E.E.T.

DEY. See Algeria, Vol. I, p. 499.

DEZFUL or DIZFUL, Persia, the commercial center of Khùzistàn province on the Dizful River, 30 miles northwest of Shuster. It has interesting Sassanian ruins. Population, 30,000. C.L.S.

DHALAK ARCHIPELAGO. See Dahlak, in these Supplements.

DHAWALAGHIRI or DHAULAGIRI, Nepal, a peak of the Himalayas rising between the Gandak and Karnali rivers to a height of 26,826 feet. It was long considered the highest point on the globe, but is surpassed by three other peaks in the Himalayan system. C.L.S.

DHOLE. See India, Vol. XII, p. 779.

DHULEEP SINGH, a Hindu prince, Maharajah of Lahore, born in February, 1837, son of the famous Runjeet Singh, Rajah of the Punjab. Dhuleep was in his sixth year when his father died in 1843, but he had been named as successor, and his mother, the celebrated Ranee Jinda, at once proclaimed his sovereignty. The demoralized state of the regency and its army which attacked British territory in 1845, and again in 1848, on both occasions being defeated, impelled the British Ministry to annex the principality under certain conditions, the young Maharajah receiving an annual pension of four lacs of rupees equal to $200,000. The prince later made his residence in England, professed Christianity, and was naturalized, his mother also living in England until her death in 1863. The prince was married twice and had six children by his first wife. Monetary embarrassments and the refusal of the British government to entertain claims for increase of pension, led to theatrical demonstrations of hostility on his part, in which he vainly attempted to gain the assistance of Russia. He afterwards made his peace with the British government and resided in Paris, where he died October 22, 1893. C.L.S.

DHUNCHEE or DHANCHI (*Sesbania aculeata*), an annual herbaceous plant of the natural order *Leguminosæ*, much cultivated in India on account of its fiber which is coarser than hemp. It has an erect stem 6 to 10 feet in height. W.R.B.

DHYANI-BUDDHAS. See Buddhism, Vol. IV, p. 392.

DIABASE. See Geology, Vol. X, p. 210.

DIAGEOTROPISM, a term in physiological botany applied to the phenomenon of an organ placing itself in a horizontal position under the influence of gravity; that is, at right angles to the directive force of gravity. Such organs are usually dorsiventral, the two surfaces differing from each other. Many leaves, rootstocks, runners, etc., are *diageotropic*.

DIAGNOSIS (Gr., *dia*, through; *gnosis*, knowledge), in general, a scientific determination or discrimination, used in botany for the determination of plants for classification; in medicine, for the determination of diseases by their symptoms. This discrimination of a disease embraces its points of distinction from other diseases, its symptoms, their relation to one another, and to the state of the different organs and functions of the body, in so far as this can be appreciated during life. Diagnosis is usually spoken of in contrast with prognosis, which implies the judgment framed by the physician as to the issues of the disease, and also with prophylaxis, which refers to the warding off of disease when supposed to be impending.

DIAGOMETER, an instrument designed to measure the electro-conductive power of various substances. It makes use of their different conductibility for the determination of their chemical composition. It possesses a magnetised needle carrying a small disc which, in repose, lies against a fixed disc. A current of electricity passing through the liquid to be tested, causes a certain deviation of the needle, which is noted. W.R.B.

DIAGONAL, in plane geometry, a straight line

joining any two angles, not adjacent, of a rectilineal figure. A line drawn between two adjacent angles would coincide with the boundary line. A triangle has no diagonal, because any two of its angles are adjacent; a four-sided figure has two diagonals; a five-sided, five; a six-sided, nine; etc. The number of possible diagonals in any figure is found by taking three from the number of sides, multiplying the remainder by the number of sides, and taking half of the product.

DIAGONAL SCALE, a device for measuring fractions of units. As it is geometrically true that the inclosing sides of equal angles in equiangular triangles are proportional, a scale is made on which one set of equidistant parallel lines is crossed by another set of parallel lines at the same distance apart, and at an oblique angle to the first set. If the distance on any of the first set of lines between two successive oblique lines represents the unit, the distances on the first set between any oblique line and a line from its foot perpendicular to the first set represent the successive fractions of the unit, the smallest being measured on the first horizontal line above the foot of the oblique line, etc.; thus, seven feet six inches would be measured on the sixth horizontal line between the perpendicular and the eighth oblique line from it.

DIAHELIOTROPISM, a term in physiological botany applied to the phenomenon of an organ placing itself at right angles to the incident rays under the influence of light. Many foliage leaves are *diahelitropic*.

DIALECT. See PHILOLOGY, Vol. XVIII, pp. 790, 791.

DIALECTICS. See LOGIC, Vol. XIV, pp. 793, 794.

DIALOGUE, a discourse between two or more persons, implying more formality and greater unity of subject than a mere conversation. As a literary form, it was oftenest used by the ancients, especially by the Greek philosophers in conveying their instructions. (See LUCIAN, Vol. XV, p. 47.) The Socratic dialogue is a conversation in form of question and answer, in which the person questioned is himself led to propound those ideas which the questioner desires to present to him. The dialogues of Plato might be called philosophical dramas in which the Socratic method of investigation is brought to bear on the speculative subjects discussed. Cicero also used the dialogue frequently. Among modern writers, Fénélon, Machiavelli, Lessing and Berkeley have employed this form. Landor's *Imaginary Conversations* is a happy effort of the kind. However, the state of modern science makes it impracticable to put the dialogue to its ancient use. The drama is dialogue combined with action.

DIALYSIS. See DIFFUSION, Vol. VII, p. 189; and CHEMISTRY, in these Supplements.

DIAMAGNETIC POLARITY. See MAGNETISM, Vol. XV, pp. 268, 269.

DIAMAGNETIC SUBSTANCES. See ELECTRICITY, § 60, in these Supplements.

DIAMAGNETISM. See MAGNETISM, Vol. XV, p. 264.

DIAMOND BEETLE. See COLEOPTERA, Vol. VI, p.

DIAMOND, CAPE, the point on which the citadel of Quebec stands, formed by the confluence of the St. Charles and St. Lawrence rivers. It rises 333 feet above the water.

DIAMOND-CUTTING INDUSTRIES IN THE UNITED STATES. For general article on the diamond industry, and optical properties of diamonds, see DIAMOND, Vol. VII, pp. 140–144. Only a very limited number of diamonds have been found in the United States. They are met with in well-defined districts of North Carolina, Georgia, Wisconsin and California, and all the discoveries thus far have been accidental.

The returns of the census in 1890 showed that there were, in New York, sixteen firms engaged in cutting and recutting diamonds, and in Massachusetts, three. Cutting had also been carried on, at times, in Pennsylvania and Illinois, but was discontinued. In 1889 seven of the New York firms ran on full time, but the others were unemployed part of the time, owing to inability to obtain rough material at a price at which it could be advantageously cut. The firms that were fully employed were generally the larger ones, whose business consisted chiefly in repairing chipped or imperfectly cut stones, or in recutting stones previously cut abroad, which, owing to the superior workmanship at command here, could be recut at a profit, or in recutting very valuable diamonds when it was desired, with the certainty that the work could be done under their own supervision, thus guarding against any possible loss by exchange for inferior stones. The persons employed numbered 236, earning, on an average, $3.55 per day when at work.

The importation of rough and uncut diamonds in 1880 amounted to $129,207, in 1889 to $250,187, and the total for the decade was $3,133,529, while in 1883 there were imported $443,996 worth, showing that there was 94 per cent more cutting done in 1889 than in 1880, but markedly more in 1882 and 1883. This large increase of importation is due to the fact that in the years 1882 to 1885 a number of our jewelers opened diamond-cutting establishments, but the cutting has not been profitably carried on in this country on a scale large enough to justify branch houses in London, the great market for rough diamonds, where advantage can be taken of every fluctuation in the market, and large parcels purchased, which can be cut immediately and converted into cash; for nothing is bought and sold on a closer margin than rough diamonds.

DIAMOND-FIELDS OF SOUTH AFRICA. See CAPE COLONY, Vol. V, p. 38; also KIMBERLEY, *post*, pp. 496–497.

DIAMOND NECKLACE, INTRIGUE OF THE. See ROHAN, Vol. XX, p. 638.

DIAMONDS, ARTIFICIAL. See CHEMISTRY, in these Supplements.

DIANA MONKEY, the name given to a black or grayish West African monkey (*Cercopithecus diana*) because of the distinct white crescent on its forehead. R.W.C.

DIANA, TEMPLE OF. See EPHESUS, Vol. VIII.

DIANE DE POITIERS, mistress of Henry II of France; born Sept. 3, 1499, in the Dauphine;

became, on the death of her first husband, Louis de Brézé, in 1531, the mistress of Dauphin Henry d'Orléans, afterwards King Henry II. During his entire reign to 1559, her influence at the French court was great. On his death, banished from the French court; she died at her castle of Anet, in 1566. G.A.S.

DIAPASON REGULATOR. The French, who give the name of *diapason* to the tuning-fork, have lately made attempts to use that instrument in connection with clockwork, partly as a means of counting very small intervals of time. M. Duhamel made an arrangement in which a cylinder, by means of a screw-tapped end, was made to advance a little in the direction of the axis; this cylinder was covered with blackened paper and was rotated by means of clockwork. A diapason had a style, or marker, made of a small bit of pointed spring, fixed to the end of one of the prongs. On the diapason being sounded in the usual way, and the spring placed lightly against the cylinder, the style traced a sinuous white line on the black paper. The sinuosities became representatives of minute intervals of time. The diapason regulates the rate of motion of the train of wheels by the equilibrity of the vibration of the prongs, while the train of wheels tends to increase the time during which the prongs vibrate and sound. An index carried by an arbor round a dial may be made to recount or record the vibrations. Brequet's experiments have gone as far as instruments giving two hundred simple vibrations (one hundred double vibrations) per second.

DIAPENSIACEÆ, a small family of mostly arctic or alpine plants, of doubtful affinity, although usually regarded as related to the *Ericaceæ*. They are low, tufted and heath-like, are common to the arctic regions of both hemispheres, and have been apparently stranded on mountain tops, or in other sheltered places, south of the arctics. In North America, *Diapensia* extends from the arctics to the northern mountain peaks of the United States; *Pyxidanthera* occurs in the pine-barrens of New Jersey; while *Shortia* and *Galax* belong to the Alleghanies of the United States, as well as to the mountains of Eastern Asia.

DIAPHRAGM. See MAMMALIA, Vol. XV, p. 368; and RESPIRATION, Vol. XX, p. 490.

DIASTASE. See BREWING, Vol. IV, p. 238.

DIATHERMANCY. See ATMOSPHERE, Vol. III, p. 30.

DIATHESIS, a Greek word signifying a disposition or arrangement, and applied by the old medical authors to the predisposition or constitution of the body which renders it prone to certain diseased states. By modern writers on medicine it is used almost synonymously with temperaments.

DIATONIC SCALE. See MUSIC, V. XVII, p. 98.

DIAZ, ABBY MORTON, author, was born at Plymouth, Mass., the daughter of Ichabod Morton. She contributed much to magazines, and wrote many books, chiefly for children and young people. She was a founder and for some years president of the Women's Educational and Industrial Union, of Boston. She died on April 1, 1904. W.F.J.

DIAZ OR DIAS, BARTHOLOMEU, a Portuguese navigator; born in 1445. He was a gentleman of the royal household of John II, where he came in contact with many of the scientific men of the time. In 1486 the king gave him the command of an expedition to explore the western coast of Africa. He soon passed the limit of South Atlantic navigation, taking possession of the country in the name of the king of Portugal, and finally sailed or was blown around the southern extremity of the continent without being aware of it. Returning homeward, he discovered the cape which he called the "Cape of All the Storms," and which was later changed by the king to its present name, the Cape of Good Hope. In December, 1487, he arrived at Lisbon, and at first was received with enthusiasm, but Vasco da Gama was given the preference, under whom Diaz was obliged to serve in the expedition of 1497. Three years later he joined the expedition of Cabral, the discoverer of Brazil, and was drowned in a shipwreck, May 29, 1500.

DIAZ, PORFIRIO, soldier and statesman; was born at Oaxaca, Mexico, on September 15, 1830, being of native Indian blood. He studied law, and then entered the Mexican army in the war with the United States, where, despite his youth, he rose to leadership. Thereafter, in the stormy and almost anarchical period of Mexican history, he was engaged chiefly in political plots and efforts at revolution being almost incessantly against the government and much of the time being practically proscribed as an outlaw. During the Maximilian episode he was one of the most efficient generals of the Republican army, and strongly supported Juarez when the latter became President. He declined to obey Juarez's successor, Lerdo, however, and started a revolution against him, drove him from power, and in May, 1877, had himself proclaimed President. In 1880 he practically dictated the election of Manuel Gonzales as his successor, and throughout his administration was himself the really dominant authority in the republic. In 1884 he was himself re-elected, and he has by successive re-election been retained in the Presidency ever since, being chosen in 1904 for the seventh time. He has been for many years practically a dictator, but his administration has been singularly pure and able, and to him more than to any other man in her history Mexico owes her stability and high prosperity and her secure place among the nations of the world. W.F.J.

PORFIRIO DIAZ.

DIAZ DEL CASTILLO, BERNAL, soldier and historian; was born in Spain about the end of the fifteenth century, and was one of the companions of Cortes on his expedition for the conquest of Mexico in 1519. He was a valiant and skillful soldier, and fought with distinction

through the whole campaign. He was with Sandoval on his expedition to the north, and with Cortes on his expedition to Honduras to punish Cristobal de Olid for his defection. He is most remembered, however, for his monumental history of the conquest of Mexico, entitled *Historia Verdadera de la Conquista de la Nueva Espana* (3 vols., Madrid, 1632). Though marked with much of the ignorance and superstition of that time, it is instinct with sincerity and with a rare power of vivid narration and description, and is practically an epic in prose, narrated by one of the chief actors in its events. He died in Mexico, in 1593. W.F.J.

DIAZ DE ESCOBAR, Narciso, poet; was born at Malaga, Spain, on June 25, 1860. He is the author of many lyric poems; of several dramas, including *A Morisco Episode; The Young Men of The Day*, and *Two Husbands and a Wife*, and a volume of *Character Sketches from Madrid*. W.F.J.

DIAZ DE SOLIS, Juan, adventurer, was a native of Spain and a contemporary of Columbus. He accompanied Coelho in his explorations of the South American coast, and was with Pinzon in Central America, and also in Brazil. He succeeded Amerigo Vespucci as chief pilot of Spain, was the first to explore the Rio de la Plata, and was killed there by Indians in 1513. W.F.J.

DIBRANCHIATA. See Mollusca, Vol. XVI, p. 692.

DICÆUM, a genus of small gaily colored birds, called honey peckers. *D. ementatum* is a typical species and inhabits southern Asia. They build large, pear-shaped nests. R.W.C.

DICE (plural of die, from Lat., *datum*, given) are small cubes of bone, ivory, or wood, which are marked on their six sides with black dots from one up to six in number, the dots so arranged that the numbers on two opposite sides taken together always count seven. Two dice are employed in certain games of chance, such as backgammon, or for settling a dispute, a practice equivalent to "casting lots." Dice are also used in throwing for high stakes. They are shaken in a dice box and then thrown on a table and the number of dots on the uppermost faces decide the game. The invention of dice is very ancient. They have been found in Egypt, were known to the Greeks, and the Romans were so passionately addicted to playing with them that often a whole fortune was staked on a single throw. Gamblers often resort to the practice of adding lead to one side, so that the highest number is almost sure to turn up. On Etruscan dice words indicating numerals were used instead of dots. W.R.B.

DICENTRA, a genus of herbs of the family *Fumariaceæ*, characterized by its corolla being heart-shaped, or two-spurred at base, and its crested seeds. *D. spectabilis*, of eastern Asia is the common cultivated "bleeding heart," with showy pink-red flowers. The common wild species of the United States, with white flowers and delicate compound leaves, are *D. Cucullaria*, or "Dutchman's breeches," with two squared corolla, and *D. Canadensis*, or "squirrel-corn," with heart-shaped corolla. The genus has also been called *Diclytra* and *Dielytra*.

DICEY, Albert Venn, an English author; born in 1835; Vinerian professor of law at Oxford University from 1882; a frequent contributor to periodical literature, and a brilliant writer; but known from a remarkable exposition of the law of the British constitution, accorded the highest praise by competent critics. His style is clear, his argument cogent and dispassionate, and his contribution to the literature of his time must be reckoned as important in its bearing upon political questions of moment.

DICEY, Edward, journalist, traveler and author; was born in Leicestershire, England, in 1832, and was graduated with distinction from Trinity College, Cambridge. He was a reporter and correspondent of the London *Daily Telegraph*, and for a short time editor of the London *Daily News*. From 1870 to 1889 he was editor of the London *Observer*. He is the author of *Rome in 1860* (1861); *The Battlefields of 1866* (1866); *A Memoir of Cavour; A Month in Russia* (1867); *England and Egypt* (1881); *The Story of the Khedivate* (1902), and other works. He has spent much time in Egypt, and also in South Africa, and has written much for reviews. W.F.J.

DICHLAMDEOUS. See Botany, Vol. IV, p. 114.

DICHOGAMY, a term expressing the fact that stigmas and stamens of the same flower become functional at different times, thus preventing close-pollination and necessitating cross-pollination. In cases of dichogamy the flowers are either *protandrous*, in which case the stamens mature and shed their pollen before the stigma is receptive; or *protogynous*, in which case the stigma matures and is receptive before the stamens have fully developed. In these cases it is necessary for pollen to be exchanged between flowers in different stages of development. Examples of protandrous flowers are found among *Umbelliferæ*, *Compositæ*, *Campanulaceæ*, etc.; of protogynous flowers, among species of *Aristolochia*, *Arum*, *Plantago*, in *Scrophularia nodosa*, etc.

DICHOTOMY, Law of. See Psychology, Vol. XX, p. 84.

DICHROISM. See Mineralogy, Vol. XVI, p. 389.

DICHROITE. See Mineralogy, Vol. XVI, p. 436.

DICK, Charles, politician, was born at Akron, Ohio, on November 3, 1858, and entered mercantile life. He became interested in politics, as an officer of the Republican State and National organizations, and in March, 1904, was elected U. S. Senator from Ohio to succeed Marcus A. Hanna. He is author of the Militia Bill. W.F.J.

DICKENS, Charles, an Englisn editor and publisher, son of Charles Dickens, the English novelist, was born in 1837. He was carefully educated, and it being thought that his talents lay more in business than in literature, he was given excellent opportunities for developing his tastes in that direction. He was a protégé of Miss Coutts, afterward Baroness Burdett-Coutts, under whose auspices he was sent to China, and who afterward found an

opening for him in London. He became interested in an extensive printing establishment, having its headquarters at the Crystal Palace, connection with which he retained after his father's death. His father, without endeavoring to influence his inclinations toward literature, constantly sought to train him in the business management of *All the Year Round*, the journal which he had himself founded, and which he made such a success. The son became proprietor of this popular journal, which suspended publication in 1895. As a public reader of his father's well-known works, and especially in the characterization of the leading parts, he was almost as great a success as was the father. He possessed all the copious notes of the father's "business," and by constant study, and under the latter's careful inspection, he was exceptionally well equipped. He had also the natural gift of oratory and an easy flow of speech. He published a number of handbooks of an informing character—*Dictionaries of London*, *Paris*, *The Thames*, *The University of Cambridge*, and *The University of Oxford*, the series having been commenced in 1879. He edited the *Life of Charles Mathews*, which was chiefly autobiographical (1879). He died at Kensington, July 20, 1896.

DICKERSON, Mahlon, an American statesman; born in Hanover, N. J., April 17, 1770. He graduated at Princeton in 1789, and was admitted to the bar in 1793. He began practice in Philadelphia; was quartermaster-general of Pennsylvania, 1805–08; recorder of the city court of Philadelphia, 1808–10; member of the New Jersey House of Representatives in 1814; governor of New Jersey, 1815–17; United States senator, 1817–33; was appointed Secretary of the Navy, by President Jackson, June 30, 1834, and was reappointed by President Van Buren, serving until June 25, 1838; United States district judge of the District of New Jersey; delegate to the State Constitutional convention, 1844; president of the American Institute, 1846–48. He died at Succasunna, N. J., Oct. 5, 1853. E.E.T.

DICKINS, John, clergyman, was born in London, England, on August 24, 1747, and came to America before the Revolution. He was one of the foremost ministers of the Methodist Episcopal Church, was associated with Bishop of Asbury in founding Cokesbury College, in Maryland, and founded the Methodist Book Concern at Philadelphia. He also suggested the name "Methodist Episcopal." He died at Philadelphia on September 27, 1798. W.F.J.

DICKINSON, Anna, an American lecturer; born in Philadelphia, Pa., Oct. 28, 1842. She was educated at the Friends' Free School; taught in Berks County, Pa., 1859–60; was employed in the United States Mint in 1861. She then lectured on slavery, woman suffrage, and other reforms, and in 1876 went on the stage, essaying Hamlet and other tragedy rôles, but was not successful, and retired from public life. She is the author of *A Paying Investment: a Plea for Education; Mary Tudor*, and *The Crown of Thorns*, both plays. E.E.T.

DICKINSON, Daniel S., an American politician; born in Goshen, Conn., Sept. 11, 1800. In 1806 his family settled in the Chenango valley, N. Y. He began to practice law in Binghamton in 1831; was State senator, 1837–40; lieutenant-governor, 1842–44; delegate to the national Democratic convention, and Presidential elector on the Polk ticket, in 1844; United States senator, 1844–51; delegate to the national Democratic convention, 1852; attorney-general of New York, 1861; delegate to the national Republican convention, 1864; and, later, United States district attorney for the Southern District of New York. He died in New York, April 12, 1866. E.E.T.

DICKINSON, Don M., an American lawyer and politician; born at Port Ontario, New York, Jan. 17, 1846, of New England parents. He was educated in the public schools of Detroit and at the University of Michigan, and was admitted to the bar in 1867. In 1872 he entered the political field as secretary of the Democratic State Central Committee of Michigan, and in the Tilden campaign he acted as chairman of that body. Subsequently he represented his state on the National Democratic Committee, and in 1886 he was appointed Postmaster-General by President Cleveland. On the expiration of his term he resumed the practice of law in Detroit.

DON M. DICKINSON.

DICKINSON, John, an American statesman; born in Maryland, Nov. 13, 1732. He was elected to the Pennsylvania House of Assembly in 1764. In 1765 he was a delegate from Pennsylvania to the first Colonial Congress, and drew up the resolutions passed thereat. In 1768 he published his celebrated *Farmer's Letters to the Inhabitants of the British Colonies*. He was a member of the first Continental Congress in 1774, but he opposed the Declaration of Independence on the ground that compromise was yet possible, and did not sign that instrument. This brought him into public disfavor, but he served as a private soldier in Delaware against the British forces. In 1779 he represented Delaware in Congress; was subsequently president, successively, of the States of Delaware and Pennsylvania, and a member of the Federal Constitutional convention, in which he advocated the adoption of the Constitution. He died in Wilmington, Del., Feb. 14, 1808. E.E.T.

DICKINSON, Jonathan, an American clergyman; born in Hatfield, Mass., April 22, 1688. He graduated at Yale in 1706, and about two years after was installed as pastor of the Presbyterian Church in Elizabethtown, N. J. When the New Jersey churches separated from the synod of Philadelphia in 1741, a charter was procured for the College of New Jersey (now Princeton University). The first classes were opened at Elizabethtown, and Mr. Dickinson

was elected president. He died in Elizabethtown, Oct. 17, 1747. E.E.T.

DICKINSON COLLEGE, an educational institution at Carlisle, Pennsylvania, founded in 1783 and named in honor of John Dickinson (q. v.). Until 1833 the college was conducted under the auspices of the Presbyterian Church, and since that date has been under Methodist control. In 1904 the college had 33 instructors, 520

DICKINSON COLLEGE.

students and a library of 40,000 volumes. There have been 4,297 graduates since the organization of the institution. The college has production funds to the amount of $400,000 and an annual income of $122,859. There are three courses of study, classical, scientific and modern languages. In 1904 the president of the college was George E. Reed. W.M.C.

DICKSON, Samuel Henry, an American physician; born in Charleston, S. C., Sept., 1798. He graduated at Yale in 1814; studied medicine in Charleston, and during the yellow fever epidemic of 1817 practised for a time. He graduated in medicine at the University of Pennsylvania in 1819. Being instrumental in the establishment of a medical college in Charleston, he was called to the chair of institutes and practice of medicine in 1824. He retired from this position in 1832, but on the reorganization of the institution as the Medical College of South Carolina he was re-elected. In 1847 he was chosen professor of the practice of medicine in the University of New York, but in 1850 he returned to his former chair in Charleston. In 1858 he was called to the chair of the practice of medicine in Jefferson Medical College, Philadelphia. He was the author of *Essays on Life, Sleep, Pain, etc.* (1852). He died in Philadelphia, March 31, 1872. E.E.T.

DICOTYLEDONS. See Vegetable Kingdom, Vol. XXIV, p. 143.

DICTIONARY. In addition to the dictionaries named in Vol. VII, pp. 155–168, the following publications of recent years should be noted:

The Oxford English Dictionary. A new dictionary on historical principles, founded mainly on the materials collected by the Philological Society; edited by Dr. James A. H. Murray and others. The publication of this work was commenced, in sections, in 1888, and had advanced, in the issue of April, 1809, to "Hox—Hwye," being pp. 256–370 of Vol. V. One of the distinctive features of this learned and valuable work is the indication, by dated quotations, of the periods when the different uses of each word began and ended in English literature.

A Dictionary of the English Language, by Rev. James Stormonth (1885). The especial design of this work is to present the correct usage of words, and the words are grouped according to their derivation.

An Etymological Dictionary of the English Language, arranged on a historical basis, by W. W. Skeat, Oxford (1882). This was the best English etymological dictionary issued up to that time.

The Century Dictionary, an encyclopædic lexicon of the English language, edited by Professor William Dwight Whitney of Yale (6 vols., 1891), to which is added a seventh volume, entitled *The Century Cyclopædia of Names.* In 1895 the work was reissued in ten volumes. It contains over 215,000 words and 50,000 phrases, and makes the attempt to give idiomatical phrases and the colloquial as well as the dialectal use of words. Technical words and terms are not only defined with scientific accuracy, but the objects they designate are described and illustrated, after the manner of an encyclopædia, with diagrams and pictures, of which there are 7,500. American writers are largely represented in the 300,000 literary quotations given.

A Standard Dictionary of the English Language, upon original plans (1895), contains about 320,000 words, carefully selected from many other dictionaries, and from several thousand representative authors; and while it gives place to the reform spellings put forth by the American Philological Association and by the American Spelling Reform Association, it does not adopt them. A prominent feature consists in giving the commonest meaning of each word first, while the etymology of words comes last in the order of their treatment. In giving synonyms and antonyms, care has been taken to bring out the distinctions with sharpness, and with especial reference to the correct established usage of the present time. Another feature is, that exact references are given for the quotations used to illustrate the meanings of words. The quotations themselves have been selected from modern standard English and American writers, and some of them are taken from newspapers. The pictorial illustrations have been selected with discrimination, and are drawn by specialists in that line.

The Encyclopædic Dictionary (1888) is styled a new and original work of reference to all the words in the English language, with a full account of their origin, meaning, pronunciation and use, with numerous illustrations. The plan of this work is somewhat in line with that of the *Century Dictionary*, which it preceded, but with the popular feature of being less expensive. The definitions are concise, and the cyclopædic matter easy.

Webster's International Dictionary of the English Language (1890) is a revision of the 1864 edition of Webster's Unabridged, made under the supervision of Noah Porter, LL.D., ex-president of Yale College, and contains many additions and changes,

made with the primary object of incorporating the new words and meanings of recent origin, especially in the departments of science and technology.

It remains to notice a work "which does greater honor to American scholarship than any other work ever published in the combined fields of sacred and classical learning," *A Greek Lexicon of the Roman and Byzantine Periods*, by Evangelinus Apostolides Sophocles, LL.D., of which a limited edition was printed in 1870 by the munificence of a few wealthy gentlemen, and a memorial edition edited by Prof. C. H. Thayer in 1887. Professor Sophocles was a native Greek, educated at the convent on Mount Sinai, a profound scholar who gave the best years of his life to Harvard University.

DICTIONARY, Biographical. See Vol. XXIII.

DICYNODONS, extinct reptiles, of the order *Anomodontia*, nearly allied to the ancestral stock from which mammals descended. R.W.C.

DIDACHE or TEACHING OF THE TWELVE APOSTLES. See Apostles, Teaching of the Twelve, in these Supplements.

DIDELPHIA. See Mammalia, Vol. XV, pp. 373, 374.

DIDIUS, Salvius Julianus. See Severus, Vol. XXI, p. 732.

DIDON, Henri, Abbé, a French priest and author; born at Thouvet, Isere, March 17, 1840; educated at Grenoble Seminary, and a disciple of Lacordaire; became a member of the Dominicans in 1862. Having visited Rome, he returned in 1868 and commenced preaching with great effect in Paris and other cities of France. In 1871 he delivered the funeral sermon at Nancy on Monseigneur Darboy. His first book was *Man According to Science and Faith*, and his first printed sermon, *What is a Monk?* In consequence of some startling sermons in 1879, dealing with the church and society, he was sent into temporary seclusion in the monastery of Carbara, in Corsica. A subsequent visit to Germany and the Holy Land furnished him with themes for *The Germans*, in which he pointed out that theory and practice have nothing in common in the Fatherland; and for *La Vie de Jesus* (1891), opposing the views of Renan, which had an immense circulation and was translated into English. Died March 13, 1900.

DIDYMIUM. See Chemistry, Vol. V, p. 470.

DIDYMUS, a famous Alexandrian grammarian. He flourished during the Augustan Age, and is said to have compiled about 3,500 writings, for which fact he was surnamed "Chalkenteros." He devoted himself chiefly to critical expounding of the works of the older Greek poets and prosaists, foremost, however, to revising of the Homeric text, carried out by Aristarchus. A greater part of the *scholiæ*, *i. e.*, annotations to Greek authors, handed down to the present time, are derived from his pen. G.A.S.

DIEFENBACH, Lorenz, a German philologist and ethnologist; born at Ostheim, Hesse, July 29, 1806; studied theology and philosophy at Giessen, and music and modern languages at Frankfort-on-the-Main. He traveled much, and devoted himself to pastoral work for twelve years. In 1848 he settled at Frankfort, and died there March 28, 1883. His literary industry was enormous, as well in the line of poetry and romance as in the heavy and learned works which have placed him among great scholars. He published, among other works, *Celtica* (1839–41); *Gedichte* (1840); *Lexicon Comparativum Linguarum Indo-Germanicarum* (1846–51); and *Glossarium Latinum Germanicum Mediæ et Infimæ Ætatis* (1857).

DIEFFENBACH, Johann Friedrich, a German surgeon; born Feb. 1, 1795, at Königsberg, studied theology at Rostock and Greifwalde, served in the campaigns of 1813–15, after which he devoted himself to the study of medicine and surgery at Königsberg. In 1830 he became surgeon at the Berlin Charité, and, in 1832, professor and director of the surgical clinic. He died Nov. 11, 1847. Besides simplifying the technics of surgery, he improved on many old methods of operating and introduced many new ones in the fields of operative, plastic, and restoring surgery, such as in the forming of artificial noses, lips, eye-brows, and cheeks, the cutting of muscles in cases of squinting and stammering. He wrote *Chirurgische Erfahrungen* (4 vols., 1829–34); *Ueber die Durchschneidung der Sehnen und Muskeln* (1841); *Die Heilung des Stotterns* (1841); *Die Operative Chirurgie* (2 vols., 1844–48), and his principal work, *Der Æther gegen den Schmerz* (1847). G.A.S.

DIEGO-SUAREZ BAY. See Madagascar, Vol. XV, p. 169.

DIEL DU PARQUET, Jacques, a French colonizer and colonial governor; died at St. Pierre, Martinique. Jan. 3, 1658. The date of his birth is unknown. He was a nephew of Pierre d'Enambuc, the colonizer of St. Christopher and Martinique, who, in December, 1638, gave him an appointment as commandant of the latter island, which was quickly confirmed by the French "Company of the American Islands." He was made lieutenant-general and seneschal, and received a grant of thirty pounds of tobacco for each inhabitant. As governor of Martinique he was beset with many difficulties, but confronted them with wisdom and vigor; introduced the culture of the sugar-cane in 1639, and by 1642 had led his people far in the direction of general prosperity, when the island was devastated by a terrible hurricane. In June, 1650, he purchased the island of Grenada from a Carib chief for a few necklaces and casks of brandy, and distributed the lands among his colonists. The vendors, soon repenting of their bargain, made an attack, and were nearly exterminated in the slaughter which ensued. In September of that year he purchased Grenada and its adjacent islets, and also Martinique and St. Lucia from the French government. In 1654, some Hollanders, expelled from Portugal, came from Brazil and desired to join his colony, but by the influence of the Jesuits, who had been there since 1640, were repelled. The same year the Caribs, under the lead of a half-breed, attempted to exterminate the French. Parquet afterward lost St. Lucia, in a sudden attack by the English. Grenada was several times ravaged by the Caribs, and as the French made reprisals, the is-

land became a scene of fire and carnage. In 1656 he was surrounded and beset, when a Dutch fleet arrived, by whose aid he put the savages to flight; and in 1657 they made submission.

DIELECTRIC. See ELECTRICITY, Vol. VIII, p. 34; also ELECTRICITY, § 7, in these Supplements.

DIELMAN, FREDERICK, a German-American artist; born in Hanover, Germany, December 25, 1847. He removed to the United States in 1859 and was graduated from Calvert College, Baltimore, in 1864. From 1866 to 1872 he served as a topographer and draughtsman of United States Engineers in Fortress Monroe and Baltimore, and in the survey of canal routes over the Alleghanies. He then studied art under Diez in the Royal Academy, Munich, and afterwards opened a studio in New York city. He has contributed largely to *editions de luxe* of Longfellow, Hawthorne, and other writers. His works include, *The Patrician Lady* (1877); *Young Gamblers* (1885), and *A Head* (1886). He was made an academician in 1883. W.M.C.

DIES IRÆ, a famous Latin hymn on the Day of Judgment, beginning with the lines:

Dies iræ, dies illa,
Solvet sæclum in favilla,
Teste David cum Sibylla!

It consists of seventeen stanzas of three rhyming lines each, and a final stanza of four lines. Its inspiration is evidently drawn from the Prophecy of Zephaniah, Chap. I, verses 14–18, and although it is written in mediæval and not classic Latin, the supreme awfulness of its theme, the mingled majesty and piety of its sentiments, and the stately sonority of its verbiage, all mark it as an unsurpassed masterpiece. The very form of the stanzas, and the use of the triple rhymes, give it a technical effectiveness almost unrivaled in literature. Each stanza, said Guericke, makes the soul tremble as with three blows of a hammer. The authorship of the hymn has been much disputed, but it was probably written by Thomas de Celano, a disciple of St. Francis of Assisi, who was born at Celano in the Abruzzi, spent the years 1221–28 in the Rhineland, and died in 1255. The date of its composition is unknown, but its first known appearance in manuscript was in a missal at Venice in 1250. Since the Council of Trent it has been one of the five "sequences" universally used in the Roman Catholic Church, its place being in the Mass in Memory of All the Faithful Dead. Some of the greatest musicians, including Palestrina, Haydn, Cherubini and Mozart, composed special music for it, and innumerable translators have rendered it into English and other modern tongues. Scott paraphrased ts opening stanzas in Canto VI of his *Lay of the Last Minstrel*, and Crashaw, Sylvester, Macaulay, Drummond of Hawthornden, Trench, Dean Stanley, Duffield, Dix and many others have produced translations, some of them of much merit, though none equaling the majesty of the inspired original. W.F.J.

DIESKAU, JOHN ERDMAN, BARON, a soldier of Saxony who served under Marshal Saxe, and afterward at the head of French troops in Canada; born in 1701; died in Surenne, France, Sept. 8, 1767. He was a major-general in the French service, when, in 1755, with about a thousand French and Indians, he entered Lake Champlain to attack Fort Edward, and surprised and defeated the New England troops, under Colonel Williams, sent to oppose him. In the pursuit which followed the victory, his Indians failed him and a desperate conflict with the British ensued, in which, after losing all his men and being severely wounded, he was made a prisoner. After being exchanged in 1763, he returned to France, where he received a pension for meritorious services, and eventually died of his wounds.

DIESTERWEG, FRIEDRICH ADOLPH WILHELM, a German educator; born Oct. 29, 1790, at Siegen, Prussia; died at Berlin, July 7, 1866; studied philosophy, mathematics and history at Tübingen and elsewhere, and settled at Mannheim as private teacher. He became second professor in the secondary school at Worms in 1811; professor in the "Model" school at Frankfort-on-the-Main in 1813; principal of the Latin school at Elberfeld in the same year, and in 1820 director of the normal school at Moers. In 1832 he was called to be superintendent of education in the city schools of Berlin. For political reasons he was partially relieved of these duties in 1847, and wholly retired in 1850, but devoted himself to the cause of education during the remainder of his life. In 1858 he was elected to the Landtag. He early adopted the theories of Pestalozzi, whose life he published in 1846; and the building up of common schools and the training of teachers were his chosen work. He was the author of many schoolbooks, chiefly relating to geometry and algebra, and of *Inspection*; *Stellung und Wesen der Neuen Volkschule* (1846); *Praktischer Lehrgang für den Unterricht in der Deutschen Sprache* (1845); and other publications.

DIET. See DIETETICS, Vol. VII, pp. 174–185.

DIETERICI, FRIEDRICH HEINRICH, a German Oriental scholar; born in Berlin, July 6, 1821; studied at Halle and Berlin, and after publishing a Persian poem, *Mutanabbi et Serfeddaula* (1847), visited Cairo, where he studied Arabic at the school of a sheik; then traveled through Upper Egypt, Mt. Sinai and Palestine, and returned by way of Constantinople, Athens and Trieste. In October, 1850, he was made assistant professor at Berlin, and in March, 1852, interpreter of the embassy from London to Constantinople. In 1851 he published an edition of the Arabic text, of Alfiyyah, and a grammar in Arabic text, with the commentary of Ibn Akie, and afterward published *Anthropology of the Arabs*, and many other works concerning the Arabian people and literature. Died Aug. 19, 1903.

DIETRICH OF BERNE, a name given to Theodoric the Great in the ancient heroic poems of Germany, in many of which he is a central and principal figure. Berne signifies Verona, his capital. *Alphart's Tod; Dietrich's Ahnen;* and *Dietrich's Flucht*, are the titles of some of the poems. He figures in the *Niebelungenlied.*

DIETRICHSON, LORENTZ HENRIK SEGELCKE, a

Norwegian poet and critic; born at Bergen, Jan. 1, 1834; passed a portion of his youth in traveling; settled in Sweden in 1859; became docent at the University of Upsala in 1861; amanuensis at the National Museum in 1866; art teacher at Stockholm in 1868; and teacher in the Manual Training School in 1870. In 1875 he was made professor of the history of the fine arts at Christiania. His works, chiefly on art-history, are written some in the Swedish language, some in the Norwegian, the best known being *Outlines of the History of Norsk Poetry* (1866).

DIEULAFOY, Auguste Marcel, a French archæologist; born Aug. 3, 1844; noted for his important discoveries in Persia in 1881 and 1885, and for his splendid works *L'Art Antique de la Perse* (1884–89); and *L'Acropole de Suse* (1890–93). His wife, Jeanne, who accompanied him in his travels, published *La Perse, la Chaldée et la Susiane* (1886), and *A Suse* (1888). G.A.S.

DIFFERENCE-ENGINE. See Calculating-machines, Vol. IV, pp. 580, 581.

DIFFERENTIAL. See Infinitesimal Calculus, Vol. XIII, p. 14.

DIFFERENTIAL THERMOMETER, a thermometer consisting of two air-bulbs connected by a bent tube, partly filled with a colored liquid, the position of the column of liquid indicating the difference of temperature between the two bulbs. When exposing one bulb to heat, the expansion of the air forces the liquid down, causing it to rise in the other tube. W.R.B.

DIFFERENTIATION, of molecules. See Atoms, Vol. III, pp. 40, 41. In biology. See Biology, Vol. III, pp. 590, 591.

DIFFRACTION. See Wave Theory, Vol. XXIV, p. 479.

DIFFUSION. See Chemistry, in these Supplements.

DIGAMMA, an obsolete letter of the Greek alphabet, resembling the English F, and equivalent in sound to the English *w*.

DIGBY, a seaport town, county seat of Digby County, western Nova Scotia, situated on an inlet of the Bay of Fundy. Ship-building is carried on, and large quantities of herring and mackerel are exported. Population, 1901, 1,150.

DIGBY, George, Second Earl of Bristol; was born in October, 1612. He was a brilliant student and wrote many controversial letters to Sir Kenelm Digby on religion. In 1640 he entered Parliament, and in 1641 succeeded his father in the House of Lords. His course was shifty and he was impeached of high treason in 1642, but never tried. In the civil war he fought for the king, and afterward entered the French army and that of Spain. Upon the Stuart restoration he returned to England, had a stormy career, and died on March 20, 1677. W.F.J.

DIGBY, Kenelm Henry, an English author; born in 1800, was the youngest son of the dean of Clonfert. Having entered Trinity College, Cambridge, he took his B.A. in 1819, and three years later published the *Broad Stone of Honor*, "that noble manual for gentlemen," as Julius Hare called it; "that volume which, had I a son, I would place in his hands, charging him, though such admonition would be needless, to love it next to his Bible." It was much altered and enlarged in the 1828 and subsequent editions (the latest 1877), its author having in the meantime turned Catholic. He died in London, where most of his long life was spent, March 22, 1880. Of 14 other works (32 vols., 1831–74) the last eight were poetry.

DIGEST. See Justinian, Vol. XIII, pp. 802–804.

DIGESTER, Papin's Steam. See Papin, Vol. XVIII, p. 232.

DIGGES, Leonard, mathematician and meteorologist, was a gentleman of Kent, England; born about the year 1500, and educated at Oxford. He devoted his attention to mathematics and the practical application of the science, and was the author of *Tectonicum*, a treatise on superficial and solid measurements. He also paid much attention to astronomy and meteorology, and wrote a curious work on the prognostication of the weather by observation of the sun, moon and stars. Most of his life was spent in retirement and study at his home in Kent, where he died in 1574. W.F.J.

DIGGES, Thomas, son of Leonard Digges, (q. v., supra); was born about 1530; was educated at Oxford, and had a military career. He excelled as a mathematician, and wrote a treatise on the application of that science to military operations. He also wrote a book on the science of numbers so far as it was necessary to be understood by a soldier. He died in 1595. W.F.J.

DIGGES, Edward, son of Sir Dudley; born in England, 1620; died in Virginia, March 15, 1675; a resident of Virginia; employed Armenians to introduce the culture of the silk-worm in the valley of the James River, and was governor of Virginia during a portion of the year 1655. He then went to England to adjust a controversy between that colony and Lord Baltimore.

DIGGES, Dudley, another son of Sir Dudley, born 1612; died 1643; was the author of a treatise on the *Illegality of Subjects Taking Arms against Their Sovereign*.

DIGGES, Sir Dudley, eldest son of Thomas; born 1583; died 1639; educated at Oxford; an accomplished politician and elegant writer; is chiefly remembered for *The Compleat Ambassador*, a collection of letters between the ministers of Queen Elizabeth respecting her projected marriage with the Duc d'Anjou, published in 1655, after his death. In 1610 he appears as a friend of the navigator, Hendrik Hudson, contributing money to equip his fleet. In 1618 he was ambassador at Rome; 1621, member of Parliament; 1630, Master of the Rolls, and in 1631, one of a committee appointed to consider Virginian affairs.

DIGHTON ROCK, a mass of granite weighing nearly ten tons, with dimensions about six by eleven feet, and rising four feet above the ground, lying just above the water on the east bank of Taunton River, in the town of Berkeley, Bristol County, Massachusetts. Its front is deeply cut with mysterious characters, which have apparently undergone no change

since first observed from the deck of a passing vessel by the early colonists. The rock is mentioned, with drawings of the inscription, in a letter from Cambridge to Sir Hans Sloane, dated Dec. 18, 1730, which is now in the British Museum; and it is also described by Edward A. Kendall in his *Travels Through the Northern Parts of the United States in 1807–08*. Many antiquarians believe that it is a runic inscription left by the Norsemen under Thorfinn, to record their visit to America, A.D. 1008. It was purchased, with the surrounding land, in 1857, for Ole Bull, the Norwegian violionist, and after his death was presented to the Royal Society of Antiquaries of Copenhagen, by whom it was, in 1890, ceded to the Old Colony Historical Society of Taunton, Massachusetts. J. J. Worsae, the eminent antiquarian of Stockholm, denies that the inscriptions are Runic or Norsk, and seems to favor the Indian tradition that it commemorates the massacre of some white men who arrived in a ship many years ago, and who, after seizing some of the natives as hostages, incautiously went ashore to a spring for water, and were overpowered.

DIGITIGRADA. See MAMMALIA, Vol. XV, pp. 362, 440.

DIHONG OR SANPO, Tibet, the principal feeder of the Brahmaputra River flowing from Lake Manasarowar on the northern slope of the Himalayan Mountains and after an easterly course of about 1,000 miles bending southwestward through a mountain-pass to Sadiya, Assam, whence it becomes the Brahmaputra. C.L.S.

DIJON MUSTARD. The celebrated Dijon mustard is worthy of note as a manufacture. Its peculiar quality is a certain piquancy not found in any other mustard. The seed is always sown on cleared charcoal-beds in forests, and the soil gives one peculiar flavor to the mustard; another flavor is differently accounted for. The mustard, when in powder, is mixed with the juice of new wine, lending that pleasant acidity with which we are familiar. But to obtain precisely the degree of acidity, it is necessary that the grape be always in precisely the same state of unripeness, a degree more or less making all the difference.

DIKE, SAMUEL WARREN, an American sociologist; born in Thompson, Connecticut, February 13, 1839. He was graduated from Williams College in 1863 and from Andover Theological Seminary in 1866. He was ordained as a Congregational minister in 1867 and held pastorates for 15 years. He was the founder of the Divorce Reform League later known as the National League for the Protection of the Family and has been its corresponding secretary from its organization. He has written numerous papers on marriage and divorce and prepared a statistical report upon these subjects for the Bureau of Statistics. W.M.C.

DIKE OR DYKE, in engineering. See HOLLAND, Vol. XII, p. 62. In geology, see GEOLOGY, Vol. X, p. 276.

DILATOMETER, an instrument for determining the expansion of liquids. The ordinary form consists of a globe bearing a graduated tube. If petroleum is to be tested, several dilatometers may be filled and immersed at once in an oil bath, the oil being heated and maintained at a certain temperature for at least fifteen minutes. At the end of this time the lid of the bath is raised and the increase in the volume of the oil in the tube is read like the mercury in a thermometer. The tube of the dilatometer is quite small, and in order to fill it, an air-pump has to be used to exhaust the oil, a very fine flexible tube being inserted for that purpose. All bubbles have to be carefully removed, and the tube must be cleaned by careful wiping. After use, the dilatometer may be emptied by a reverse process, air being blown in, followed by ether, to completely cleanse the apparatus.

C. H. COCHRANE.

DILETTANTE, an Italian expression for a lover of the arts and sciences, who devotes his leisure to them as a means of amusement and gratification. In 1734 a number of gentlemen formed in London a "Dilettanti Society," which published a splendid work on *Ionian Antiquities* (1769–1840); and *Specimens of Ancient Sculpture, Egyptian, Etruscan, Greek and Roman* (1809–35), *The Temples of Ægina and Bassæ* (1860); etc.

DILKE, SIR CHARLES WENTWORTH, an English politician and author, was born at Chelsea, London, Sept. 4, 1843; a grandson of Charles Wentworth Dilke, proprietor and editor of *The Athenæum*, whose *Papers of a Critic* Sir Charles edited in 1875, and son of Sir C. W. Dilke, one of the active originators of the great exhibition of 1851, and British commissioner to the New York Industrial Exhibition of 1853. Sir Charles was educated at Cambridge, where he graduated as "senior legalist" in 1866, and in the same year was called to the bar. During 1866–67 he made a tour of English-speaking and English-governing countries, including the United States, Canada, Australia, New Zealand and India, the results of which appeared in a cleverly written record of travel, under the title of *Greater Britain*. This work, which met with instant and signal success, treated the new subject of the influence of race on government, and of climatic conditions upon race, and won praise for its author as an acute and highly intelligent observer on imperial and colonial questions. In 1868 he entered Parliament as member for Chelsea. A doctrinaire Radical in politics, in 1871 he was attacked for holding republican opinions when he avowed his preference for a republican form of government to a constitutional monarchy. Despite this fact, he held office under the crown, being Under-Secretary of State for Foreign Affairs, and president of the Local Government Board, with a seat in Mr. Gladstone's Cabinet.

SIR CHARLES DILKE.

In 1881–82 he was chairman of the royal commission for the negotiation of a commercial treaty with France. In 1885 he carried the Diseases Prevention Act through Parliament. He was also concerned with legislation creating the metropolitan school boards, directly elected by the rate-payers, and for conferring the municipal franchise on women. In 1885, in consequence of the disgraceful exposure of the Crawford divorce case, in which he was named as a co-respondent, he was defeated in a contest for a Parliamentary seat in Chelsea, and began to devote himself more to literary work and travel, and to the study of questions bearing upon the European and colonial policy of Britain, her military strength, the imperial defenses, etc. His chief publications, besides *Greater Britain*, already noted, are an anonymously published satire, entitled *The Fall of Prince Florestan of Monaco* (1874); *Two Recess Speeches* (1876); *The Eastern Question* (1878); *Parliamentary Reform* (1879); *The Present Position of European Politics* (1878); *The British Army* (1888); *The Problems of Greater Britain* (1890); and, conjointly with Spencer Wilkinson, a volume entitled, *Imperial Defence* (1891). In 1892 he was returned to the House of Commons as member for the Forest of Dean, Gloucestershire. In 1885 he married Mrs. Mark Pattison, widow of the late rector of Lincoln College, Oxford, herself a writer and author of several clever stories.

DILKE, Emilia F., an English authoress; born at Oxford in 1840; married the Rev. Mark Pattison, rector of Lincoln College there, in 1862, and after his death 1884, married, in 1885, Sir Charles W. Dilke. During many years she wrote the art criticisms in the *Athenæum*, and the articles on Italy and France in the *Annual Register*. She also wrote on trades unions for women, in the *Fortnightly Review* and in the *New Review*. Her *Life and Works of Claude Lorraine* (1879) shows a judicious and appreciative critical talent; and in *The Renaissance of Art in France* (1879) she treats with thoroughness a most difficult period of French art. Among her other works are *The Shrine of Death* (1866); and *Art in the Modern State* (1888). Died October 24, 1904.

DILLMANN, Christian Friedrich August, a German theologian and Orientalist; born at Illingen, Würtemberg, April 25, 1823; died July 4, 1894; educated at Stuttgart, Schönthal and Tübingen; became a parish vicar at Tersheim in 1845; made researches among the libraries of Paris, London and Oxford in 1846–48; filled various posts of honor at the universities of Tübingen, Giessen and Kiel; edited a number of catalogues of Oriental and Ethiopic manuscripts; translated and explained the *Book of Enoch* (1853); published a *Grammar of the Ethiopic Language* (1857), and a lexicon of the same (1865); and undertook an edition of the Old Testament in that language. In 1869 he resigned his chair at Giessen to become the successor of Hengstenberg, at Berlin. The author of numerous works on Ethiopic themes, he was unquestionably the first authority in Europe on those languages. He possessed a magnificent Oriental library of 5,000 volumes, which has been acquired by the Johns Hopkins University, at Baltimore.

DILLON, a city and the capital of Beaver Head County, southwestern Montana, 100 miles S.S.W. of Helena, on the Beaverhead River, and on the Union Pacific railroad. It is a shipping-point for the country for 15 miles about, exporting ore, wool, cattle, sheep and farm products. Population 1900, 1,530.

DILLON, John, an Irish politician, son of John Blake Dillon; born in Blackrock, County Dublin, in 1851; educated at the Catholic University of Dublin; entered Parliament for Tipperary, 1880; became an active supporter of Mr. Parnell, and was the first on the list when, Feb. 2, 1881, the entire Parnell party was suspended. He resigned in 1883; was elected for East Mayo in 1885, and again in 1886. He was twice imprisoned under the Coercion Act of 1881, and in 1886, while executing the "plan of campaign," was arrested at Loughrea and bound over to keep the peace. In 1888 he was sentenced to six months' imprisonment in Tullamore jail. He afterward traveled in Australia; returned in 1890, and was arrested on a political charge, forfeited his bail, escaped with William O'Brien to Cherbourg and thence went to the United States, where he was received by the friends of Mr. Parnell. He surrendered in 1891, and, after a brief imprisonment, declared in favor of Parnell's retirement from the leadership of the Irish party. Later he reëntered Parliament, and on the resignation of Justin McCarthy, in Jan., 1896, he was elected leader of the Anti-Parnellites, and was reëlected in 1897, 1898, and 1899.

JOHN DILLON.

DILLON, John Forrest, jurist, was born at Northampton, N. Y., on December 25, 1831, removed to Iowa, and became a lawyer. He was made prosecuting attorney in 1852, district judge in 1858, and judge of the supreme court of the State in 1863, being re-elected in 1869. He became professor of real estate and equity jurisprudence in Columbia University in 1879, resigning in 1882. He is a member of the Institute de Droit International, and is the author of numerous works on law. W.F.J.

DILUVIUM, distinguished from alluvium. See Alluvium, Vol. I, p. 518.

DIMINUTIVES, in grammar, words having a special affix expressive of littleness, or of the ideas of tenderness, affection, contempt, etc., commonly associated therewith. In English, the terminations *-kin*, *-ling*, and *-et*, as in napkin, gosling, and pocket, are examples of common diminutives.

DIMITY, a heavy, fine, white cotton fabric with a crimped or ridged surface; plain, striped, or cross-barred. The term is derived from the Greek *dimitos* (made with a double thread). The Greek cloth is believed to have been a kind of twilled goods. Modern dimity is used for women's dresses and in fancy draperies.

DIMORPHISM, in botany, is a term expressing

the fact that a plant produces two forms of flowers related to each other in the work of pollination, frequently called *heterostylism*, as it involves reciprocal lengths of styles and stamens. In one form of flower the style is short and the stamens are long; in the other, the style is long and the stamens are short; but the long styles correspond in position to the long stamens, and the short styles to the short stamens. An insect visiting one of these flowers will receive pollen upon that portion of its body which will brush against the stigma of its own length in the reciprocal flower. It is found that if pollen from a short stamen be placed upon the stigma of a long style, or *vice versâ*, it will be completely ineffective, or, in any event, not nearly so effective as the pollen upon a stigma of its own length. In this way, close-pollination is practically prevented, and cross-pollination necessitated. As examples of dimorphic or heterostylic flowers, species of *Houstonia*, *Primula*, *Linum*, and *Polygonum* may be cited. This relationship is still more complex in *trimorphic* flowers, such as species of *Oxalis*, *Lythrum*, *Salicaria*, etc., in which there are reciprocal stamens and styles of three lengths, and hence three forms of flowers.

The term *dimorphism* has also a wider application, and is sometimes made to include a condition in which two forms of flowers are produced, but which do not involve heterostylism. For example, in the cases of *cleistogamous* flowers, these apparently abortive but really very productive flowers are formed in addition to the ordinary more showy flowers of the plant, which thus has flowers of two forms, and may be said to be dimorphic as to its flowers. A still wider application of the term makes it include all those plants in which the phenomenon of alternation of generations appears. Such plants—and they include all plants but the lower Thallophytes—have two alternating forms of plant body, the *gametophyte* and the *sporophyte*, and hence may well be called dimorphic. See SEX, Vol. XXI, p. 757. J. M. COULTER.

DIMORPHITE, a mineral. See MINERALOGY, Vol. XVI, p. 410.

DIMSDALE, THOMAS, physician; was born in England in 1712, and was one of the foremost practitioners of inoculation for the prevention of smallpox. He made two journeys to Russia, in 1768 and 1784, for the purpose of inoculating the Empress Catherine and other great personages, and was the author of several books explaining and advocating that practice. He was a member of the House of Commons, for Hertfordshire, in two Parliaments. He died in England in 1800. W.F.J.

DINARIC ALPS, a mountain range of Austria, connecting Mount Kleck at the southeast extremity of the Julian Alps with the western extremity of the Balkan range. It runs from northwest to southeast, through Croatia, forming the eastern frontier of Dalmatia, while a western branch covers much of that country. One of its highest peaks, Mount Dinara (6,010 feet), so called from the Celtic *Din*, or *Dinas*, a fortified height, gives name to the range. See also ALPS, Vol. I, p. 547.

DINDINGS. See STRAITS SETTLEMENTS, **Vol.** XXII, pp. 615, 616.

DINDORF, WILHELM, a German philologist, whose scholarship combined elegant taste with profound learning; born Jan. 2, 1802, at Leipsic, where his father was professor of Oriental languages; entered the university at 15, and by his acquirements soon gained the friendship of many distinguished scholars. He was appointed custodian of the Royal Library at Berlin in 1827, and professor of literary history at Leipsic in 1828, but resigned in 1833 to devote himself wholly to literary work. With L. and M. Hase he reëdited the *Thesaurus* of Stephen; and afterward edited *Demosthenes*, *Æschylus*, and other Greek authors for the University of Oxford, and many volumes in Didot's Paris *Library of the Greek Classics*. He died at Leipsic, Aug. 1, 1883.

DINGELSTEDT, FRANZ VON, a German poet; born June 30, 1814, at Halsdorf, became librarian at Stuttgart in 1843, director of theatre at Weimar in 1857, director of the Vienna Imperial Theatre in 1867, and of the Vienna Hofburg Theatre in 1871. He died at Vienna, May 15, 1881. G.A.S.

DINGLEY, NELSON, JR., statesman; was born at Durham, Maine, on February 15, 1832, and was graduated from Dartmouth College in 1855. The next year he purchased the weekly *Journal* of Lewiston, Maine, and became its editor. In 1865 he added a daily edition, and made it one of the leading Republican papers of the state. He was a member of the state legislature in 1862–65, 1868, and 1873, being speaker of the House in 1863–64, and in 1874–76 he was governor of Maine. He was elected to Congress in 1881 at a special election to fill a vacancy, and was re-elected successively for the remainder of his life. He paid particular attention to national legislation affecting shipping, currency, and the tariff, and was the author of the so-called Dingley tariff law of 1898. He died on January 13, 1899, universally esteemed. W.F.J.

DINGO, a wild dog of Australia. See DOG, VII.

DINGRAS, a town in the province of Ilocos Norte, Luzon, Philippines. Pop., 1903, 15,792.

DINICHTHYS HERZERI. See OHIO, XVII.

DINKA, an African race. See AFRICA, XXV, 67.

DINOMYIDÆ. See MAMMALIA, Vol. XV, p. 426.

DINOSAURIA. See REPTILES, Vol. XX, p. 455.

DINSMOOR, ROBERT, poet, was born at Windnam, N. H., on October 7, 1757, and was self-educated. He became a farmer, and a rustic poet. He died on March 16, 1836. W.F.J.

DINWIDDIE, ROBERT, a British colonial governor; born in Scotland in 1690. In 1752 he was appointed lieutenant-governor of Virginia, after having served some years as collector of customs for the British government in the West Indies, where he detected and exposed enormous frauds. As a reward for his disclosures he was given the Virginia appointment. During his official career from 1752 to 1758 he recommended the annexation of the Ohio valley and the erection of forts to secure the Western frontier against the French. He was one of the most earnest supporters of the French and Indian War, which

began about 1753 and continued for 10 years. While he was governor he was charged with applying to his own use $100,000 sent to defray the expenses of Virginia for the public service. It was during his administration that Braddock proceeded on his expedition against the Indians. He died in Clifton, England, August 1, 1770. W.M.C.

DIOCLETIAN ERA. See CHRONOLOGY, Vol. V, p. 621.

DIODATI, CHARLES, nephew of Giovanni Diodati (q. v.), was born in 1608, was educated at Oxford, practiced medicine, was a close friend of Milton, and died in 1638. W.F.J.

DIODATI, GIOVANNI, was born at Geneva, Switzerland, on June 6, 1576, became a follower of Calvin, and was professor of Hebrew in the Geneva University, professor of theology in succession to Beza, and pastor of a Reformed church. He died at Geneva on October 3, 1649. W.F.J.

DIODON. See GLOBE-FISH, Vol. X, p. 611.

DIOMEDE ISLANDS. See BEHRING'S STRAIT, Vol. III, p. 440.

DIONÆA. See INSECTIVOROUS PLANTS, Vol. XIII, p. 142.

DIONYSIUS, SAINT. See DENIS, Vol. VII, p. 70.

DIONYSIUS THRAX, a classic author, a native of Thrace, who taught rhetoric at Rome about 75 B.C. See GRAMMAR, Vol. XI, pp. 34, 39.

DIOPHANTUS. See ALGEBRA, Vol. I, p. 451.

DIOPTRIC SYSTEM. See LIGHTHOUSE, Vol. XIV, pp. 624–628, 636.

DIORAMA, an exhibition invented by Daguerre in 1822, and given in London and Paris, in which a combination of both transmitted and reflected light was used to show large colored pictures to an assembly of spectators. See DAGUERRE, Vol. VI.

DIORITE ROCK. See GEOLOGY, Vol. X, 209.

DIPLACANTHUS, a genus of fossil ganoid fishes peculiar to the Old Red Sandstone, in which six species have been found. The body was covered with very small scales, and the tail was heterocercal. There were two dorsal fins, which, with each of the other fins, were furnished with a strong spine in front, the base of which was simply imbedded in the flesh, as in the dogfish, and not articulated, as in the siluroids. The head was large and the mouth wide and opening obliquely.

DIPLOGRAPTUS, a genus of fossil hydroids (*Cœlenterates*) belonging to the Graptolites. The colong consisted of a stalk with a double row of hydranths. It resembled the well-known sertularians. The fossils are from the Silurian shales.

DIPLOMATIC AGENTS, functionaries commissioned to represent one state at the capital of another, or to negotiate with that other state concerning national affairs. Ancient Greece, Rome, Persia, etc., used political agents to discuss their national affairs; but, as the civilized world was then often confined within the limits of a single empire, the science of diplomacy, as known in modern times, did not exist; and the diplomatic agent of the present day is the product of a policy of statecraft which was initiated in the sixteenth century.

Ambassadors were the original diplomatic agents of modern civilized nations, but as they were supposed to represent the person of their sovereign, the execution of their business was often retarded by ceremonious formalities. To avoid this disadvantage, agents were appointed under the name of *resident ministers;* and it was these "envoys of the second degree" who were first intrusted with permanent missions at foreign courts. In the sixteenth century their duties involved deceit, trickery, and espionage into the secrets of the nation to which they were accredited, in order to serve the personal schemes of their sovereign. But by the eighteenth century three classes of diplomatic agents had been developed: ministers plenipotentiary, resident ministers, and *chargés d'affaires.* (See AMBASSADOR, Vol. I, pp. 577–579, and Vol. XXV, p. 155.

To these classes was added in 1818, by the protocol of Aix-la-Chapelle, that of "ministers resident," who rank between envoys and *chargés d'affaires.* These are accredited from one sovereign to another; but the *chargés d'affaires* receive credentials from the minister of foreign affairs of their own country, addressed to a similar officer of the government to which they are accredited. The foregoing classification omits certain diplomatic agents of irregular status, such as semi-official agents sent by non-recognized governments. Such agents are not members of the diplomatic corps. It also omits commissioners to fix boundaries or adjust claims; also great personages, charged with important missions, who desire to avoid useless ceremonies without sacrificing their rank and position.

Diplomatic agents are exempt from arrest, and, generally speaking, from the jurisdiction of the courts of the country to which they are accredited; and straightforward honesty in their intercourse with the government of that country, and non-intervention in its internal affairs, are necessarily required of them.

Consuls, who are government agents sent abroad to facilitate commercial intercourse between their own country and the city or port to which they are sent, are sometimes intrusted with certain duties which carry the title of diplomatic agent, or *chargé d'affaires*, and in such cases they are furnished with a letter of credence to secure recognition of their diplomatic authority, in addition to their commission as consul. The constitution grants to the supreme court of the United States original jurisdiction in all cases affecting diplomatic agents and consuls.

DIPLOPHANTINE ANALYSIS, that section of the theory of unlimited or indeterminate problems which attempts to find rational and commensurable values answering to certain equations between squares and cubes.

DIPNOI. See ICHTHYOLOGY, Vol. XII, p. 725.

DIPPER. See OUSEL, Vol. XVIII, pp. 78, 79.

DIPPING-NEEDLE, a magnetic needle so suspended as to have a free vertical motion. If the vertical plane in which the needle moves is the magnetic meridian, the angle between the needle and a horizontal line is called the dip or inclination of the needle. In theory, there can be no dip at the magnetic equator, but a dip of 90° should be found

at the magnetic pole. From observations with a carefully adjusted dipping-needle Sir J. C. Ross, in 1831, fixed the magnetic pole in Boothia Felix, near lat. 70° N. and long. 96° W., where he found the dip to be 89° 59′, or nearly perpendicular.

DIPSAS, a genus of harmless tree-serpents living in the tropical regions of both hemispheres. The name, signifying thirst, arose from an ancient mith that the animal was driven by an insatiable thirst to inhabit springs, where it awaited an opportunity to bite a victim, and impart a thirst which only death could quench.

DIPTEROCARPUS, a genus of mostly large trees of tropical Asia, which receives its name from the large wings attached to the fruit, and which gives its name to the family (*Dipterocarpaceæ*). These peculiar wings are largely developed sepals. The trees are mostly very large and handsome, with hard wood, and yield an abundant resin. Some of the species are known as "gurjun trees."

DIPTERUS, a genus of fossil ganoid fishes, found in Devonian formations. They approach the lung-fishes (*Dipnoi*) in many points of structure.

DIRECTORY, in French history. See FRANCE, Vol. IX, p. 536.

DIRK-HARTOG ISLAND, an island off the western coast of Australia, lat. 26° S. long. 113° E. With two smaller islands it forms the breast-work of Shark's Bay, one of the most commodious inlets on that coast.

DISABILITY, in law, is the state of being incompetent to perform a legal act, or to hold a certain office. It may be partial or complete, or temporary or permanent; and may be caused by the subject's own volition or act, or be involuntarily imposed upon him by natural conditions or by accident. W.F.J.

DISAPPOINTMENT, CAPE, also called CAPE HANCOCK, is at the southwestern corner of the state of Washington, a part of Pacific County, jutting into the Pacific Ocean at the north side of the mouth of the Columbia River. Fort Canby and the town of Ilwaco are at its base, and a lighthouse stands at its point. The same name is given to the southern extremity of the island of South Georgia, in the South Atlantic Ocean, east of Cape Horn. W.F.J.

DISBARMENT, a term denoting the withdrawal of the status and privileges granted practitioners of the legal profession on their admission to the bar. One invested with the privileges of an attorney, solicitor, counselor-at-law or barrister may be deprived of his rights as such and the exercise of his functions in that capacity by the courts, and they may take this action on their own motion when conduct justifying such action comes under their observation, or the indictment may be presented by other parties, accompanied with evidence to sustain the charges. Gross professional dishonor, persistent contempt of court, taking unwarranted advantage of clients, dishonesty, extortion, or evidences of a weakness or viciousness of character rendering one unfit to be trusted with legal business, singly or collectively, may be taken as sufficient reason for disbarment. The accused must be given an opportunity to be heard in his own defence, either before a selected tribunal or in open court, and has the privilege of producing evidence in his own behalf, examining witnesses and cross-examining as is done under indictments fo. criminal offenses. The penalty which deprives a barrister of his means of livelihood is a severe one and it is only inflicted for grave offenses and when the evidence of guilt is beyond question. The court, in its discretion, may restore the disbarred attorney on satisfactory proofs, indications and promises of proper conduct in the future. A.R.R.

DISCHARGE IN HIGH VACUA AND AT HIGH POTENTIAL. See ELECTRICITY, §§ 94, 95, in these Supplements.

DISCIPLES OF CHRIST. The religious communion known by this title had its origin in the United States and is the youngest of the great Protestant churches, having had its beginning in the early part of the last century. In 1809 Thomas Campbell published what is known as "The Declaration and Address," setting forth certain principles which have since been held and emphasized by the Disciples of Christ. This is generally conceded to be the beginning of this movement, although there were a number of influences at work even earlier that were potent factors. Numerous Christians of different denominations, in different localities and entirely independent of each other, were taking the position that denominationalism was a sin and that Christian people should unite upon the Bible, and the Bible alone, as a basis of faith and conduct, and that all human names should be discarded and the name Christian alone be used by the people of God. North, south, east and west these advocates of Christian union appeared. Thomas Campbell and his son Alexander, the pioneers of the Disciples, were of this number. They began their labors in western Pennsylvania. At this time they were members of the Presbyterian Church. After deciding to take the Bible and the Bible alone as their guide, they changed their views upon the subject of baptism and united with the Baptists. With them they continued to labor until 1827, at which time the Baptists expelled Alexander Campbell from their fellowship, and soon after this they began the organization of independent churches, bearing the name of Churches of Christ, and whose members were known simpy as Christians, or Disciples of Christ. Associated with the Campbells in the early day of the Disciples were Barton W. Stone and Walter Scott. Western Pennsylvania, Virginia, Ohio, Indiana and Kentucky were the states in which these men principally labored. These states, together with Illinois, Missouri, Tennessee, Iowa, Kansas and Texas, contained the numerical strength of the Disciples in 1904.

In the early days, the Disciples of Christ were assailed on every hand and were compelled to contest every inch of ground they gained. As a result they developed a talent for and a love of controversy that did much to aid them in plant-

ing their faith. Among them were found many great debators. Mr. Campbell, in addition to his other numerous duties as teacher, preacher, author and organizer took part in innumerable public discussions. He thus met advocates of almost every phase of thought differing from his own, from the ordinary Evangelical to the Roman Catholic represented by Bishop Purcell, and infidelity as advocated by Robert Owen, of Scotland. This spirit of controversy has largely passed away and in its stead the Disciples of Christ are marked by an intense love for what they regard as "their plea" and marked by an evangelistic spirit. As a result their growth has been quite remarkable and still continues to be so. In 1866 when Mr. Campbell died the Disciples numbered about 240,000. Since then they have made a net gain of about 1,000,000.

In faith, the Disciples hold the great essential truths of Christianity that are common to the Evangelical Churches: such as the inspiration of the Holy Scriptures of both the Old and New Testaments; the divinity of Jesus Christ; the sufficiency of his atonement for sin; the work of the Holy Spirit in convicting the world of sin, of righteousness, and of judgment and His indwelling in the hearts of Christians as comforter and sanctifier; the doctrine of rewards and punishment, including immortality for the faithful and everlasting punishment for the wicked.

The distinctive purpose with which they began their work and which characterizes them to-day is to restore to the church of the living God the unity for which Christ prayed and which was largely realized during the Apostolic age. This they propose to do by returning to the Apostolic faith and practice as set forth in the New Testament. They hold — First. That the word of God is a perfect rule of faith and conduct and that it is a sufficient guide for the people of God without the aid of human creeds. They do not ask for a return to the life of that age, for that was imperfect, but to the teachings of the apostles. Second. That in order to unite the people of God no names should be used for the church, save those that all agree upon. The names used in the Scriptures are satisfactory to all. So they call their churches, Churches of Christ or Christian Churches and themselves Disciples of Christ or Christians. In doing this, they disclaim any desire to monopolize these names, but state their wish to be to share them with all the Christian world. Third. Their creed, if they may be said to have a creed, is that which was demanded by the apostles, viz., Belief in Jesus as the Christ, the Son of God and a personal Savior. This creed they claim is broad enough to include all that the authority of Jesus rests upon and narrow enough to exclude all else and yet it leaves men free to hold whatever private opinion they prefer as to the many dogmas that have vexed the church and divided it. Fourth. The condition of membership among them is (1) faith in the above mentioned creed; (2) repentance, a turning away from sin to God; (3) a public confession of faith; (4) baptism for the remission of sin and as an act of obedience to the divine will. They practice immersion not only because they believe it to be the baptism of the Apostolic age but because it is the only form concerning which there is no controversy and upon which, for that reason, without offence to conscience the churches could unite. Intolerance has nothing to do with this position but a desire to reach a universally acceptable practice, if possible; (5) a consistent moral life directed by the Spirit of God. Fifth. They observe the Lord's Supper every Lord's Day to which they neither invite nor debar Christians of other communions, but all who love and obey the one Master, Jesus, are gladly welcomed if they desire to unite in the commemoration of the sufferings of the Lord.

They are Congregational in government. Each church has complete control of its affairs. As nearly as possible they organize their congregations after the New Testament pattern. Each congregation is governed by a board of deacons and elders. Trustees are added to these in order to comply with the civil law. They have no ecclesiastical authority. All, from the lowliest member to the most distinguished minister, are amenable only to the local congregation in which they hold membership and to the weight of public opinion. They have no heresy trials because they have no tribunal before which such trials may be had. Their missionary interests and other general interests are cared for in conventions to which congregations voluntarily send or withhold delegates. The actions of these conventions are not binding upon any persons, having only advisory power. These conventions are numerous, each state and many smaller districts holding them annually, besides a great national gathering to which many thousands go. These national gatherings elect the boards that control the great missionary interest of the body.

The Disciples early realized the necessity of having an educated ministry. Their first ministers were educated in the colleges of the denominations; but to-day, though less than a century has passed, they have many colleges and universities, numbering twenty-five in all. The first of these was Bethany College in West Virginia, established by Alexander Campbell, he being its president until his death. It was soon followed by many others, the chief of which are Drake University at Des Moines, Iowa; Kentucky University at Lexington, Kentucky; Hiram College, Hiram, O., and Christian College, Waco, Texas. They have Negro schools in Mississippi and Kentucky. The one at Edwards, Miss., being modeled after the Tuskegee Institute. Their colleges are not largely endowed, the total amount being only about $1,690,000. Their college property is valued at $2,123,500. In 1903, there were 831 ministerial students in these colleges. The same year they expended about $250,000 upon education.

The Disciples are but beginning to put forth a literature. The most valuable historical documents being *The Christian Baptist* and *The*

Millennial Harbenger, which were edited by Alexander Campbell from 1823 to time of his death. His debates in book form and class room lectures, together with other volumes from his pen, are considered valuable. *Memoirs of A. Campbell*, by Richardson, is a valuable work. More recent authors of note are Isaac Errett, J. W. McGarvey, J. H. Garrison, Robert Milligan and Herbert L. Willett. The leading papers of to-day are *The Christian Evangelist*, of St. Louis, Mo.; *The Christian Standard*, of Cincinnati, O.; *The Christian Century*, of Chicago, Ill.; and *The Christian Guide*, of Louisville, Ky. *The Missionary Tidings* of Indianapolis, Ind., *The Missionary Intelligencer*, *The American Home Missionary*, and *Business in Christianity* are the missionary papers of worth. Sunday school supplies are published by the Standard Publishing Company of Cincinnati and the Christian Publishing Company of St. Louis, and at Nashville, Tenn.

The missionary work of the Disciples is done by numerous boards, the amount spent in 1903 aggregrating $681,065. The most important of these missionary agencies are The Foreign Christian Missionary Society, of Cincinnati, O., whose income in 1903 was $210,000; the Christian Woman's Board of Missions, of Indianapolis, Ind., income $145,000: and the American Missionary Society of Cincinnati, O., with an income of something over $100,000. They have also a Church Extension Society with headquarters at Kansas City, Mo., which has a trust fund for building churches amounting to about $450,000. The State Societies, of which there are many, also have in trust considerable sums for missionary purposes. The total number of missionaries on the foreign field is about 425. They labor in India, China, Japan, Hawaiian Islands, Philippine Islands, Jamaica, Cuba, Africa and Tibet. The Disciples have colleges in Japan, China and India. The growth of the missionary spirit has been quite marked among the Disciples, the income of the Foreign Society having increased 300 per cent. during the last ten years. They have also a National Benevolent Association with headquarters at St. Louis. They conduct homes for the aged and the orphans. These are located in St. Louis, Mo., Jacksonville, Ill., Cleveland, O., and Aurora, N. Y. They also have a Ministerial Relief Fund that is growing encouragingly.

The growth of the Disciples of Christ has been remarkable. Their first organizations were effected in 1827, and in 1904 they had 10,983 churches and 1,220,841 members, and ranked fourth among the Protestant churches of America. They had 8,855 Bible schools and 850,000 scholars. They had 6,507 ministers.

Many have been the theories offered in striving to account for the rapid and continued progress of the Disciples of Christ. The most natural explanation is that what they hold that is distinctive has proven a popular theory with the American people. As stated above the distinctive purpose is to unite the people of God upon the Bible as an all sufficient guide; thus dispensing with the innumerable divisions in the body of Christ, the Church. That this is a popular plea is proven not only by the fact of the rapid progress of the Disciples, but by the further fact that all denominations to-day are to a greater or less extent influenced by a desire to realize a closer fellowship among God's people of every name and creed, while at the time of the Campbells a more unpopular doctrine could not have been preached.

July, 1904. JOHN G. SLAYTER.

DISCIPLINE, CHURCH. See EXCOMMUNICATION, Vol. VIII, p. 699.

DISCIPLINE, FIRST AND SECOND BOOKS OF. See PRESBYTERIANISM, Vol. XIX, pp. 699, 700.

DISCLAIMER, in law, is a renunciation by which a party renounces or disclaims some right or interest in property. Thus a patentee may renounce a part of his title to a patent, or a party may refuse to accept an estate which has been conveyed to him by deed or in a will. The widow frequently disclaims the interest conveyed to her by her deceased husband's will, for the reason that she prefers to take her dower interest in the property; and trustees may disclaim an estate conveyed to them in trust, when, for any reason, they do not care to execute the trust. In pleading, the term means a renunciation, by a defendant, of all interest in the subject-matter of the dispute or claim.

DISCOBOLI. See LUMP-SUCKER, Vol. XV, p. 66.

DISCO ISLAND. See BAFFIN'S BAY, Vol. III, p. 190.

DISCOVERY, in law, means the disclosure of facts in the knowledge of a defendant, or the production of documents for the use of the party making the demand therefor. Discovery may be had, in chancery proceedings, of matters of use to the complainant in sustaining his claim, and which he is not otherwise able to procure. Frequently, suits solely for discovery are instituted in courts of chancery, as a collateral proceeding to another suit then pending in that or some other court. In courts of chancery, however, relief and discovery may both be obtained in the same suit, thus rendering a supplemental proceeding to a suit in a chancery court for the purpose of discovery usually unnecessary.

DISCOVERY OF TERRITORY, a phrase to express the claim of right by which civilized nations have sought to possess themselves of newly discovered countries. There are many familiar examples of such claims in the history of America, Africa and Polynesia; and England, France, Spain, Portugal and Holland have often vied together in a headlong race to see which nation should first appropriate the inheritance of unsuspecting savages. In the time of Columbus, the pope of Rome gave unhesitating assent to such claims, and undertook to divide among certain favored nations, in advance, the right of acquiring territory by discovery in the unknown portions of the globe. In the present century the Oregon question, between the United States and Great Britain, was a controversy involving the right

of prior discovery, and the occupation of each newly discovered guano island in the Pacific Ocean affords an instance of its practical operation.

DISFRANCHISEMENT, in the ordinary use of the term, means the act of depriving a citizen of the right to vote. This cannot be done by public authorities. Frequently, criminals, or those who have been convicted of crime, are disfranchised by law, but the disability is generally only for a limited time, or is capable of being removed. Disfranchisement, as a legal term, means the act of depriving a member of a corporation of his right of membership by expelling him from the corporation. Corporations which are not for pecuniary profit have the right to expel their members as an incident to their corporate existence, but corporations which are maintained for profit have not this right, except when it is expressly granted by the charter. In any event, however, the right must be exercised only upon just cause, and after ample notice to the member, and opportunity to be heard. The power of disfranchisement can only be exercised by the corporation or society at large, unless the by-laws otherwise expressly provide. The remedy for wrongful expulsion is a writ of *mandamus* against the corporation to effect a restoration of the expelled member to his corporate rights.

DISHONOR, commercially, is the defaulting upon or failure to pay a bill, note or draft when it is due. In such case the endorsers of the note, if there be any, become liable for it, but in order to ensure their legal liability a notice of the default, called Notice of Dishonor, must be served upon them. Such notice may, generally speaking, be given by word of mouth or in writing, in any intelligible form, though in some states certain details of form and in most places limitations of time are prescribed. W.F.J.

DISK, a term of wide application in botany, but generally applied to an outgrowth of the receptacle of a flower, which often appears as a ring between the stamens and pistil, or as a cup more or less investing the pistil. Sometimes it carries up a set of organs, as the stamens, or both petals and stamens, or all the organs except the pistil, resulting in what is known as an *epigynous* flower, or one with an "inferior ovary." When the disk occurs it often functions as a *nectary*, secreting the characteristic nectar of insect-pollinated flowers.

DISPART, in gunnery, is a sight or projection cast upon the muzzle of a gun, and equal in height to half the difference between the diameters of the breech and of the muzzle; its object being to enable the gunner to obtain a line of sight from a cleft in the breech across the top of the dispart which shall be exactly parallel with the axis of the bore.

DISPENSARY, primarily, a room or place where medicines are compounded or dispensed, used to signify the places where medical treatment and medicines are supplied gratuitously, or nearly so, to the poor. In the latter case they serve not only as an outlet for philanthropic impulses, but to diminish the danger of pauperism, by restoring to health and the ability to labor the afflicted poor, and they act as a sanitary restraint for the community in checking incipient epidemics and relieving conditions that would otherwise tend to breed disease. The first recorded distinct dispensary was established in London in 1770, for "the relief of the sick poor, without regard to place of abode." It was an adjunct to St. Bartholomew's Hospital, and received governmental support. Its success led to the formation of similar institutions in other cities of England and the Continent. In England they became subject to Parliamentary regulation in 1805. The first dispensary in America was organized in Philadelphia in 1786, and was supported chiefly by the Society of Friends. In New York City the first dispensary was started by the New York Medical Society in 1791. In Boston their beginning was in 1796, under the auspices of the Chamber of Commerce. Baltimore followed in 1801. Since then they have spread to all the larger cities and towns.

In Germany, France and Austria any one can receive free treatment upon application. In England tickets are issued, after examining the worthiness of the applicant. There are, in England, also, many provident dispensaries (fifty in London in 1891) that are co-operative and self-supporting. Members pay a small sum monthly, for which they are entitled to medical treatment in case of sickness. In 1878, at a conference of delegates of the dispensaries in New York, it was decided to demand a nominal fee (ten cents) for each prescription, provided the applicant could pay. The fee was paid by about 85 per cent of the applicants, who, in 1891, numbered 452,429. In London the various dispensaries relieved (1891) 1,158,026 patients, or 274 to each 1,000 of the population. In most of the larger cities dispensaries are largely supported by the medical colleges.

DISRAELI, BENJAMIN. See BEACONSFIELD, EARL OF, in these Supplements.

DISSEN, LUDOLF, a German philologist, born at Grossen-Schneen, near Göttingen, Dec. 17, 1784; studied philology at Göttingen, became in 1812 professor of philology at Marburg, and in 1817 at Göttingen. He died Sept. 21, 1837. He published editions of *Pindar* (1830); *Tibullus* (1850), and of *Demosthenes' De Coronna* (1855). His treatises which are of great hermeneutical value appeared at Göttingen (1839). G.A.S.

DISSENTERS, in Great Britain, the appellation for those Protestants who separate themselves on grounds of faith, or practice, from the established church. The term is of English origin, although its near equivalent may be said to have existed in Poland in the name of *Dissidents*, which first appears in the acts of the Warsaw Confederation of 1573, and there denotes the Polish Protestants, in contradistinction to the members of the established Catholic religion. After 1632 the term *Dissidents* was applied, in Poland, to all who were not Roman Catholics, as Lutherans, Calvinists, Greeks, Armenians, etc. In England, the term *Dissenters* appears to have come into use in the seventeenth century, as synonymous with *Nonconformists;* and from England its use was transferred to Scotland in the eighteenth century, after the secession church had been

founded in that country. The principle that none but persons professing the established religion were eligible for public office found expression in stringent legislation during the reigns of Elizabeth and Charles II, and dissenters remained under certain legal disabilities, which were only removed by acts of Parliament passed between 1828 and 1871; for an account of which, see TEST ACTS, Vol. XXIII, p. 216. For a list of 122 Dissenting religious denominations in England and Wales, see ENGLAND, Vol. VIII, pp. 223, 224.

DISSEPIMENT, in botany, a partition consisting of the coherent sides of adjacent carpels, separating the cells of a syncarpous ovary or fruit, such as the carpel of the lotus. Partitions otherwise formed are called spurious, or false dissepiments. It also refers to the middle part of a lamella of the pileus in hymenomycetous fungi. Sometimes dissepiments are partial, appearing as mere projections from the outer walls of the ovary. In zoölogy, one of the horizontal plates connecting the vertical septa in corals. Also one of the divisions or body-segments of an annelid. W.R.B.

DISSOCIATION. See CHEMISTRY, Vol. V, p. 412; and ELECTROLYSIS, in these Supplements.

DISTANCE. The limit of view in a picture, or "point of distance," as it is called in perspective, is that portion of the picture where the visual rays meet, the "middle distance" being the central portion between the extreme distance and the foreground. The art of producing on the eye the effect of real distance, in so far as it is not accomplished by mere mechanical rules, is one of the most subtle branches of landscape-painting, and cannot be acquired otherwise than by long experience and a careful study of the effects of light and shade.

DISTEMPER, in painting. See TEMPERA, Vol. XXIII, pp. 173, 174.

DISTICH (Gr., *distikon*, couplet), a couple of lines of verse (couplet) usually making complete sense and (in modern poetry) rhyming. The Greeks and Romans were fond of the distich as a vehicle of expression, preferring a hexameter and pentameter. Here is Schiller's couplet:

Im Hexameter steigt des Springquells flüssige Säule,
Im Pentameter drauf fällt sie melodisch herab,

that is:

In the hexameter rises the fountain's silvery column;
In the pentameter aye falling in melody back.

W.R.B.

DISTILLED WATER, water in its purest state, produced by condensation from steam. Impure and salt water may be passed through a "still" as steam, and by distillation be made drinkable, and this method of obtaining a water-supply is in use by navigators of the present day. Distilled water is especially necessary in chemical operations, where the presence of the foreign matters which ordinary water contains would be injurious.—DISTILLED WATERS is a term used to indicate such products as rose-water and lavender-water, which are obtained by distilling water and certain essential oils together.

DISTRIBUTING MACHINES. See TYPE-SETTING MACHINERY, in these Supplements.

DISTRICT ATTORNEYS. These officials represent the general government, in circuit and district courts, civil and criminal, and in the prosecution of crimes and misdemeanors. They resemble the public prosecutor in England and the *procureur de la république* in France. State attorneys occupy similar positions in regard to criminal prosecutions in each county of a separate state. District attorneys are appointed by the President. State attorneys are elected by popular vote.

DISTRICT OF COLUMBIA. (See COLUMBIA, DISTRICT OF, Vol. VI, p. 150.) Population 1890, 230,392; 1900, 278,718. In 1900, the old limits of the city of Washington contained 218,196 inhabitants; now it is co-extensive with the district. Prior to the year 1871 the affairs of the district were administered by Congress, but in that year the district was placed upon a territorial basis, Henry D. Cooke being governor from 1871 to 1873, and Alexander Shepherd from 1873 to 1874. Since 1874 the government has been in the hands of a local corporation, with an executive consisting of three commissioners, two of whom are appointed from civil life by the President of the United States, while the third must be an officer of the engineer corps, detailed for that purpose. Judicial officers, recorders and justices of the peace are also appointed by the President, while all subordinate municipal officers are appointed by the Commissioners.

DITTANY, a genus of plants of the natural order *Rutaceæ*, of which *Dictamnus albus* is a native of the rocks and dry mountain forests of the south of Europe, especially in calcareous soils, which is generally cultivated as a garden flower. The flowers are of a fine rose color with darker veins, more rarely white. The plant diffuses a powerful fragrance from its numerous oil-glands when in flower and during dry, hot weather exhales such a quantity of volatile oil that its sudden combustion makes a slight flash when a candle is brought near it. The root is thick, white, and very bitter. *D. origanum* of Crete is probably the dittany of the ancients. W.R.B.

DIVIDEND is a part of the principal or profit distributed among the owners or other persons entitled thereto. The profits of a stock company are distributed to the stockholders in proportion to the respective amounts of their stock by means of dividends. Administrators and executors, trustees, assignees, receivers and other similar trust officers, upon whom the duty may devolve to administer insolvent estates, divide the proceeds derived from the sale or investment of assets by means of dividends.

DIVIDING-ENGINE. See GRADUATION, Vol. XI, pp. 27, 28.

DIVISIBILITY, that property of quantity, matter or extension through which it is either actually or potentially separable into parts. Whether matter is or is not indefinitely divisible is a question which has occupied the minds of philosophers since very early times. There is no doubt that, abstractly speaking, it is indefinitely divisible. We cannot conceive any body or space so small but that we can subdivide it in imagination, and thus figure to ourselves bodies and spaces still smaller; and practically we know that the subdivision of matter is carried in

nature far beyond appreciation either by our senses or by calculation. The diffusion of odors through the air, for long periods, from odoriferous bodies, without their suffering any sensible change of weight, and the tingeing of great quantities of fluid by very minute portions of coloring matter, are cases commonly appealed to in proof of the extreme fineness of certain material particles; while, by experiment, it is shown that there is no particular limit to the divisibility of even the most solid substances. Thus an ounce weight of silver, gilt over with eight grains of gold, has been drawn out into a wire 13,000 feet long, which was all its length covered with gold. Divisibility resolves molecules into atoms; but these are, relatively, as various in size as the occupants of the stellar universe. The most patent form of matter, in a state of attenuated divisibility, is ether, "composed of aboriginal atoms, the diameters of which measure the seven hundred thousand millionth of the wave length of violet light." The evolutionary energy of the universe, in fact, depends upon the microcosmic potentialities of matter in its infinitesimal divisibility.

Revised by R.C.A.

DIVORCE, a subject exhaustively treated, in relation to Europe, under the appropriate heading in this ENCYCLOPÆDIA, Vol. VII, pp. 260–265, is of especial interest to Americans, not only by reason of the many and varying laws dealing with this most important social question, but also on account of the more reasonable principles upon which American courts in general have proceeded to dissolve ties which, through misconduct, have become productive of evil to an innocent plaintiff, and thus constituted an evil in the body politic.

The Catholic theory of indissolubility of marriage bonds finds no place in American statute laws, unless it be (and for a far different reason) in South Carolina, which, while legislating as to how large a proportion of his property a married man may leave to his concubine, has steadfastly declined to grant divorces, even for adultery aggravated by the greatest of indignities.

The history of American divorce legislation is interesting, and the tendencies of the various enactments run on well-defined lines. In colonial days, divorces were mainly, if not quite exclusively, granted by acts of the colonial legislatures, and by analogy with the English practice of divorce by act of Parliament. Instances are numerous in early colonial records of the granting of such relief, and until the present day the constitutions of the six New England states, with New York and Delaware, contain no express prohibition of this practice. The causes for which divorce was granted were much the same as in English law; and to the present day, in Georgia, limited divorces are granted "on any ground which was held sufficient in the English courts prior to May 4, 1784."

With the birth of the republic came a change in method. Each separate and sovereign state possessed the power of legislating for itself and its citizens, while the Federal Congress had (and to-day has) legislative jurisdiction over divorces only in the District of Columbia and "in any territory or other place where the United States has exclusive jurisdiction." Thus, and for these reasons, within the boundaries of the United States, may be found nearly half a hundred codes of law, each regulating the granting of divorce within the borders of a state or territory, and occasionally evolving riddles in matrimonial law.

Legislative divorce soon fell into disfavor in the young republic, as savoring of class legislation, and benefiting only the rich. Tennessee was the first to prohibit this method, in a constitution adopted in 1834. Pennsylvania and New Hampshire have ingrafted similar prohibitions upon the state constitutions. Elsewhere the practice is obsolete, or has never been sanctioned by precedent.

As regards the causes for which divorce may be granted, the American colonial legislatures began early to enact statutes more equitable and remedial than obtained in the motherland. The earliest colonists who laid the foundations of New England had brought with them views on divorce common to their reformed brethren in Scotland and Holland. Marriage was no sacrament, and desertion was a sufficient cause for a decree of dissolution. In those days desertion was a very different matter from that which is so called now. Voyages to remote colonies, to the more distant West Indies, or to the far-off motherland, implied long severance of family ties, and to a vagabondic spirit added an extreme probability of adultery. To meet such a case is found a law of the Massachusetts colony, as early as 5 William and Mary (1694), whereby "three years' absence for one gone to sea, the ship not being heard of for three years, when a voyage is usually made in three months," is declared to be sufficient ground for divorce.

The newer states of the Northwest have followed the policy of the first settlers. Causes for divorce have multiplied freely, and have been designed to meet most of the cases of hardship possible. Naturally, in a period of transition from prairie to sovereign state, some abuses have crept in. That parasite of the law—the pettifogger—at times has waxed fat by the exercise of his abilities in obtaining fraudulent divorces and occasionally has conducted a "mail-order business." But settled procedure, bar associations, publicity, and due and proper provisions for the personal service of process, are rapidly rendering "divorce colonies" few and far between.

Decisions of sterling value have gone so far as to hold fraudulent and invalid divorces obtained by concealment and fraud, especially where a plaintiff has proceeded from his own state to one with more lax laws, and for the express purpose of obtaining a divorce, and that without personal service on the defendant, and without the defendant's appearance, in order to give *bona fide* jurisdiction.

In Delaware, Maine and Massachusetts it has been provided by statute that when an inhabitant of the state shall go into any other jurisdiction to obtain a divorce for any cause occurring within the state, or for a cause which would not authorize a divorce by the laws of the state, a divorce so obtained shall be of no force or effect in the state. In all other cases a divorce decreed in any other state or country

according to the laws thereof, by a court having jurisdiction of the case and of the parties, is valid in these states.

In Indiana it is declared, without qualification, that "a divorce decreed in any other state, by a court having jurisdiction thereof, shall have full effect in this state."

The foregoing are the only statutory provisions found on this subject.

Still, the complex and varying nature of the divorce codes of the separate states has produced a well-defined demand for uniformity of laws on this subject. Under the present system it is possible for too many men to have

"One wife at Natchez-under-the-hill,
And another at home in Pike."

The sentiment crystallized into action in 1891, when the legislatures of six states appointed commissions of able jurists to confer as to rendering uniform many important laws, including divorce. By 1895 the number of commissions at work was increased to 28. Valuable service has been rendered by these bodies, and their labors are gradually bearing fruit. Their recommendations, in the main, are in the direction of each state adopting a divorce law based upon that of the District of Columbia, and thus to abolish a multiplicity of complex, and at times conflicting, statutes. The alternative of a change in the constitution, giving to Congress the power of passing one uniform divorce law, was considered, but rejected as impracticable.

In many instances intricate questions of law arise on the wording of statutes, and, as a general rule, the subject is one for any interested person to avail himself of the advice of an attorney of standing in the particular state where relief is sought.

The following table, with its appended notes, presents the salient features of the divorce laws of every state and territory, a statement of the causes for which the law's aid may be invoked following immediately after the table:

States and Territories.	Court in which Proceedings Had.	Requirement of Previous Residence.	Specific and Valid Defenses. (See notes below)	Limitation for Bringing Suit.	Right to Re-marry after Divorce.
Alabama	Chancery.	1 to 3 years.	a. b. c. d.	None.	Unless decree.
Alaska	----------	1 year.	b. c. d.	1 year.	6 months.
Arizona	District.	6 months.	a. b. c. d.	4 years.	Yes.
Arkansas	Equity circuit.	1 year.	a. b. d.	5 years.	Yes.
California	Superior.	1 year.	a. b. c. d.	2 years.	Yes.
Colorado	District chancery.	1 year.	a. d.	None.	Yes.
Connecticut	Superior.	3 years.	----------	None.	Yes.
Delaware	Superior.	No law.	a. b. c. d.	None.	Not adulterers.
District of Columbia	Supreme.	2 years.	----------	None.	No law.
Florida	Circuit.	2 years.	a. d.	4 years.	Plaintiff.
Georgia	Superior.	1 year.	a. b. c. d.	None.	Jury permit'g.
Idaho	District.	6 months.	a. c. d.	1 to 2 years.	Yes.
Illinois	Circuit.	1 year.	a. b. d.	5 years.	Yes.
Indiana	Sup'r and circuit.	2 years.	b. c. d.	2 years.	2 years.
Indian Territory	Only tribal laws.	----------	----------	----------	----------
Iowa	District or circuit.	1 year.	----------	None.	Yes.
Kansas	District.	1 year.	d.	5 years.	6 months.
Kentucky	Equity.	1 year.	c.	5 years.	Yes.
Louisiana	District.	No law.	c.	None.	10 months.
Maine	Supreme.	1 year.	a. d.	None.	2 yrs., or leave.
Maryland	Equity.	2 years.	----------	None.	Unless decree.
Massachusetts	Superior.	3 to 5 years.	----------	None.	Def't, 2 yrs.
Michigan	Circuit.	1 to 2 years.	a. b. c. d.	5 years.	Def't, 2 yrs.
Minnesota	District.	1 year.	b. c. d.	3 years.	Yes.
Mississippi	Chancery.	1 to 2 years.	a. c. d.	6 years.	Unless decree.
Missouri	Circuit.	1 year.	a. b. d.	None.	Yes.
Montana	District.	1 year.	a. c. d.	3 years.	Yes.
Nebraska	District.	6 months.	a. b. c. d.	4 years.	6 months.
Nevada	District.	6 months.	c.	4 years.	Yes.
New Hampshire	Supreme.	1 year.	----------	6 years.	Yes.
New Jersey	Chancery.	3 years.	a. b. d.	2 years.	Yes.
New Mexico	District.	6 months.	----------	None.	No law.
New York	Sup'me and sup'r.	1 year.	b. c. d.	5 years.	Not defendant.
North Carolina	Superior.	2 years.	a.	10 years.	Yes.
North Dakota	Circuit.	90 days.	a. b. c. d.	Unreasonable time.	No law.
Ohio	Common pleas.	1 year.	----------	10 years.	No law.
Oklahoma Territory	District.	90 days.	a. b. c. d.	4 years.	6 months.
Oregon	Circuit.	1 year.	b. c. d.	1 year.	6 months.
Pennsylvania	Common pleas.	1 year.	b. c. d.	None.	Adulter'r bar'd
Rhode Island	Supreme.	1 year.	a.	None.	Yes.
South Carolina	No divorce laws.	----------	----------	----------	----------
South Dakota	Circuit.	6 mos. to 1 yr.	a. b. c. d.	Unreasonable time.	No law.
Tennessee	Circuit.	2 years.	b. c. d.	None.	Adulter'r bar'd
Texas	District.	6 months.	a. b. c. d.	4 years.	Yes.
Utah	Circuit.	1 year.	----------	4 years.	No law.
Vermont	County.	1 to 2 years.	----------	None.	3 years.
Virginia	Circuit.	1 year.	b. c.	5 years.	Unless decree.
Washington	Circuit.	1 year.	----------	1 year.	6 months.
West Virginia	Circuit.	1 year.	b. c.	5 years.	Yes.
Wisconsin	Circuit.	1 year.	b. c.	3 years.	Yes.
Wyoming	Circuit.	6 months.	a. b. c. d.	3 years.	Yes.

Specific and Valid Defenses or Bars to Relief. The statutes of a majority of the states provide for the disallowance of applications for divorce where there has been collusion, connivance, condonation, or in case of recrimination.

a. *Collusion* is an agreement between the parties for one of them to commit, or appear to have committed, some act constituting a cause for divorce, in order to enable the other to obtain a divorce.

b. *Connivance* is the corrupt consent of a party to the act of the other constituting a cause for divorce, which is afterward sought to be taken advantage of in an action for divorce.

c. *Condonation* is the conditional forgiveness, either express or implied, by one party, of a breach of matrimonial duty in the other.

d. *Recrimination* arises when the party seeking the divorce is also guilty of the act of which he or she complains in the other, or, in some states, of any other act constituting a ground for divorce.

By reference to the fourth column of the foregoing table, the application of these specific defenses or bars, in each state, can be ascertained.

Causes for Which Divorce is Granted. *Adultery*, the violation of the marriage vow, is sufficient cause for absolute divorce in all the states and territories, except South Carolina, which, as has been stated, is without any divorce laws.

Physical incapacity is a cause in all the states except California, Connecticut, Idaho, Iowa, Louisiana, New Mexico, New York, South Carolina, Texas and Vermont. In most of these states it renders marriage voidable.

Willful desertion, six months in Arizona; one year in Arkansas, California, Colorado, Florida, Idaho, Kansas, Kentucky, Missouri, Montana, Nevada, North Dakota, Oklahoma, Oregon, Utah, South Dakota, Wisconsin, Washington and Wyoming; two years in Alabama, District of Columbia, Illinois, Indiana, Iowa, Michigan, Mississippi, Nebraska, New Jersey, Pennsylvania and Tennessee; three years in Connecticut, Delaware, Georgia, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, Ohio, Texas, Vermont and West Virginia; five years in Louisiana, Virginia and Rhode Island, though the court may, in the latter state, decree a divorce for a shorter period. Both parties living apart without cohabitation, five years in Kentucky; ten years, Rhode Island.

Habitual drunkenness, in all the states and territories, except Illinois, Maryland, New Jersey, New York, Pennsylvania, South Carolina, South Dakota, Texas, Vermont and Virginia.

Imprisonment for felony or *conviction of felony*, in all the states and territories (with limitations), except Florida, Maryland, New Jersey, New Mexico, New York and South Carolina.

Cruel and abusive treatment, *intolerable cruelty*, *extreme cruelty*, *repeated cruelty* or *inhuman treatment*, in all the states, except Maryland, Michigan, New York, South Carolina, Tennessee, Virginia and West Virginia.

Failure by the husband to provide, six months in Arizona; one year in California, Colorado, Idaho, Nevada and Wyoming; two years in Indiana; three years in Delaware; no time specified in Arizona, Maine, Massachusetts, Michigan, Nebraska, New Mexico, Rhode Island, Utah, Vermont, Washington and Wisconsin.

Fraud and fraudulent contract, in Connecticut, Delaware, Georgia, Kansas, Kentucky, Ohio, Pennsylvania, Vermont and Washington.

Absence without being heard from, three years in New Hampshire and Ohio; seven years in Connecticut and Vermont; *voluntary separation*, five years in Wisconsin; *when reasonably presumed dead by the court*, in Rhode Island.

Ungovernable temper, in Kentucky; *habitual indulgence in violent and ungovernable temper*, in Florida; *cruel treatment, outrages or excesses as to render their living together insupportable*, in Arkansas, Kentucky, Louisiana, Missouri, Tennessee and Texas; *indignities as render life burdensome*, in Missouri, Oregon, Pennsylvania, Tennessee, Washington and Wyoming. *Attempt to murder the other party*, in Illinois, Louisiana and Tennessee.

Insanity or idiocy at time of marriage, in Arkansas, Colorado, District of Columbia, Georgia, Iowa and Mississippi. *insanity lasting ten years*, in Washington.

Other causes in different states are as follows: *Husband notoriously immoral before marriage, unknown to wife*, in West Virginia; *fugitive from justice*, in Virginia; *gross misbehavior or wickedness*, in Rhode Island; *any gross neglect of duty*, in Kansas and Ohio; *refusal of wife to remove into the state*, in Tennessee; *mental incapacity at time of marriage*, in Georgia; *three years with any religious society that believes the marriage relation unlawful*, in Massachusetts; *joining any religious sect that believes marriage unlawful, and refusing to cohabit six months*, in New Hampshire; *parties cannot live in peace and union*, in Utah; *vagrancy of the husband*, in Missouri and Wyoming; *refusal of wife to cohabit for twelve months*, in North Carolina; *excesses*, in Texas; *where wife, by cruel and barbarous treatment, renders condition of husband intolerable*, in Pennsylvania.

In Georgia, an absolute divorce is granted only after the concurrent verdict of two juries, at different terms of the court. In New York, absolute divorce is granted for but one cause, adultery. In South Carolina there are no divorce laws.

In many states a limited divorce may be granted for any of the causes for which an absolute decree may be given. This decree may be limited as to time, and in operation resembles the judicial separation granted by the English courts. The decree does not enable either party to marry any other person, as the original marriage remains undissolved.

The literature on the question of divorce is more than voluminous. Bishop's learned *Commentaries on the Law of Marriage and Divorce* (2 vols., 1891) and Nelson's *Divorce and Separation* (2 vols., 1895) must be placed in the front rank of American legal textbooks. The masterly report of the Commissioner of Labor, Carroll D. Wright, is interesting as a popular and accurate compilation of laws, and a most valuable collection of statistics. Among other works may be mentioned *Divorce and Divorce Legislation*, by Theodore D. Woolsey (1882); *A Digest of Divorce and Alimony*, by W. H. Browne (1872); *A Treatise on the Law of Divorce*, by A. P. Lloyd (1887); and *The Law of Marriage and the Family Relations*, by Neville Geary (1892). Polemically, the question has been treated by a host of social scientists, and from every possible point of view. Much valuable information can be gleaned from the annual reports of the National Divorce Reform League, the corresponding secretary of which organization, the Rev. Samuel W. Dike, LL.D., has labored long, and with marked literary as well as executive ability, in the interests of wholesome and uniform legislation on this greatest of social questions.

DIX, Dorothea Lynde, philanthropist, was born in Worcester, Mass., probably in 1805, the daughter of Dr. Dix, a physician. Left an orphan, she became a school teacher, until, on inheriting a fortune, she was enabled to devote herself to charitable works, especially to the reform of prisons and the founding of asylums for the unfortunate classes. During the Civil War she did a great work in the army hospitals, and was appointed by the Secretary of War to be superintendent of female nurses. At the end of the war she resumed her work for asylums, especially for insane patients. She wrote several books and many pamphlets on various topics. She died on July 19, 1887. W.F.J.

DIX, John Adams, an American soldier and statesman; born in Boscawen, New Hampshire,

July 24, 1798. He received his education at Salisbury, Philips Exeter Academy, the College of Montreal, and Saint Mary's College. In 1812 he was appointed a cadet in the United States army and was made an ensign in 1813. He participated in the operations on the Canadian frontier during the War of 1812 and became aide-de-camp to General Brown. He afterward studied law and was admitted to the bar in Washington. In 1826 he was sent as a special messenger to the court of Denmark. In 1828 he resigned from the army and commenced the practice of law at Cooperstown, New York. In 1833 he was appointed secretary of state and adjutant-general of New York, and was prominently identified with the Democratic party. In 1841 he was elected to the state assembly and from 1845 to 1849 was a United States Senator. In 1861 he was appointed Secretary of the Treasury by President Buchanan. While in this office he ordered the captain of a revenue cutter to sail from New Orleans to New York. The captain refused to obey. Dix telegraphed to place him under arrest, adding the statement which made him famous — "If any one attempts to haul down the American flag, shoot him on the spot." At the outbreak of the Civil War he was appointed major-general of New York volunteers and subsequently held the same rank in the regular army, receiving also the command in Maryland, and afterwards the direction of the Seventh Army Corps. After the close of the war he was appointed minister to France where he remained two years. In 1872 he was elected Republican governor of New York, but in 1874 he was defeated by Samuel J. Tilden. He died in New York city, April 21, 1879. W.M.C.

DIX, Morgan, an American clergyman and author; born in New York city, November 1, 1827. He is a son of John Adams Dix (q. v.). He was graduated from the Columbia College in 1848, and from the General Theological Seminary in 1852. He became a priest in the Episcopal Church and after serving as assistant in Trinity Church, New York, became the rector of Trinity Parish in 1862. His success in the New York parish has been such that he nominates his own assistants independently of the bishop of the diocese, and he presides directly over one-ninth of the entire diocese. He has written *Commentary on the Epistle to the Romans* (1864); *Exposition of the Epistles to the Galatians and Colossians* (1865); *Lectures on the Pantheistic Idea of an Impersonal Substance Deity* (1865); *Lectures on the Two Estates* (1872); *Memoirs of John A. Dix* (1883); *The Sacramental System* (1893); *History of Trinity Church* (1901). Died April 29, 1908. W.M.C.

REV. MORGAN DIX.

DIX ISLAND, Maine, a granite islet 10 miles southeast of Rockland, Knox County, off the entrance of Penobscot Bay. It has an area of about 50 acres, and is inhabited by quarrymen who work the fine quality granite for export. Dix Island granite was used for the New York post-office and other notable buildings. C.L.S.

DIXON, a village of Solano County, central western California, 20 miles S.W. of Sacramento on the Southern Pacific railroad. The town has granaries and flour-mills, and exports wheat, barley, hay, cattle, wool, wine and pork, the products of the neighborhood. Pop., 1890, 1,082; 1900, 783.

DIXON, a city and the county seat of Lee County, Illinois, in the northern part of that state. It lies on the Rock River, which provides an ample water supply and power for its numerous and varied manufacturing establishments. It is the seat of Rock River University, the Northern College of Illinois, a normal school, and other institutions of learning. It is 93 miles west of Chicago, and is reached by the Illinois Central and the Chicago and Northwestern railroads. Its population in 1900 was 7,917. W.F.J.

DIXON, James, an American politician; born in Enfield, Conn., Aug. 5, 1814. He graduated from Williams College in 1834; studied law, and was admitted to the bar. He was a member of the Connecticut House of Representatives, 1837–38, 1844, and 1854, and a Whig Representative in Congress, 1845–49. He was elected to the United States Senate as a Republican (to succeed Francis Gillette, the former representative of the Free-Soil party), and served from March 4, 1857, to March 3, 1869. He was defeated as a Democratic candidate for the United States Senate in 1868, and as a Democratic candidate for Representative in the Forty-first Congress. He died at Hartford, Conn., March 27, 1873. E.E.T.

DIXON, James Main, a Scottish-American educator; born in Paisley, Scotland, April 20, 1856. He was graduated from the University of Saint Andrews and in 1879 was appointed professor of English in the Imperial College at Tokio, Japan. From 1886 to 1892 he was professor in the University of Japan, and from 1892 to 1901 was professor of English literature at the Washington University. He has written *A Dictionary of English Phrases* (1891) and a *History of Methodism* (1900). W.M.C.

DIXON, Joseph, inventor and manufacturer, was born on January 19, 1799, and in his boyhood was apprenticed to the shoemaker's trade. He invented a file-cutting machine, was a printer, a lithographer, and a medical student. He was the inventor of friction matches, of photo-lithographic processes, of the anti-friction "Babbitt metal," of crucible steel making, of the reflector in optics to prevent objects from appearing reversed, of the use of collodion in photography, and of the plumbago crucible. He founded in Jersey City, N. J., a large manufactory of plumbago crucibles, lead pencils, and other articles of black lead. He died on June 14, 1869. W.F.J.

DIXON, William Hepworth, an English au-

thor; born in Manchester, June 30, 1821. He entered journalism and in 1853 became chief editor of the *Athenæum*, a position which he retained till 1869. His works include *Memoir of John Howard; Life of William Penn; Life of Admiral Blake; Spiritual Wines; New America; Personal History of Lord Bacon; The Holy Land* and *Free Russia*. He died in London, England, December 27, 1879. W.M.C.

DIXON, William W., an American lawyer and public man; born in Brooklyn, N. Y., June 3, 1838. He removed with his family to Quincy, Ill., in 1842, and to Keokuk, Ia., in 1849; received a common-school education, and entered the profession of law in Keokuk; went to Tennessee and Arkansas in 1860, and in 1862 crossed the plains to California; went to Nevada the same year, and to Montana in 1866. In 1879 he went to the Black Hills, remaining two years, and then settled in Butte City, Montana. In politics a Democrat, he was elected a member of the Montana legislature in 1871; was a member of the Montana constitutional conventions of 1884 and 1889, and in 1890 was elected to the Fifty-second Congress from Montana.

DIXON ENTRANCE, northwest America, the strait separating the Prince of Wales Archipelago in the Alaskan "panhandle" from Queen Charlotte Islands, British Columbia. It extends east to west about 100 miles with an average width of 40 miles. C.L.S.

DJEZZAR, or "Butcher," was the name given, because of his infamous cruelties, to Achmed Pasha, a Turkish commander, who was born in Bosnia in 1735. Originally a slave, he rose, largely through murder and treason, to be pasha of Acre. Upon the advice of Sir Sidney Smith he decided to hold the city of Acre against the French when Napoleon Bonaparte advanced against it in 1799. He defended it obstinately from March 20 to May 21, when the French retired in defeat. He died in 1804. W.F.J.

DOANE, George Washington, clergyman and author, was born at Trenton, N. J., on May 27, 1799, and was graduated from Union College in 1818. He became a clergyman of the Protestant Episcopal Church in 1821, was an assistant minister of Trinity Church, New York, and was the first professor of rhetoric in Trinity, then Washington, College. After serving churches in New York and Boston he was made bishop of the diocese of New Jersey in 1832, and settled at Burlington, N. J., where he founded St. Mary's Hall, a school for girls, and Burlington College, for boys. He went to England in 1841 and was the first American bishop to preach in that country. He published some volumes of addresses and sermons, and a volume of poems, among which was the favorite hymn, *Softly Now the Light of Day*. He died at Burlington on April 27, 1859. W.F.J.

DOANE, William Croswell, clergyman and author, son of George Washington Doane (q. v.), was born in Boston on March 2, 1832, and was graduated from Burlington College, N. J., in 1850. He entered the ministry of the Protestant Episcopal Church in 1853, and was successively rector of churches at Burlington, N. J., Hartford, Conn., and Albany, N. Y. In 1869 he was made bishop of the diocese of Albany, N. Y., where he founded All Saints' Cathedral, St. Agnes's School, the Child's Hospital, and other institutions. In 1902 he was elected a regent of the University of the State of New York, and in 1903–04 was chancellor of the university. He has written a number of poems, and several volumes in prose, including a life of his father. W.F.J.

BISHOP DOANE.

DOBBS, Arthur, statesman and author, was colonial governor of North Carolina in 1754–65. He was the author of *Trade and Improvement of Ireland* (1729); *Captain Middleton's Defense* (1744); *Countries Adjoining Hudson's Bay* (1744); and other works. He died in 1765. W.F.J.

DOBBS FERRY, a beautiful and aristocratic residence village on the east bank of the Hudson River, twenty miles north of New York city. It has some industries, and several noted secondary schools. It had in 1900 a population of 2,888. W.F.J.

DÖBEREINER, Johann Wolfgang, a German chemist; born in Hof, Bavaria, December 15, 1780. He was professor of pharmacy and chemistry at the University of Jena for 39 years, and discovered the combustibility of platinum, the apparatus for utilizing which is known as Döbereiner's lamp. He published *Zur Pneumatischen Chemie* and other works. He died in Jena, March 24, 1849. W.M.C.

DOBSON, Henry Austin, an English litterateur and writer of *vers de société* and lyrical *elegantiæ;* born in Plymouth, England, Jan. 18, 1840, the son of George C. Dobson, a civil engineer. After an education, received partly in England and in Germany, he was appointed, at the age of 16, to a civil service clerkship in the London Board of Trade. His temperament and tastes early disposed him to the manufacture of the graceful and light forms of drawing-room verse, including adaptations of the French rondeau, ballade and villanelle. In this *rôle* he at once became the pioneer of a new movement in English poetry, associated with the names of Frederick Locker, C. S. Calverley and Mackworth Praed, to revive the dainty, debonair verse of Suckling, Prior and other early fashionable poets and courtly troubadours. In 1873 he collected his scattered lyrics into a volume entitled *Vignettes in Rhyme and Vers de Société*, which was followed, four years later, by *Proverbs in Porcelain*. These, in turn, were followed by *Old World Idyls* (1883) and *At the Sign of the Lyre* (1885). Prose composition now for a time occupied his pen. To Humphry Ward's *English Poets* he wrote the introductions on

Prior, Gay, Praed, Hood; to Morley's English men of Letters he contributed a *Life of Fielding;* to the Great Writers Series, a *Life of Goldsmith;* to the English Worthies Series, a *Life of Steele;* to the *Biographies of Great Artists*, a *Life of Hogarth;* and to the Parchment Library an edited collection of *Eighteenth-Century Essays.* Besides these works, Mr. Dobson published, in 1884, *Thomas Bewick and His Pupils;* in 1890, a *Memoir of Horace Walpole;* in 1891 a further volume of essays, entitled *Four Frenchwomen;* and in 1892 and 1894, two series of, *Eighteenth-Century Vignettes.* He was also a contributor to the Temple Library, the Chiswick Press Reprints, the Ex-Libris Series, and edited a number of English and French classics for the Clarendon Press. For the Cranford Series he edited, in 1894, a collection of *Old English Songs,* with introduction and notes.

DOD, Albert Baldwin, an American educator; born in Virginia in 1805. He studied at the Princeton Theological Seminary and in 1829 was ordained minister in the Presbyterian Church. In 1830 he was appointed professor of mathematics in Princeton College, which position he retained until his death in 1845. A Dod memorial was erected at Princeton in 1890. W.M.C.

DODD, Anna Bowman (Blake), authoress, was born in Brooklyn, N. Y., in 1850, and in girlhood began to write for magazines. Her best known works are *Cathedral Days*, *The Republic of the Future*, *In and Out of Normandy Inns*, *On the Norfolk Broads*, *Struthers*, and *Glorinda.* She has also written much for *The London Art Journal* and other important periodicals. She was married to Edward Williams Dodd in 1883, and in recent years has lived in Paris. W.F.J.

DODD, Edward Mills, missionary, was born at Bloomfield, New Jersey, on June 22, 1824, and was educated for the ministry of the Presbyterian Church. In 1849 he proceeded to the Levant as a missionary, under the patronage of the American board of commissioners for foreign missions. He conducted a mission to Jews at Salonica, European Turkey; then one at Smyrna, Asia Minor, to the Turks; and finally settled in Armenia, where the remainder of his life was spent. He died at Marsovan on August 16, 1865. W.F.J.

DODDER-LAURELS, a common name given to species of *Cassytha*, a genus of *Lauraceæ*, or "laurels," although sometimes considered a separate family (*Cassythaceæ*). They are dodder-like, herbaceous, slightly green, almost leafless, twining parasites, natives of the tropics, but one Florida species belonging to the United States.

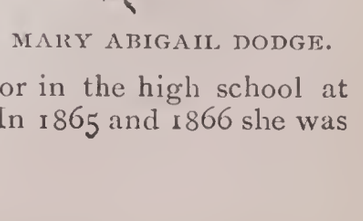
DODDS, Alfred Ámédée, a French mulatto general, famous for long and successful service in Africa; born at St. Louis, Senegal, Feb. 6, 1842; entered the army in 1864; served in the Réunion campaign in 1869, in the campaigns of Sedan, the Loire and the East in 1870, and in Senegal from 1872 to 1892. In 1892 he led a victorious campaign against Dahomey, and was in 1900 promoted commander of the troops in Indo-China.

DODECATHEON, an American genus of *Primulaceæ*, or "primroses," whose species occur from the western slopes of the Alleghanies to the Pacific. It is characterized by its cluster of smooth leaves at the base of the stem, which bears an umbel-like cluster of beautiful flowers, the calyx being reflexed, the long white to purple petals also sharply reflexed, and the linear anthers conniving into a long, slender projecting cone, giving the flower a Cyclamen-like look. The common species of the eastern Mississippi basin is *D. Meadia*, often called "shooting-star" or "American cowslip."

DODGE, Augustus Cæsar, an American soldier and statesman; born in Missouri, January 2, 1812. From 1838 to 1839 he was a registrar of the land office in Iowa. In 1840 he was a territorial delegate to Congress and from 1848 to 1855 was a United States Senator. In 1855 he was minister to Spain. He died in Burlington, Iowa, November 20, 1883. W.M.C.

DODGE, Grenville Mellen, soldier, was born at Danvers, Mass., on April 12, 1831, and was educated at Norwich University, Vermont (1851). Before the Civil War he was engaged as a railroad engineer in Illinois. In the war he served in Missouri and under Sherman in Georgia, and won promotion to the rank of major-general of volunteers. After the war he was chief engineer of the Pacific railroad, and superintended the completion of it. He was a Republican representative in Congress from Iowa in 1867–69. He succeeded General Sherman as president of the Society of the Army of the Tennessee, and became president of the New York commandery of the Order of the Loyal Legion. He was also president of the commission appointed to inquire into the conduct of the Spanish War in 1898. He is now interested in western and southern railroads. W.F.J.

DODGE, Henry, an American statesman; born in Vincennes, Ind., Oct. 12, 1782. He emigrated to Missouri; served in the Black Hawk and other Indian wars; and left the army as colonel of the 1st United States Dragoons, in July, 1836. He was governor of Wisconsin from 1836 to 1841; served in Congress as a delegate from 1841 to 1845; was again appointed governor of Wisconsin, Feb. 6, 1846; and was elected United States senator from Wisconsin as a Democrat, and re-elected, serving from June 23, 1848, to March 3, 1857. He died in Burlington, Iowa, June 19, 1867. E.E.T.



MARY ABIGAIL DODGE.

DODGE, Mary Abigail, an American journalist and author; best known under the pseudonym of "Gail Hamilton"; born in Hamilton, Massachusetts, in April, 1830. She was educated in the public schools and in 1851 became an instructor in the high school at Hartford, Connecticut. In 1865 and 1866 she was

one of the editors of *Our Young Folks*, and was meanwhile establishing a reputation as a newspaper correspondent and contributing to various journals and periodicals. She wrote a large number of books, including *Country Living and Country Thinking* (1862); *Gala-Days* (1863); *Woman's Wrongs* (1863); *A New Atmosphere* (1864); *Red-Letter Days* (1864); *Skirmishes and Sketches* (1865); *The Battle of the Books* (1870); *Woman's Worth and Worthlessness* (1871); *A Washington Bible Class* (1872); *Twelve Miles from a Lemon* (1873); *Our Common School System* (1880); *The Insuppressible Book* (1885), and *English Kings in a Nutshell* (1893). She also wrote a biography of James G. Blaine (q. v.). She was a relative and intimate friend of Mr. Blaine and upon his death was appointed his literary executor. She died at Hamilton, Massachusetts, August 17, 1896. W.M.C.

DODGE, MARY ELIZABETH MAPES, author and editor, was born (Mapes) in New York City, and was married to William Dodge, who died many years ago. She became one of the editors of the periodical *Hearth and Home*, and from 1873 was editor of the *St. Nicholas* magazine. She was also a prolific writer, chiefly of stories for children and young people, among her works being the *Irvington Stories*, *Hans Brinker*, *A Few Friends*, *Theophilus and Others*, *Donald and Dorothy*, and *The Land of Pluck*. She also wrote much in verse, including *Rhymes and Jingles*, *Along the Way*, and *When Life is Young;* and edited *Baby World* and *Baby Days*. Her best known work is *Hans Brinker*, which has been translated into many other languages. She died August 21, 1905. W.F.J.

MARY MAPES DODGE.

DODGE, WILLIAM EARLE, an American capitalist; born in Hartford, Connecticut, September 4, 1805. He was educated in the public schools and became a dry goods merchant. In 1833 he was a member of the firm of Phelps, Dodge & Company and in 1879 he retired with a large fortune. He was director of the Erie railroad, president of the New York Chamber of Commerce, trustee of Union Theological Seminary and the founder of the Union League of New York. He died in New York city, February 9, 1883. W.M.C.

DODGE CITY, the seat of Ford County, Kansas, in the southwestern part of that state. It is the seat of a college, is reached by the Atchison, Topeka and Santa Fé, the Chicago, Rock Island and Pacific, and other railroads, and had in 1900 a population of 1,942. W.F.J.

DODGEVILLE, a city and the county seat of Iowa County, Wisconsin, in the southwestern part of that state. It is forty miles west of Madison, and is reached by the Chicago and Northwestern and Illinois Central railroads. Its population in 1900 was 1,865. W.F.J.

DODGSON, CHARLES LUTWIDGE, an English author; born in 1832; graduated at Christ Church, Oxford, in 1854, with high honors in mathematics; was mathematical lecturer there in 1855–81; and was ordained to the ministry in 1861. He was the author of a large number of valuable works in mathematics; among them, *Euclid and His Modern Rivals* (1879); *Mathematica Curiosa* (1888–93), characterized as a valuable contribution to the science; also *Symbolic Logic* (1896). Under the pseudonym, "Lewis Carroll," he produced many quaint books, which, for children, are unrivaled, including *Alice's Adventures in Wonderland*, with illustrations by Sir John Tenniel (1865); *Phantasmagoria, and Other Poems* (1869); *Through the Looking-Glass, and What Alice Found There* (1871); *The Hunting of the Snark* (1876); *Doublets: A Word Puzzle* (1879); *Rhyme? and Reason?* (1883); *A Tangled Tale* (1885); *Alice's Adventures Underground: A Fac-Simile of the Original Manuscript*, with 37 illustrations by the author (1886). *Through the Looking-Glass*, which is a continuation of *Alice's Adventures*, is established as an English nursery classic, and has been translated into nearly every language in Europe. Died in Guilford, Jan. 14, 1898.

DOG–DAYS, anciently, the forty days between July 3d and August 11th, the term being derived from Sirius, the dog-star, which was supposed to cause the insufferable heat at this season. The dog-days of the Egyptians extended from the 4th of August to the 14th of September. The rising of Sirius, however, has been so accelerated by the precession of the equinoxes during the passage of more than two thousand years that the corresponding conditions for the ancient dog-days would not include them within the 3d of July and the 11th of August, so that our modern dog-days have no connection with the rising of Sirius or any other star.

DOG DISTEMPER. See VETERINARY SCIENCE, Vol. XXIV, p 222.

DOG FOX, a small animal of the genus *Cynalopex*, family *Canidæ*, found in Asia.

DOGGER BANK, an extensive sand shoal in the North Sea (q. v., Vol. XVII, p. 577) which affords one of the most valuable cod fisheries in the world. It was the scene of a deplorable tragedy on October 22, 1904, when Russian warships en route for Japan fired upon a fleet of British fishing smacks, under the alleged misapprehension that they were Japanese torpedo boats, with deadly results. W.F.J.

DOGGETT, DAVID SETH, clergyman; was born in Virginia in 1810, and became a preacher of the Methodist Episcopal Church. He was also a professor in Randolph-Macon College. Upon the separation of the Methodist Episcopal Church between the North and South, he adhered to the Southern branch, and became a bishop of it in 1866. He died at Richmond, Va., on October 27, 1880. W.F.J.

DOG ISLAND, an island in Franklin County, southwestern Florida, four miles from shore. St. George's Sound is between it and the mainland. It

is six miles long and quite narrow. A lighthouse stands on the island, a mile from its western end, at lat. 29° 46′ 51″ N., long., 84° 38′ 37″ W., with a revolving light.

DOGMA, originally an opinion or proposition put in the form of a positive assertion, its truth being supposed to have been previously shown. In theology it was understood to signify a doctrine founded on Scripture, and advanced, not for discussion, but for belief. But as this method of stating truth easily degenerates into the assertion of opinions without ground, and without regard to the aspect they may present to others, *dogma* and *dogmatism* have come, in English, to be almost synonymous with assertion without proof. In Continental theology, however, the word is still used without implying any censure, dogmas meaning simply doctrines; and this is the case in our own expressions, *dogmatic theology*, or *dogmatics*, which is that branch of theology that treats of the systematic arrangement of the doctrines of Christianity. See DOGMATIC, Vol. VII, p. 288.

DOGS. For a full, general discussion of this subject, see Vol. VII, pp. 281–287. The annual exhibitions which, during the last few years, have been held at New York, Chicago, Boston and other American cities, under the auspices of the Westminster Kennel Club, have fostered an increasing love for and knowledge of dogs, and have resulted in great improvement in the various breeds of this most companionable and affectionate type of all the brute creation. Competition in the champion and open classes has grown more and more spirited, and interest in these annual exhibitions has spread, until now, polite society having put the stamp of its approval upon it, the "dog show" has become admittedly one of the fashionable happenings of the season. At the annual exhibitions held under the auspices of the Westminster Kennel Club, in the cities named, dogs of every breed and clime are to be seen.

Corps of trained dogs are attached to the different European armies, which are to be used not only as guards for outpost work, but also to carry dispatches and ammunition.

By the statutory regulations of most of the states, a dog is personal property; the owner may be indemnified in case of willful injury to the dog, and theft of the animal is a crime. Some states require, however, that the dog shall be licensed, or registered and collared, and therefore subject to taxation, before any property rights can attach to the animal. Unless duly authorized by law to kill unlicensed dogs, no one has a legal right to kill a dog belonging to another, unless he, or some one under his protection, or his animal, is in immediate danger of injury from the dog, or the dog is rabid, or has been bitten by a rabid animal. In general, the owner is liable in damages for any injuries caused by his dog; and he cannot plead ignorance of the vicious habits of the animal in mitigation of the damages, every owner being bound to know the character of the dog he keeps. The owner of a vicious and dangerous dog may be indicted for keeping a nuisance, and be compelled to muzzle or kill the animal. Dog-racing is not illegal when for training purposes only, but if chance is the principal element, it becomes a crime within the statutes against gaming.

Boards of health, or other civic authorities generally throughout the United States, issue edicts requiring all dogs to be kept muzzled for a certain number of weeks during the summer season, and authorizing any person to kill any dog found running at large not so muzzled. In many cities the police make raids on ownerless dogs and destroy them. Some American cities have homes for lost dogs, modeled after that at Battersea, London.

DOGSBANE, the common name of a small genus (*Apocynum*) of the family *Apocynaceæ*, perennial herbs or under-shrubs. The dogsbane of North America (*A. androsæmifolium*), often called "fly-trap," from the throat appendages of its corolla closing upon the insects which enter it, is of medicinal repute; similarly, also, its congener, *A. cannabinum*, or Indian hemp.

DOG'S-TAIL GRASS, a common name applied to *Eleusine Indica*, an Oriental grass introduced into the United States for lawns, and used in the South as a pasture-grass. It is also known as "crab-grass," "yard-grass" and "wire-grass." The name is also applied, in England, to another lawn and pasture grass, *Cynosurus cristatus*.

DOHRN, ANTON, a German zoölogist; born at Stettin, Prussia, Dec. 29, 1840; studied at Königsberg, Bonn, Jena and Berlin. He lectured for a time at Jena on zoölogy, and, after studying the crustaceans of the British coast and the Mediterranean, he founded the famous zoölogical laboratory at Naples in 1870, which, by his assiduity, has drawn investigators from nearly every country where science is prosecuted. In embryology he is noted for his researches into the development of insects, and also on the origin of vertebrates. His views can be gathered by referring to the article on VERTEBRATA, Vol. XXIV, p. 198; and ZOÖLOGY, Vol. XXIV, p. 850, of this ENCYCLOPÆDIA. He has published *Der Ursprung der Wirbelthiere* (1875); and *Studien zur Urgeschichte des Wirbelthierkörpers* (1882).

DOILY OR DOILEY, a small napkin used at a table for putting glasses upon during dessert. Some are highly ornamented. The name is said to be derived from the original maker, but more probably it is a modification of the Dutch *dwaele*, a towel, and was introduced with the article from Holland.

DOIT, a small copper coin current in Scotland during the reigns of the Stuarts. It was a Dutch coin (*duit*), and in value the sixteenth part of a guilder.

DOKMEH, DAKHMA OR TOWER OF SILENCE, a receptacle for the dead used by the Parsees, consisting of a low stone tower, on top of which the bodies are exposed to the vultures till, being denuded of their flesh, their bones drop through the grating into a pit beneath. See PARSIS, Vol. XVIII, pp. 331, 332.

DOLABRA, a rude ancient hatchet. *Dolabræ* are represented on the columns of Trajan and Antoninus, and abound in all museums. When made of flint, which was their earliest and rudest form, they are usually called *celts*.

DOLABRIFORM, having the shape of an ax or hatchet, as some leaves, and also certain organs of some shell-fish.

DOLBEAR, Amos Emerson, educator and inventor; was born at Norwich, Connecticut, on November 10, 1837, and was educated at the Ohio Wesleyan University and the University of Michigan. Since 1864 he has been professor of physics at Tufts College. While a student in college, in 1864, he invented a writing telegraph, and in 1876 he invented a telephone operated by magnetism. His other inventions have been a static telephone in 1879, an ammeter in 1889, an air-space telegraph cable in 1882, a system of wireless telegraphy in 1881, and a method of photographing with electric waves, in 1893. He is the author of a number of books and many magazine articles. He received for his inventions a bronze medal at the Philadelphia Exposition of 1876, a silver medal at Paris in 1881, and a gold medal at London in 1882. He was twice elected mayor of Bethany, West Virginia. W.F.J.

DOLE, Sanford Ballard, an American statesman; born in Honolulu, Hawaii, April 23, 1844. His parents were American missionaries. He received his early education in Honolulu, and completed his studies at Williams College. In 1874 he was elected to the legislature and in 1887 was appointed judge of the supreme court. He then resigned to accept the leadership of the revolution that overturned the monarchy in 1893, and established a provisional government. On July 4, 1893, a republic was formally proclaimed, of which he was elected President. After the annexation of Hawaii in 1898 he was appointed governor. W.M.C.

DOLES AT FUNERALS are of great antiquity. St. Chrysostom speaks of them as being given to procure rest to the soul of the deceased. On this ground, as well as on the score of general benevolence, the practice of making gifts to the poor at funerals was common until comparatively recent times, for it was continued, sometimes on a munificent scale, long after the custom of praying for the dead had been adandoned in some localities on the introduction of reformed doctrines. For a curious instance see Tichborne, in these Supplements.

DOLGORUKIJ, the family name of one of the oldest princely houses in Russia, deriving their name from Rurik. The most renowned members were:—Jacob Federovitch D., born in 1639. He was sent in 1687, ambassador to France and Spain; was taken prisoner by the Swedes in the battle of Narva, released in 1710, and appointed a Senator. Died July 5, 1720.—Vassilij Vladimirovitch D., born in 1667; gained the confidence of Peter the Great, and signed in 1709 the alliance with Frederick IV of Denmark, was exiled by the intrigues of Menshikow in 1718, but recalled by Katharine I, and appointed field-marshal by Peter II. Exiled again by Empress Anna and recalled by Empress Elizabeth, he died Feb. 22, 1746.—Vassilij Lukitch D., was Russian ambassador at the Danish court for 13 years, and at the French court from 1716–23. On account of his intrigues against Empress Anna he was banished to Siberia and beheaded at Novgorod, Nov. 6, 1739.—Peter Vladimirovitch, born at Moscow in 1807, was banished by Emperor Nicolaus on the publication of his work *The Principal Families of Russia*, but pardoned later. He was again banished for life on having published *The Truth about Russia* (1860). He died at Bern, Aug. 17, 1868. He also wrote *France under the Bonapartist Régime* (1864); *The Question of Russian Serfdom* (1861). His *Memoirs*, published in Geneva from 1867–71, portray many of his contemporaries most effectively. G.A.S.

DOLGORUKIJ, Katharina Michailovna, Princess Jurjevskaja. She became the second wife of Alexander II, czar of Russia, July 31, 1880. After the violent death of the emperor, Princess Dolgorukij left Russia for Switzerland, where she, under the pseudonym of Victor Laférté, published *Alexandre II: Détails Inédits sur sa Vie Intime et sa Mort* (1892). G.A.S.

DOLICHOCEPHALIC. See Anthropology, Vol. II, p. 99.

DOLICHOS (Gr., *dolichos*, long), a large genus of climbing leguminous greenhouse or hardy herbs, with long twining stems fond of climbing trees, belonging to the order *Leguminosæ*. They possess trifoliate leaves, the flowers, either solitary or in racimes, spring from the bases of the leaves and produce edible legumes and pulses. *D. sesquipedalis* is a native of tropical America, has pods a foot long containing 7 to 10 kidney-shaped seeds. W.R.B.

DOLIUM, a genus of gastropodous molluscs, family *Doliidæ* (tun-shells), inhabiting tropic seas. They are globose, somewhat compressed and spirally ribbed. *D. galea* has a shell 8 to 10 inches long. R.W.C.

DOLL, an image, usually representing a little girl, but sometimes a boy or man, and used as a toy. The word *doll* is of doubtful derivation; various etymologies have been suggested. The use of dolls dates from the most remote times, and is common in all countries, barbarous as well as civilized. The love of dolls is a perfectly legitimate feeling, and its exercise helps to cultivate not only tender affections, but also taste as regards the making and management of children's dresses. Accordingly, the keeping of dolls becomes a part of the home education of girls, and is recognized to be so by the universality of the practice. Dolls at one time were imported chiefly from the Netherlands, and hence not an unusual name for a doll was "Flanders baby." These old Flemish or Dutch dolls were made of wood with neatly formed faces and flashy dresses, the cheaper kinds having slender wooden legs. Latterly, there have been great improvements in the making of dolls, and it has assumed the character of a manufacture; but there are still large importations from the countries on the Rhine, France and Switzerland. The discovery and perfection of the phonograph marks a new era in the manufacture of these toys, and talking dolls are now almost as common as the ordinary wax dolls were a few years ago.

DOLLAR-BIRD, a name given to the bird

Eurystomus australis (family *Coraciidæ*, or rollers), from the fact that it exhibits a circular light wing-patch when flying. It inhabits tropical Africa, Australia and parts of Asia. R.W.C.

DOLLART ZEE, the indentation of the North Sea formed by tidal inundations of the 13th century, at the estuary of the Ems River between Hanover, Germany, and the Netherlands. It is about ten miles long and seven broad. C.L.S.

DÖLLINGER, Johann Joseph Ignaz, a German theologian; son of the physiologist Döllinger; born in Bamberg, Bavaria, Feb. 28, 1799. He was appointed in 1822 chaplain at Oberscheinfeld in the diocese of Bamberg, in 1823 professor of church history and ecclesiastical law at the lyceum of Aschaffenburg, and in 1826 at the University of Munich, afterward provost of the collegiate church of St. Cajetan in Munich and archiepiscopal councilor, and also first librarian at the university library. In 1845 he was made representative of the university in the Bavarian diet. In 1857 he visited Rome and soon afterward it became evident that his religious views had undergone a change. Public announcement was made of this in a course of lectures which he delivered at Munich, in which he declared the temporal power of the Pope not an essential part of the Roman Catholic Church, and he vindicated this position in a treatise on *The Church and the Churches* (1861). In 1874 he presided over a conference of Old Catholics at Bonn, and here he declared that he did not hold himself bound by the decisions of the Council of Trent. His principal works are *Mohammed's Religion* (1838); *Die Reformation, ihre innere Entwickelung und ihre Wirkungen im Umfange des Lutherischen Bekenntnisses* (1846); *Hippolytus und Kallitus* (1853); *Heidenthum und Judenthum* (1857); *Christenthum und Kirche, zur Zeit ihrer Grundelegung* (1860), and *Kirche und Kirchen* (1861); *Lectures on the Reunion of the Churches* (1872); *The Sects of the Middle Ages* (1890). He died in Munich, January 10, 1890. W.M.C.

DOLLIVER, Jonathan Prentiss, United States Senator of Iowa. He was born near Kingwood, Va. (afterward W. Va.), February 26, 1858; graduated from the West Virginia University in 1875; was admitted to the bar in 1878, and was elected to Congress in 1889, and re-elected five successive terms when he was appointed Senator, 1900, to fill a vacancy, and was elected to succeed himself in 1902.

DOLLY VARDEN TROUT, a charr, differing from the true trout in the number and arrangement of its teeth. It is a variety of the common brook-trout. R.W.C.

DOLMENS. See Rude Stone Monuments, Vol. XXI, p. 57.

DOLOMITE. See Geology, Vol. X, p. 203.

DOLPH, John Henry, artist; was born at Fort Ann, N. Y., on April 18, 1835, and studied portrait painting at Cleveland in 1855–58, worked in New York in 1863–70, and studied in Antwerp in 1870–73, and in Paris in 1880–83. He became an associate of the National Academy in 1877, and a member in 1899. He was for many years a member of the Society of American Artists. He has painted many portraits of well known men, but in later years has devoted himself largely to cats, dogs, and other animals. Among his best known pictures are *A Knickerbocker Farmyard; A Country Blacksmith; The Rehearsal; Alexander and Diogenes*, and *The Antechambers.* W.F.J.

DOLPH, Joseph Norton, senator; was born near Watkins, New York, on October 19, 1835, studied and taught in public schools, was admitted to the bar in 1861, and went across the plains to Oregon a year later. He established himself in legal practice at Portland, became city attorney in 1864, and United States District Attorney in 1865. He was prominently associated with the development of the railroad systems of the northern Pacific coast, and was a leader of the Republican party. He served in the Oregon legislature in 1866–72 and in 1874, and in 1883 became a United States Senator, serving by re-election until 1895, and filling a commanding place in that body. He died on March 10, 1897. W.F.J.

DOM or DON, from Latin *Dominus*, Lord, a title originally assumed by ecclesiastical dignitaries, and still used in Benedictine and Carthusian communities. In Portugal and Brazil it is applied to the sovereign and to all men of high social or official standing. In Spain the form *don* is similarly used, often in combination with señor. In Germany *dom* is applied to church edifices. W.F.J.

DÖME, Mrs. Zoltan F., best known by her stage name of Nordica; was born at Farmington, Maine, on December 12, 1859, her maiden name being Lillian Norton. She was trained in singing at the New England Conservatory of Music in Boston, became an oratorio singer, went to England with P. S. Gilmore's concert band, studied for the opera stage in Milan, and made her *début* at Brescia in *La Traviata*. Since then she has made steady progress, until for some years she has ranked as one of the two or three greatest dramatic sopranos in the world — perhaps the very greatest. She has nearly 50 operas in her repertory, and sings equally well in English, French, Italian or German. She was married in 1883 to F. A. Gower, an electrical engineer, who lost his life in a balloon voyage in 1884. In 1896 she was married to Zoltan F. Döme, from whom she has since separated. W.F.J.

DOMESTIC ARCHITECTURE. The external forms and internal arrangements of the domestic abodes of a people are far more influenced by their manners, habits and occupations, and by the climate in which they live, than their ecclesiastical edifices and public buildings, and there is, consequently, no department of architecture which is so varied and national as domestic architecture. But not only are the circumstances of each country different in this respect, but the same is the case with every department in each country, with every town in each department, with every street in each town; and a domestic architecture which fulfills its object

will only adapt itself to the necessities, but will also make the best, in point of artistic effects, of the specialties of every case with which it is called upon to deal. The circumstances of families, and even the tastes and fancies of individuals; are legitimate subjects of consideration in domestic architecture. See also ARCHITECTURE, Vol. II, pp. 334–419, and in these Supplements.

DOMETT, ALFRED, one of the favorite minor poets of English literature; was born in England on May 20, 1811, and was educated at Cambridge. He early manifested a roving disposition, and came to America for two years. Next he wandered over the continent of Europe. Returning to England, he practiced at the bar for a year, and then, in 1842, went to New Zealand among the pioneer settlers in that land. There he remained, became secretary of the colony, and finally, in 1862, its prime minister. He returned to England in 1871, and died on November 11, 1887. His *Christmas Hymn: Old Style*, beginning "It was the calm and silent night," has become well known the world around. He published half-a-dozen volumes, including one of prose. He was a close friend of Browning, who wrote his poem of *Waring*, on Domett's departure for New Zealand, "Waring" being his pen-name for Domett. W.F.J.

DOMINO, the name formerly given to the garb worn in winter by priests while officiating in cold edifices. It is now used to signify a masquerade costume, consisting of an ample cloak or mantle with wide sleeves.

DOMINOES, the name of a game, usually played with twenty-eight oblong, flat pieces of ivory or bone, etc., each of which bears two numbers marked by points from naught to six. The attempt has been made to trace the game of dominoes back to the Greeks and Hebrews, and also to the Chinese. It is certain that it was introduced about the beginning of the eighteenth century from Italy into France, where it immediately became popular in the larger towns. It is a game requiring some skill, considerable powers of calculation being necessary to make the best combinations with the different numbers on the pieces.

DOMINUS, the Latin word which we commonly render "lord," but which more properly signifies master, as opposed to the slave (*servus*). Aurelianus is said to have been the first emperor who adopted *dominus* as a title of honor on his medals, though it had long been made use of in conversation and in correspondence in that sense. In legal phraseology, the *dominus litis* is the person really interested in the issue of an action, though not necessarily the pursuer.

DONALDSON, JAMES LOWRY, soldier, was born at Baltimore, Maryland, on March 17, 1814, and was educated at West Point (1836). In the Civil War he was chief quartermaster of the Middle Department, and furnished the supplies of Sherman's army in the whole campaign from Chattanooga to Savannah. He afterward established the system of national cemeteries. He died on November 4, 1885. W.F.J.

DONALDSONVILLE, Louisiana, the seat of Ascension Parish, and the former capital of the state, at the outlet of Bayou La Fourche into the Mississippi, 70 miles N.W. of New Orleans, and at the junction of a branch line with the Texas & Pacific railroad. It has sugar industries, and manufactures machine and foundry products, lumber and wood wares, bricks and ice. Pop., 1900, 4,105. C.L.S.

DONAX, a bivalve mollusk with triangular shell, found living and fossil in Europe and America.

DONDRA HEAD, Ceylon, the southernmost point of the island projecting into the Indian Ocean, 50 miles east of Point de Galle, in latitude 5° 55′ north, longitude 80° 38′ east. Near it is the small native village of Dondra Head with about 1,000 inhabitants engaged in sea fisheries and allied industries. C.L.S.

DONELSON, ANDREW JACKSON, diplomat, was born in Tennessee, and was graduated at West Point in 1820. He served as aide-de-camp to his uncle, Andrew Jackson, then governor of Florida, and afterward became a lawyer. In 1829 he was President Jackson's private secretary. In 1844 he was sent by President Tyler to negotiate the annexation of Texas, in 1846–49 he was United States minister to Prussia, in 1851 he became editor of the *Washington Union*, and in 1856 was the "American" party's candidate for the Vice-Presidency. Fort Donelson in Tennessee was named for him. W.F.J.

DONELSON, FORT, an important Confederate fortification on the Cumberland River, in northwest Tennessee. It was 12 miles from Fort Henry, on the opposite bank of the Tennessee River, both forts being in Stewart County. They were connected by road, and were about forty miles above the junction of the two rivers with the Ohio, and commanded the navigation of the rivers upon whose banks they were situated. They were of great strategic importance to the Confederates in their operations in the territory between Memphis and Bowling Green in the winter of 1861–62. The Federals decided upon a combined attack on these forts in January, 1862. A fleet of seven vessels, under the command of Commodore Andrew H. Foote, left Cairo, Illinois, February 2d, to be followed by an army consisting of 15,000 men, commanded by General Grant, who was delayed by bad roads. Foote, being impatient, opened fire on Fort Henry, February 6th, the fort being defended by 17 guns and 3,000 men under General Tilghman, who was forced to surrender in little more than an hour. General Tilghman and about seventy of his men were captured, the others of the garrison escaping to Fort Donelson. General Grant, after waiting to repair the damage done to the gunboats, pushed on Fort Donelson on February 12th, and arrived in front of the works the same day. Fort Donelson had been considerably reinforced by the arrival, on the 9th, of General Pillow, on the 12th, of General Buckner, and on the morning of the 13th, of General John B. Floyd. The latter assumed command of the entire force, now consisting of 16,000 men. The high ground to the rear of the fort had been well protected, and the whole aspect of affairs indicated

the difficulty of the capture of the place by the Unionists. General Grant at once commenced operations by investing the lines of the enemy, upon whom he also opened a cannonade, begun on the morning of the 13th. In the afternoon of the same day General McClernand attempted an assault upon the fort, but was repulsed with considerable loss. The next day the arrival of 10,000 additional troops raised the total number of land forces under Grant to 27,000. A combined attack then was determined upon by the land forces and the fleet. The fleet, however, had to commence operations alone, as General Grant found it impossible to get his troops into position to aid the attack of the fleet, which was compelled to retire after an hour and a half, every gunboat being more or less disabled, and 54 men being killed or wounded. General Grant then made his investment of the Confederate lines more complete and sat down to await the arrival of his reinforcements. The Confederates were quite aware of the situation, and early in the morning of the 15th they made a sudden sortie, but were at once met by the fire of their opponents. The engagement lasted until well in the afternoon, when General Grant ordered a general advance all along the line, driving the Confederates back upon their works, a position on the left within the Confederate lines being gained by the Federals. The loss on each side, in killed and wounded, was 2,000. The next morning, while General Grant was arranging for a more determined attack, the Confederate generals held a hurried consultation, when it was agreed by them to surrender. Generals Floyd and Pillow, with about two thousand men, escaped, leaving General Buckner to his own resources. The latter dispatched a flag of truce to General Grant to secure an armistice until noon and to inquire the terms of surrender. General Grant then sent back the reply to the Confederate general, which at once made his name famous when it became known to the world: "No terms other than unconditional surrender can be accepted. I propose to move immediately upon your works." The Confederates, having no other resource, at once accepted the terms; 14,625 prisoners, 65 cannon, 17,000 small arms, besides quantities of stores and munitions, fell into the hands of the Federals. The total loss of the latter was 2,832 killed, wounded or missing.

DONGAN, THOMAS, statesman, was born in Ireland in 1634. In 1682 he was made governor of New York and New England. He drafted a charter for the colonies, which James II suppressed as too liberal. He settled boundary disputes, secured charters for the cities of New York and Albany, succeeded to the earldom of Limerick in 1698, and died in 1715. W.F.J.

DONNELLY, IGNATIUS, an American author, born in Philadelphia, Pennsylvania, November 3, 1831. He removed to Minnesota in 1857; was elected lieutenant-governor in 1859, and again in 1861, and was then elected to Congress. He wrote *Atlantis, the Antediluvian World* (1882); *Ragnarok* (1883); and *The Great Cryptogram* (1888). His best known novel is *Cæsar's Column* (1890). He died in Minneapolis, Minnesota, January 2, 1901. W.M.C.

DONNER LAKE, California, near Truckee, in Nevada County, 11 miles N.W. of Lake Tahoe, on the Lake Tahoe and the Southern Pacific railroads, is a mountain lake resort in the Sierra Nevada much frequented by summer-tourists. A party of emigrants snowbound here in 1846 died from starvation with the exception of a few who subsisted on the dead bodies. The lake is named after their leader. C.L.S.

DOO, GEORGE THOMAS, one of the best English historical engravers of the century; born in the parish of Christ Church, Surrey, Jan. 6, 1800. His admirable rendering of Eastlake's *Italian Pilgrims Coming in Sight of Rome;* his exquisitely finished heads of women and children, after Lawrence; his engravings, *The Infant Christ*, from Raphael; *Ecce Homo*, from Correggio; *Knox Preaching Before the Lords of the Covenant*, from Wilkie, etc., have succeeded in winning for him a high place in the estimation of the admirers of his laborious art. In 1836 he was appointed historical engraver to William IV, and in 1842 to Queen Victoria. In 1851 he was elected a fellow of the Royal Society, and in 1856 a royal academician. He died Nov. 13, 1886.

DOOLITTLE, JAMES ROOD, statesman, was born at Granville, N. Y., on January 3, 1815, was graduated from Hobart College in 1834, became a lawyer and judge in Wisconsin, and was a United States Senator from Wisconsin from 1857 to 1869. In 1866 he sided with President Johnson, voted against his impeachment, and withdrew from the Republican party. He died on July 27, 1897. W.F J.

DOOM, 1. To condemn to any punishment. 2. A judgment, or decision, formally pronounced, mostly of adverse character. 3. Personal or private judgment. 4. The faculty of judgment of discrimination or discomment. 5. Fate, lot, irrevocable destiny (usually of adverse fate). 6. Final fate, destruction, ruin, death. 7. The action or process of judging trial. 8. The last judgment at the end of the world. W.R.B.

DOOM (OR DOUM) PALM. See ARABIA, Vol. II, p. 207.

DOON, a Scotch river rising in the southeast of Ayrshire, in Loch Enoch; runs northwest through Loch Doon, past Dalmellington, Burns's Monument and Alloway Kirk, to the Firth of Clyde. It was immortalized by Robert Burns in his poem *Ye Banks and Braes o' Bonnie Doon*, which has been read and sung wherever the English language is known.

DOOR AND DOORWAY. In art the form of the door is determined by the architectural style of the building in which it is placed. In classical buildings it is generally rectangular in form, though both Greeks and Romans, following the Egyptians, among whom the practice was almost universal, occasionally diminished the opening toward the top, and the Romans, in later times, very frequently threw over it the circular arch, which was the characteristic feature of their style. Egyptian doors are known to us, for the most part, only by the examples which remain in monumental structures, and these, like the other mem-

bers of the style thus exhibited, are of gigantic proportions. The door of the temple at Edfoo measures seventy-four feet to its summit. With the Egyptians the door was an architectural object of very great importance. On either side colossal statues or obelisks were placed, and often the approach to it was lined with rows of gigantic sphinxes. The Greek door was surrounded by moldings, and as the lintel or top stone which covered it projected on both sides beyond the jambs, the moldings which ran around both sides jutted out at the place of meeting, forming a sort of shoulder. This arrangement, however, was by no means uniform, the moldings of the jambs often being separated from those of the architrave, as is the beautiful door of the Erechtheum. The doors themselves, in private dwellings of antiquity, were usually of wood, and in structures devoted to religious or public purposes, of metal, and occasionally of marble. They generally were paneled, and turned on pivots working in sockets. With the exception of the forms of the windows and the tracery and foliage of the pillars, doors are the most characteristic features of all the styles of Gothic architecture.

DOORGA OR DURGA, a Hindu divinity, one of the names given to Paravati, the consort of Siva. She is the Amazonian champion and protectress of the gods, and has been compared to the Olympian Juno, and the Pallas or armed Minerva of the Greeks. She is represented with ten arms. In one hand she holds a spear, with which she is piercing the giant Muhisha; in another, a sword; in a third, the hair of the giant, and the tail of the serpent turned around him; and in others, the trident, discus, axe, club and shield.

DOORNBOOM, the Dutch name given to the *Acacia horrida*, or "thorn tree," a native of South Africa, having numerous sharp spines. W.R.B.

DORA D'ISTRIA, pseudonym. See KOLTZOFF-MASSALSKY, in these Supplements.

DORAMA, Arabia, an agricultural town and supply depot of Nejd on the central plateau, at the junction of several caravan routes, 450 miles northeast of Mecca. The ruins of Derayeh are 30 miles to the south. Pop., 8,000. C.L.S.

DORAN, JOHN, an English author, of Irish parentage; born in London, March 11, 1807. He was educated chiefly in France and Germany, and became tutor in four noble British families. He was early attached to literature, and in 1822 produced a melodrama, *The Wandering Jew*, which was acted at the Surrey Theatre, London. His *History of the Borough of Reading* secured for him the degree of Ph.D. from Marburg, Prussia. Among his many works are, *Table Traits; Knights and Their Ways; Queens of the House of Hanover; Monarchs Retired from Business; The Book of the Princes of Wales; Their Majesties Servants; The History of Court Fools*, etc. He wrote the articles *Beard* and *Dwarf* for the BRITANNICA; was elected an F.S.A.; and was editor of *Notes* and *Queries* at the time of his death, which occurred in London, Jan. 25, 1878. R.C.A.

DORCHESTER, Massachusetts, the southern corporate portion of Boston city on Dorchester Bay in Suffolk County. Prior to 1869 it was a manufacturing city of Norfolk County, four miles south of Boston, and was founded in 1630 by Puritan settlers from Dorchester, England. It was the parent colony of Windsor & Hartford, Connecticut, whose 100 founders went there through the wilderness in 1636. C.L.S.

DORCHESTER, New Brunswick, a town of Westmoreland County on an upper reach of Shepody Bay, 90 miles northeast of St. John's on the Intercolonial railroad. It is a port of entry with an active export trade in bituminous coal and quarried stone. Population, 2,000. C.L.S.

DORÉ, PAUL GUSTAVE, painter and illustrator; was born in Strasburg on January 6, 1832, and in 1845 settled in Paris, where, two years later, he began to exhibit pen and ink work at the Salon. He became a member of the staff of an illustrated paper, but won most fame as an illustrator of books. He illustrated the works of Rabelais (1854), of Eugene Sue (1855), and Balzac (1856). His greatest work was done in Dante's *Divina Commedia*, especially the *Inferno* (1863–68), and he also illustrated the *Tales* of Perrault; *Don Quixote;* Milton's *Paradise Lost;* the Bible; Tennyson's *Idyls of the King;* La Fontaine's *Fables*, and other works. Between 1850 and 1870, according to his own word, he earned $1,400,000 with his pencil. He also painted many pictures, chiefly historical and Biblical in theme, and produced some creditable statuary. He most excelled, however, in grotesque, weird and terrible portrayals, such as those of the *Inferno* and of *Don Quixote*. He began in 1882 a monument to the elder Dumas, but left it unfinished at his death, which occurred in Paris on January 23, 1883. W.F.J.

GUSTAVE DORÉ.

DOREMUS, ROBERT OGDEN, chemist, was born in New York city on January 11, 1824, and was educated at New York University, being graduated from its collegiate department in 1842 and from its College of Medicine in 1851. He studied chemistry and metallurgy in Paris in 1847, and in 1848 opened a laboratory of analytical chemistry in New York. He became professor of chemistry in the New York College of Pharmacy in 1849, and in 1851 after receiving his degree as doctor of medicine, took a similar professorship in the College of the City of New York. He was one of the founders of the New York Medical College, and of the Long Island College Hospital in Brooklyn. He became professor of chemistry and toxicology in the Bellevue Hospital Medical College in 1861, and in Paris in the two following years he perfected a system of manufacturing compressed granulated gunpowder, which was adopted by the

French government. He also invented a chemical fire extinguisher which came into wide use. His method of disinfecting plague ships with chlorine-gas was adopted by the United States quarantine service. For some years he was president of the board for examining druggists and prescription clerks, in New York. He ranked as one of the foremost chemical experts, and his services were frequently called into requisition in the courts. He delivered many popular lectures, and wrote much for the periodical press. Died Mar. 22, 1906.W.F.J.

DOREMUS, Sarah Platt, philanthropist, was born (Platt) in New York City on August 3, 1802, the child of rich and philanthropic parents. She married Thomas C. Doremus, a rich merchant, and had nine children, her only son being Robert Ogden Doremus (q. v.). She organized a mission for the relief of the Greeks in their war with the Turks in 1828, interested herself in Canadian missions in 1835, and in 1840 began services for the reformation of the prisoners in the New York City prison, in which last-named work she labored for thirty-seven years. She founded the Isaac T. Hopper Home, in 1842, for women released from prison, and was for many years the president of its board of managers. She became a manager of the New York City Mission and Tract Society in 1841, and of the City Bible Society in 1849, and in 1850 she founded the House and School of Industry. In 1854 she was one of the founders of the Nursery and Child's Hospital, and the next year, at the suggestion of Dr. J. Marion Sims, she secured the foundation of the Woman's Hospital. In 1860 she was the chief founder of the Woman's Union Missionary Society, during the Civil War she labored effectively for the welfare of the soldiers of the Union army in the hospitals, in 1866 she was one of the organizers of the Presbyterian Home for Aged Women, and in 1876 she was one of the committee for organizing the Gould Memorial. She was interested in the relief of the Irish famine in 1869, and gave much time, labor and money to many other good works, and after a career of memorable usefulness she died in New York on January 29, 1877. W.F.J.

DORLAND, William Alexander Newman, physician, was born at Hilton Head, S. C., on December 26, 1864, and was educated in the medical college of the University of Pennsylvania. He has written several medical handbooks. W.F.J.

DORN, Johann Albrecht Bernhard, a German Orientalist; born at Scheuerfeld, Saxe-Coburg, March 11, 1805. In 1829 he was appointed ordinary professor of Oriental languages at the Russian University of Charkow, and in 1845 became professor of history and Asiatic geography at the Oriental Institute at St. Petersburg. In 1843 he was made keeper of the Imperial Library and director of the Asiatic Museum. He published many translations of Oriental works on history and geography, and also a valuable book as the result of a scientific journey to the Caucasus, entitled *Caspian Invasion of the Ancient Russians in Taberistan*. He died in St. Petersburg, May 31, 1881.

DORNICK, DORNIC or DORNOCK, a species of figured linen, deriving its name from Dornich, or Tournay, in the Netherlands, where it was formerly made in considerable quantity.

DORR, Julia Caroline Ripley, author, was born at Charleston, South Carolina, on February 13, 1825, the daughter of W. Y. Ripley, and was educated in Vermont, whither she was taken in infancy. She was married in 1847 to Seneca M. Dorr, who died in 1884. Mrs. Dorr has long been a popular writer, in both poetry and prose, for both juvenile and adult readers. She has published many volumes, and has contributed much to various periodicals. Among her best-known works are *Farmingdale*, *Lanmere*, *Friar Anselmo*, *The Flower of England's Face*, *A Cathedral Pilgrimage*, *In Kings' Houses* and *Afternoon Poems*. W.F.J.

DORR, Thomas Wilson, an American politician; born in Providence, R. I., Nov. 5, 1805. He was educated at Phillips Academy, Exeter, N. H., and was graduated at Harvard in 1823. He studied law under Chancellor Kent; was admitted to the bar in 1827; and commenced practice in Providence. Originally a Federalist, he became a Democrat in 1837. The government of Rhode Island at that time was based on a charter granted by Charles II in 1663, and the apportionment of representation in the legislature was greatly at variance with the distribution of population. The elective franchise was limited to the holders of a certain amount of real estate and to their eldest sons. About one-third only of the citizens were voters. Mr. Dorr was a member of the Assembly, 1833–37, and exerted himself to procure the substitution of a liberal constitution in place of the old charter, but his movement for reform was defeated by 70 votes to 7. He then organized a suffrage party, which in 1841 called a State convention to frame a new constitution, which was submitted for ratification to the popular vote. It received 14,000 votes, a clear majority of the citizens of the State. The charter party contended that the proceeding was seditious, and that a large proportion of the votes were fraudulent. The suffrage party proceeded to hold an election for State officers, in which Mr. Dorr was chosen governor, and a legislature, composed exclusively of his supporters, was elected. The charter party also held a legal election for State officers, polling 5,700 votes, while the suffrage party claimed to have polled 7,300. On May 3, 1842, Mr. Dorr's government attempted to organize at Providence and to seize the reins of power. They were resisted by the legal State government, which organized at Newport on the same day. Both sides appealed to arms. Gov. King proclaimed the State under martial law, called out the militia, and asked for and obtained Federal aid to suppress the insurrection. On May 18 a portion of the suffrage party assembled at Providence under arms, and attempted to seize the arsenal, but dispersed on the approach of a military force. Another assembly at Chepachet, ten miles from Providence, dispersed without resistance on May 25, and the

affair was over on the 28th. Mr. Dorr fled, but soon returned and was convicted of high treason, and sentenced to life imprisonment. He was pardoned in 1847, and in 1853 the legislature restored his civil rights, and ordered the record of his sentence to be expunged. He died in Providence, Dec. 27, 1854. E.E.T.

DORSEY, James Owen, ethnologist, was born in Baltimore, Md., on October 31, 1848, and was educated for the ministry at the Theological Seminary of Virginia, in 1871. He became a clergyman of the Protestant Episcopal Church in 1873, and foi five years was engaged in pastoral work in Maryland. He then turned his attention to scientific investigations, and became connected with the United States Geological and Geographical Survey, as ethnologist. In that capacity he worked in the Rocky Mountain region, and spent much time at the Omaha Indian reservation in Nebraska. Later he was employed in the United States Bureau of Ethnology at Washington, where he was recognized as a leading authority upon the ethnology of the North American Indians. In 1885 he was made secretary of the Anthropological Society, of Washington, D.C. In addition to numerous official reports he wrote *Comparative Phonology of the Four Sioux Languages*, *Sioux Folklore and Mythological Notes*, *Kansas Mourning and War Customs*, and *Indian Personal Names*. These works are instinct with a thorough and sympathetic knowledge of the subjects treated, and are esteemed as standard authorities. Mr. Dorsey died at Washington, D. C., on February 4, 1895. W.F.J.

DORSHEIMER, William, an American lawyer and journalist; born in Lyons, New York, February 5, 1832. He was admitted to the New York bar in 1861 and in 1867 was appointed United States district attorney for northern New York. In 1875 he was elected Democratic lieutenant-governor and in 1883 was elected to Congress. In 1885 he was appointed United States district attorney. In 1884 he wrote *The Life of Grover Cleveland*, and for two years was editor of the New York *Star*. He died in Savannah, Georgia, March 26, 1888. W.M.C

DORSIVENTRAL, in botany, a term applied to a plant body or organ which has two surfaces, dorsal and ventral, which differ from each other in structure or in the organs they bear. A thallus, such as that of liverworts, is an example of a dorsiventral body; many foliage leaves are examples of dorsiventral organs.

DORTURE (old Eng., *dorter;* Fr., *dortoir*), a long room in a convent, divided into a succession of small chambers, or cells, where the inmates sleep. It usually has immediate access to the church or chapel, for the convenience of attendance on services during the night.

DORY (nautical), a small boat of simple construction, flat-bottomed, and much used in seafisheries as a go-between from the larger boat and the shore, in loading and unloading. It is also used to go in from the larger vessel in catching fish.

DOSTOJÉVSKIJ, Feodor Michailovitch, a Russian novelist; born at Moscow, Nov. 11, 1822. His first story *Poor People* (1846), portraying the truthful condition of Petersburg officialdom, was followed by other novels, treating on life of the small gentry, among them *The Double* and *A Weak Heart*. Involved in the plot of Petrashevskij, in 1849, he was condemned to death, but sentence was commuted to ten years of exile in Siberia. Pardoned in 1856, he returned to St. Petersburg, where he published *The Humiliated and Wronged* (1861); *Memoirs from a Dead House* (1861–62); *Crime and Punishment* (1867); *Guilt and Atonement* and *The Idiot* (1868); *Demons* (1872). He died Feb. 9, 1881. G.A.S.

DOTEREL (*Charadrius morinellus*), a species of plover inhabiting northern Europe and Asia in summer, breeding chiefly in the highest latitudes. On the approach of winter, it migrates to the countries around the Mediterranean, and to others of similar climate. See Killdeer, Vol. XIV, p. 78.

DOUAY BIBLE, The, the name given to the translation of the Holy Scriptures current among English-speaking Roman Catholics. The college of Douay, France, was founded in 1568, by Catholic exiles from Great Britain. Here Dr. William (afterwards Cardinal) Allen, Dr. Gregory Martin, Dr. Richard Burton and John Reynolds, all educated at the University of Oxford, conceived the idea of writing an English version of the Bible to be made from the Vulgate with comparison of the Hebrew and Greek texts. Owing to political troubles they found it necessary to transfer the college to Rheims. Here the New Testament was published in 1584. The Old Testament, translated by Martin, with notes by Dr. Worthington, was published in 1610 at Douay, and hence the version as a whole is commonly known as the Douay Bible. This version has never received Papal approbation. W.R.B.

DOUBLE CONSCIOUSNESS, a term applied by some to an abnormal condition having various forms, and arising probably out of latent modifications of the mind. The patient may have alternate periods in which he has no recollection in one of what occurred in the other, or he may imagine himself successively to be different persons, or he may seem to himself to be confronted by another personality within him, as in the case of demoniacal possessions in the New Testament.

DOUBLEDAY, Abner, soldier, was born at Ballston Springs, N. Y., on June 26, 1819, and was educated at West Point, where he was graduated in 1842. He served in Mexico and in the last Seminole War, and was in garrison at Fort Sumter at the outbreak of the Civil War, being second in command. It fell to his lot to aim and fire the first gun fired on the Union side in the war, in defense of Fort Sumter. Later he was engaged in the defense of Washington, and fought at the second battle of Bull Run, at Fredericksburg, Chancellorsville, and Gettysburg. He was one of the defenders of Washington against General Early's

raid in 1864, and in 1865 was made a major-general by brevet in the regular army. He retired from active service in 1873 and thereafter lived at Mendham, New Jersey, where he died on January 26, 1893. General Doubleday was a soldier of marked ability, of modest and unpretentious demeanor, and of attractive personality. He wrote *Reminiscences of Forts Sumter and Moultrie, Chancellorsville and Gettysburg*, and *Gettysburg Made Plain*. W. F. J.

DOUBLE STARS. See ASTRONOMY, Vol. II, p. 716.

DOUBLE-SHOTTING, an augmentation of the destructive power of ordnance, by doubling the shot fired off at one time from a gun. Sometimes three shots are fired at once, in which case the piece is said to be "treble-shotted."

DOUBLING GAP SPRINGS, a health-resort of Cumberland County, Pennsylvania, central southern Pennsylvania, 30 miles W. of Harrisburg. Many chronic diseases are cured by the use of water from these springs. Some of the springs are saline-sulphuric, and others are carbonated saline chalybeate.

DOUBLING THE CUBE, a celebrated geometrical problem among the ancients. The object was to find the side of a cube whose contents should be twice that of another given cube; and various accounts are given of how the problem was suggested.

DOUBLOON, a Spanish coin, originally equal in value to a double pistole, from which fact it took its name. From 1730 to 1772 the value of the double pistole was equivalent to $8.24; from 1772 to 1786, $8.08; and from 1786 to 1848 to $7.87. The current Spanish doubloon of Isabella II, of 1848, is of the value of 100 reals and is worth a little more than $5.02, which value it retained until 1868. The coinage of doubloons has ceased in Spain.

DOUCET, CHARLES CANILLE, a French dramatic author; born in Paris, May 16, 1812; studied law and practiced as a notary. He soon began to devote himself to dramatic composition, and produced, in collaboration with Antoine Bayard, in 1838, the vaudeville *Léonce*. He wrote a number of plays, which were published in 1858, under the title *Comédies en Vers*, and which were produced at the Théâtre Français. They included *Un Jeune Homme; L'Avocat de sa Cause; Ennemis de la Maison;* and *Le Fruit Défendu*. He produced, also, many other works, both of a poetical and dramatic nature, such as *La Considération*, a drama in four acts (1860); *Le Chant du Cygne* and *Le Juin, 1606*, both in verse. In 1853 he became divisional chief of theaters, and had in this capacity the supreme charge of the Paris theaters as well as those in the departments. In 1865 he was elected a member of the Academy and, 11 years later, became its permanent secretary. He was elected several times as member of the council-general of the Yonne for the district of Ville-Neuve l'Archevêque, and in 1891 was promoted to be grand officer of the Legion of Honor. He died in Paris, April 1, 1895.

DOUCET, HENRY LUCIEN, a French artist; born in Paris, August 23, 1856; entered the School of Fine Arts in 1874; and was a pupil of Lefebvre and of Boulanger. He obtained the *Grand Prix de Rome* in 1880, and made his *début* at the Salon in 1877 with *Adam and Eve;* afterward producing a great number of works and portrait designs. His *Mme. Galli-Marié* of the Opera Comique, was a remarkably striking portrait. Among his other works are *Atala* (1878); *Après le Bal* (1888); and *Figure Nue* (1890); *Portraits de Mes Parents* (1891). He obtained a gold medal at the exposition of 1889; and received the decoration of the Legion of Honor in 1891.

DOUGHERTY, DANIEL, an American orator; born in Philadelphia, Pennsylvania, October 15, 1826. He studied law and was admitted to the bar in 1849. He was originally a Democrat, but during the Civil War became a Republican and made numerous speeches in the Lincoln campaign. In 1876 he again joined the Democratic and as a delegate to the National Democratic conventions of 1880 and 1888 made nominating speeches for Hancock and Cleveland He became widely known as a popular orator and met with considerable success upon the lecture platform. He was popularly called "The Silver-tongued Orator." He wrote three books, *American Politics; Orators and Oratory*, and *The Stage*. He died in Philadelphia, September 5, 1892. W. M. C.

DOUGLAS, ARCHIBALD, EARL OF ANGUS. See SCOTLAND, Vol. XXI, pp. 517 et seq.

DOUGLAS, SIR HOWARD, Baronet; was born at Gosport, England, the son of Admiral Sir C. Douglas, in 1776, and entered the British army. He served in Canada in 1795, and in the Peninsular War, being present at Corunna. He was governor of New Brunswick, Canada, and founder and chancellor of the University of Fredericton; Lord High Commissioner of the Ionian Islands, and a member of Parliament. He was the author of a number of treatises on military and naval affairs, including *An Essay on Military Bridges; Naval Gunnery; Observations on Carnot's Fortification*, and *Naval Evolutions*. His treatise on bridges is said to have suggested the invention of suspension bridges, while his treatise on naval gunnery was widely reproduced in other countries. He died on November 9, 1861. W. F. J.

DOUGLAS, SIR ROBERT KENNAWAY, Chinese scholar and Orientalist; was born in Devonshire, England, on August 23, 1838. He served in China as a consul from 1858 to 1865, and in the latter year was appointed assistant in charge of the Chinese department of the British Museum. He has long been professor of Chinese in King's College, London, and since 1892 has been keeper of Oriental books and MSS. at the British Museum. He was knighted in 1903, and is the author of a *Life of Li Hung Chang;* a *History of China;* a *Chinese Grammar*, and various other works on China. W. F. J.

DOUGLASS. DAVID BATES, an American engineer; born in Pompton, N. J., March 21,

1790. He graduated at Yale in 1813, and entered the army. He took part in the battle of Niagara and in the defense of Fort Erie. In 1815 he was appointed assistant professor of natural and experimental philosophy at West Point. He was a member of the boundary commission in 1819–20, and in the latter year was promoted to the professorship of mathematics at West Point. In 1823 he was transferred to the chair of civil and military engineering. In 1831 he resigned this position and became chief engineer of the Morris Canal. In 1832 he was appointed professor of civil architecture in the University of the City of New York and prepared the designs for its building. In 1833 he planned the Croton aqueduct to supply the city of New York with water, and was appointed chief engineer to the commission, but had accomplished only the preliminary work when he was superseded. In 1840 he was elected president of Kenyon College, but resigned the office in 1844. In 1848 he was elected professor of mathematics and natural philosophy at Geneva College, and entered on his duties in October of that year. He planned several cemeteries, including Greenwood, at Brooklyn, N. Y., one at Albany, N. Y., and one at Quebec. He died in Geneva, Oct. 19, 1849. E.E.T.

DOUGLASS, Frederick, an American journalist, diplomat and orator; born in Tuckahoe, Maryland, in February, 1817. His father was a white man; his mother a mulatto slave. He learned to read and write and early developed natural talents as an orator. Though his father was white, he was, according to the law, reared as a slave. In 1832 he was purchased by a Baltimore ship-builder, but made his escape in 1838 and settled in New Bedford, Massachusetts. Here he came into prominence as a public speaker and his speeches attracting the attention of the abolitionists, he was persuaded, in 1841, to devote his time and talents to the colored race. He was therefore employed by various anti-slavery societies. In 1844 he wrote his autobiography and the next year went abroad and lectured on slavery in England, Ireland and Scotland. In December, 1847, he commenced the publication of the *North Star*, a weekly newspaper at Rochester, New York. It was afterwards called *Frederick Douglass's Paper* and was published successfully for sixteen years. In 1859 he was accused of complicity in the raid made by John Brown on Harper's Ferry, and sought refuge in England. During the Civil War he raised two regiments of negro troops in Massachusetts, and in 1870 began the publication of the *New National Era*, in Washington. In 1871 he was appointed by President Grant a member of the commission sent to Santo Domingo and in 1872 was a Republican presidential elector in New York state. In 1877 he was appointed by President Hayes United States marshal for the District of Columbia and in 1881 President Garfield appointed him recorder of deeds for the District of Columbia. In 1889 he was appointed by President Harrison United States minister to Hayti, which office he resigned in 1891. During his public life he was president of three National conventions of negro citizens. In 1881 he published a revised edition of *My Bondage and My Freedom*. In 1892 the government of Hayti appointed him a commissioner to the Columbian Exposition. He died in Washington, February 20, 1895. W.M.C.

FREDERICK DOUGLASS.

DOUGLASS, Sir James Nicholas, an English engineer; born in London, Oct. 16, 1826. He studied civil and mechanical engineering, and, after a regular training for the profession, became, in 1847, assistant engineer to his father, who was the superintending engineer to the Trinity House, the English governmental department having charge of lighthouses, buoys, channels and coast navigation, which at that time was engaged in building a lighthouse on the Bishop Rock, the westernmost of the dangerous rocks of the Scilly Isles. After this work was completed, he was appointed resident engineer in sole charge of the erection of a lighthouse on the chief rock of the dangerous group of the Smalls, off Milford Haven. This work he completed with a saving, in cost, to the government, of $75,000 on the amount of the lowest estimate. In 1862, on the death of the engineer-in-chief to the Trinity House, he was appointed to that office, in the execution of which he carried out many important engineering works; amongst others, the erection of the Wolf, Longships, Great and Little Bass, new Eddystone, and Muricoy lighthouses. He effected many improvements in the construction of lanterns and in the mechanism of optical, electrical, oil, and gas illuminating apparatus. He was knighted on the completion of Eddystone lighthouse, in the erection of which he saved $120,000. He was elected a member of the institutions of civil engineers, mechanical engineers, and electrical engineers, and in 1887 a fellow of the Royal Society.

DOUKHOBORS. See Duchobortzi, p. 460, this volume.

DOURO RIVER. See Spain, Vol. XXII, 309.

DOUROUCOULI or DURUKULI, the name of a small South American monkey of the genus *Nyctipithecus*. It is nocturnal in its habits.

DOVE. In Christian art the dove is employed as an emblem of the Holy Ghost, no doubt from the fact of this being the form in which the Spirit descended upon Jesus at his baptism. From the dove being used to symbolize purity, it generally is represented white, with its beak and claws red, as they occur in nature. In the older pictures a golden nimbus surrounds its head, the nimbus frequently being divided by a cross, either red or black. In stained-glass windows we see the dove with seven rays proceeding from it, terminating in seven stars, significative of the seven gifts of the Holy Spirit. Holding an olive branch, the dove

is an emblem of peace. When seen issuing from the lips of dying saints and martyrs, it represents the human soul.

DOVÉ, Heinrich Wilhelm, a German physicist; born at Liegnitz, Oct. 6, 1803. In 1828 he became assistant professor of natural philosophy at Königsberg, and in 1829 at Berlin. He was made full professor in the latter university in 1845, and elected a member of the Royal Academy of Sciences. He applied the stereoscope to the detection of forged bank-notes. Among his many works, the two best known, outside of Germany, are his *Distribution of Heat on the Surface of the Globe*, published by the British Association in 1853; and *The Law of Storms* (1874). He died April 4, 1879. See Acoustics, Vol. I, p. 102.

DOVE, Richard Wilhelm, professor of canonic law, son of the preceding; born in Berlin, Feb. 27, 1833; professor at Tübingen in 1863; at Kiel, in 1865; and at Göttingen, in 1868; elected to Parliament in 1871, and called to the Upper House in 1875. He published most of his works in *Zeitschrift für Kirchenrecht*, of which he was a founder, and also revised *Lehrbuch des Kirchenrechts* by Richter. G.A.S.

DOVEKIE or SEA-DOVE. See Guillemot, Vol. XI, p. 233.

DOVER, Delaware, the seat of Kent County and the capital of the state, on Jones Creek, 10 miles W. of its entrance in Delaware Bay, and 75 miles S. of Philadelphia on the Delaware division of the Pennsylvania railroad. The state house is the principal building and among educational establishments is the Wilmington (Methodist Episcopal) Conference Academy. The industrial interests are connected with farming, fruit, berry and vegetable growing, distilleries, and various manufactures. Pop., 1900, 3,329. C.L.S.

DOVER, a city of southeastern New Hampshire and capital of Strafford County. Dover is the oldest town in the state, having been settled in 1623. It is abundantly supplied with water-power from the Cocheco River, which has here a direct fall of 32 feet. The site of the city is hilly or uneven, and many of the streets cross each other obliquely. Population, 1890, 12,790; 1900, 13,207. See Dover, Vol. VII, p. 330.

DOVER, a town and the capital of Piscataquis County, north-central Maine, on the Piscataquis River, and the Bangor and Aroostook railroad, 65 miles N.N.E. of Augusta, in a farming district. It manufactures woolens, pianos and organs, furniture and spools. Population, 1900, 1,889.

DOVER, New Jersey, a town of Morris County, 38 miles N.W. of New York city, on the Rockaway River and Morris canal, and on the Delaware, Lackawanna & Western and the Central of New Jersey railroads. It has foundry, machine, and railway repair shops, silk mills and other factories, and is a busy center for a farming and summer-resort region. Pop., 1900, 5,938. C.L.S.

DOVER, Tennessee, the seat of Stewart County, on the Cumberland River, and on a branch line of the Tennessee Central railroad to Bear Spring, two miles S.E. Steamers facilitate the export of its iron mining, smelting, and agricultural products. Pop., 1900, 400. C.L.S.

DOVER'S POWDER, a preparation of powder of ipecacuanha, one dram; opium, in powder, one dram; and sulphate of potash, one ounce. The whole is thoroughly mixed, and the ordinary dose is from five to ten grains. Occasionally, saltpeter is added, as well as camphor. It acts as a sudorific, increasing the proportion of sweat, or sensible perspiration.

DOW, Neal, reformer; was born at Portland, Maine, on March 20, 1804, and was educated in a Friends' School in Massachusetts. Early in life he became an earnest advocate of total abstinence from alcholic liquors, and was the author and chief advocate of the famous "Maine law," which was adopted by the legislature in 1851, prohibiting the manufacture and sale of liquor within that state. He was for the rest of his life one of the foremost leaders of the prohibition movement in America, aiding also in its promotion in other countries, and in 1880 was the Prohibitionist candidate for President of the U. S. He was elected mayor of Portland in 1851 and in 1854, and was a member of the Maine legislature in 1858–59. He served in the Civil War, under Butler at New Orleans, in command of the forts at the mouth of the Mississippi, and in the famous assault upon Port Hudson. In the last-named engagement he was wounded and captured and spent eight months in a Southern military prison. He rose to be a brigadier-general of volunteers. Died on Oct. 2, 1897. W.F.J.

DOWAGIAC, Michigan, a manufacturing city and summer-resort of Cass County, 35 miles S.W. of Kalamazoo on the Michigan Central railroad, and on the Dowagiac affluent of the St. Joseph River, which affords power for grain mills and other industries; agricultural implements and stoves are manufactured. Pop., 1900, 4,151. C.L.S.

DOWDEN, Edward, Shakespearean student and critic; was born in Cork, Ireland, in 1843, and was educated at Queen's College, Cork, and Trinity College, Dublin, ranking as one of the most brilliant students of his day. In 1867 he won, through competition, the professorship of oratory at Dublin University, but soon changed it for that of English literature, which he has filled with great distinction. He has written much for magazines and reviews, largely on Shakespearean topics, and is the author of *Shakespeare: A Study of His Mind and Art* (1875); a *Shakespeare Primer* (1877); *Studies in Literature: 1789–1877* (1878); *Southey* (1879); *Transcripts and Studies*, and a *Life of Shelley* (1888). He published a volume of poems in 1876. W.F.J.

DOWER, in the ordinary use of the term, is the estate which a widow takes in the lands or tenements of her husband for the support of herself and children. By the common law the widow was entitled to a life estate in one-third of all the real property of which her husband was seised at any time during coverture, and which any issue she might have had could inherit. Dower is said to be inchoate when the conditions of marriage and the seisin of the husband exist, and consum-

mate upon the death of the husband. It is not necessary that the husband remain seised of real estate for any particular length of time, as the right of dower attaches instantly upon the seisin of the husband for his own use and benefit, and in order that he may give complete title in a conveyance of the property, it will be necessary that the wife join in the deed. The right of dower in the United States is largely regulated by statute in the various states, and the right is always determined by the laws of the state where the property is situated. In many states the right is now extended to personal property, and in some states the wife, upon the death of her husband, takes an absolute estate in fee-simple in her husband's realty. In many states where the estate which the husband took in his wife's property under the common law, called estate by the curtesy, has been abolished, the right of dower has been extended to the husband in his wife's estate in the same manner as her dower right exists in his estate. The manner in which the right of dower may be defeated or released is generally governed by statute. See also HUSBAND AND WIFE, Vol. XII, p. 417.

DOWLAIS, a town of Glamorganshire, southeastern Wales, on the Taff, and on the Brecon and Merthyr Tydfil and London and Northwestern railways. It is a suburb of Merthyr Tydfil, and is important for its extensive iron-works. Population, 16,807. See BELLOWS, Vol. III, p. 475.

DOWLAS, a kind of coarse, strong linen, used by working-people for shirts, and manufactured largely at Knaresborough, Yorkshire, England, at Dundee, and at Newburgh and other places in Fifeshire, Scotland.

DOWNIE, DAVID, an American missionary; born in Glasgow, Scotland, July 29, 1838. He removed to America at the age of 15 and was graduated from Phillips Andover Academy in 1865. He also studied at Brown University and in 1872 graduated from the Rochester Theological Seminary. In 1873 he was sent by the American Baptist Missionary Union to Madras, India, where he was eminently successful in establishing missionary agencies and schools. His *History of the Teluga Mission* was published in 1893. The Telugas were among the original natives belonging to the Dravidian family. W.M.C.

DOWNIEVILLE, California, the seat of the northeastern Sierra County, 25 miles N.E. of Nevada City, where it connects with the Nevada County Narrow Gauge railroad by a daily stage. Downieville is on the Yuba River in a mountainous region where Downieville Butte rises 8,700 feet above sea-level. It is famous for its gold placer and quartz mines, and is the receiving and distributing center of the district. Population, 1900, 500. C.L.S.

DOWNING, ANDREW JACKSON, an American horticulturist, landscape-gardener and author; born in Newburg, New York, October 31, 1815. His father was a nursery man and landscape-gardener, and he succeeded him in the conduct of an extensive business. In 1838 he had become so well known that he was regarded as an authority on landscape-gardening and visited Europe where he wrote numerous magazine articles descriptive of the country homes of the titled aristocracy. In 1851 he was employed by the government to design the public parks in Washington. For several years he was editor of *The Horticulturist* published in Albany, New York. He wrote a *Treatise on the Theory and Practice of Landscape Gardening* (1841); *Cottage Residences* (1842); *Fruits and Fruit Trees of America* (1845); *Rural Essays* (1854), and contributed many articles on horticulture to encyclopedia and periodical literature. He was accidentally drowned in the Hudson River near New York city, July 28, 1852. W.M.C.

DOWNINGTON, Pennsylvania, a town of Chester County, 33 miles W. of Philadelphia on the east branch of Brandywine Creek, and a junction of the Youngstown and Lancaster line with a branch of the Philadelphia and Reading railroad. It has good educational institutions, and its industries comprise the manufacture of machinery, paper, wooden wares, brick and limestone. Pop., 1890, 1,920; 1900, 2,133. C.L.S.

DOWNS, THE. See SUSSEX, Vol. XXII, p. 760.

DOYLE, SIR ARTHUR CONAN, grandson of John ("H.B.") Doyle (*post*, p. 445), won fame in a kindred art as a popular novelist. Born in Edinburgh, May 22, 1859, he studied at Stonyhurst College and in Germany, returning to Edinburgh for a course of medical instruction. In his youth, short stories of his found their way into *Chambers's Journal*. A trip to the Arctic regions in a whaler preceded his medical graduation, when he spent four miserable months as surgeon on a passenger steamer plying between England and the west coast of Africa. Then for eight years he practiced medicine at Southsea, varying its monotony with his literary work. In his *Study in Scarlet*, written for *Beeton's Annual*, he created his best character, Sherlock Holmes. *The Firm of Girdlestone* (very much on the lines of Charles Reade's *Hard Cash*) and *Micah Clarke* (a novel of the western rising under Monmouth) followed, and fell in with popular favor. *The White Company*, a semi-historical novel similar to *Micah Clarke*, is esteemed by many as Dr. Doyle's best work. Then he wavered for a while between an oculist's career and the attractions of literature. Books prevailed, and Sherlock Holmes stalked through his "Adventures" and "Memoirs," sardonic, but a master of the science of deductive logic. Every boy in England and America dwelt lovingly on these detective stories, and admired Doyle's mingling of science with detective skill. He drew the bow too far, however, and many of the elders sighed with relief when he killed his much-exploited modern Vidocq. *Round the Red*

A. CONAN DOYLE.

Lamp, a collection of medical stories, and *The Stark-Munro Letters* still showed his bent for medicine and his skill in interweaving its details with his stories. Then he turned to the Napoleonic period and delighted many readers with the exploits of that *vieux soldat*, Brigadier Gerard. *Rodney Stone* (1896), a story of the Regency, once more approached the field of his former success in historical plots. His latest works are *Uncle Bernac* (1897); *The Tragedy of the Korosko* (1898); *Songs of Action* (poems, 1898); *Round the Fire* (1899). Dr. Doyle has written much on the Boer War. Knighted 1902.

DOYLE, Sir Francis Hastings Charles, an English poet; born at Nunappleton, near Tadcaster, Aug. 22, 1810. He was educated at Eton and Oxford, and took a first class in classics in 1831; and was elected a Fellow of All Souls, in 1832. He was called to the bar at the Inner Temple in 1837, but his devotion to poetry and his love of horses and horse-racing precluded his success as a barrister. He succeeded his father as a second baronet in 1839, and in 1867–77 filled the chair of poetry at Oxford. In 1868 he published his *Lectures on Poetry*, a second series appearing in 1877; and in 1886 his *Reminiscences and Opinions*, which revealed its author's genial humor, broad sympathies, and liberal culture. Died June 8, 1888.

DOYLE, Henry Edward, son of John Doyle, mentioned below; born in 1827, and educated for an artist. He soon became interested in art exhibitions. He represented Pope Pius IX in his contributions to the London Exhibition of 1862, and was rewarded with the order of knighthood of the Holy Roman Empire. In 1869 he was appointed director of the National Gallery of Ireland, and labored long and with much success to improve the collections of art in that country. He died in County Wicklow, Feb. 19, 1892.

DOYLE, John, a famous British caricaturist; born in Dublin in 1797. He learned his art in the schools of that city, went to London and essayed portrait-painting, exhibiting at the Royal Academy. He found lithography a more lucrative field, and soon won popularity and fame with his series of representations of prominent people. These were signed as the work of "H. B.," and the originals, now deposited in the British Museum, are well known as the "H. B." caricatures. He died Jan. 2, 1868.

DOYLE, Richard, an English artist; son of John Doyle (q.v.); born in London in 1826. He was a pupil in the Royal Academy, and became one of the founder-illustrators of *Punch*. In 1850 his association with this paper came to a somewhat abrupt end, on account of the frequency with which it then ridiculed the Roman Catholics, and especially Cardinal Wiseman. He contributed innumerable illustrations to books, including *The Newcomes; Jar of Honey from Mount Hybla*, and *King of the Golden River*. Next came out *Fairy Tales from all Nations; Jack the Giant-Killer*, and *The Continental Tour of Messrs. Brown, Jones and Robinson*. In 1885 appeared as a posthumous publication, a series of sketches of the *Manners and Customs of Ye English*, in *Punch*, and *Bird's Eye Views of Society*, in *Cornhill* which illustrate the life and manners of London men and women of his time with extraordinary felicity and fidelity. He died in London, December 11, 1883. W.M.C.

DOYLESTOWN, a borough and the capital of Bucks County, southeastern Pennsylvania, 25 miles N. of Philadelphia, on the Philadelphia and Reading railroad. It has two private academies, a public library, gas-works, water-works, and is a pleasant resort for summer visitors. It manufactures spokes and agricultural implements. Population 1890, 2,519; 1900, 3,034.

DOZY, Reinhart, a learned German Orientalist; born in 1820, at Leyden. He studied at the university of his native city, and devoted himself especially to Oriental subjects. In 1844 he entered the Manuscripts Library, and in 1850 was appointed professor of history at Leyden. His fame rests chiefly on his valuable works on the history of Spain under the Moorish domination. His *Historie des Mussulmans d'Espagne* is a brilliant model of what a history should be, in style, arrangement and matter. He died April 29, 1883.

DRAA WADI, River. See Africa, Vol. I, p. 227.

DRACÆNA DRACO or DRAGON TREE. See Horticulture, Vol. XII, p. 275.

DRACHENFELS, a mountain in Rhenish Prussia, on the right bank of the river Rhine, about 8 miles S.E. of Bonn. Its name (Dragon's Rock) is from a legendary dragon which was supposed to inhabit a cave here, and this cave is pointed out now to the traveler. The mountain is of volcanic origin, consisting of lava, trachyte and basalt. It is covered with brushwood nearly to the top, which is crowned with a ruined castle, and whence the view is beautiful. It is celebrated in Byron's *Childe Harold's Pilgrimage:*

> "The castled crag of Drachenfels
> Frowns o'er the wide and winding Rhine."

DRACHM. See Apothecaries' Weight, in these Supplements; and for its symbol see Abbreviatory Signs, also in these Supplements.

DRACHMA. See Greece, Vol. XI, p. 80.

DRACHMANN, Holger, was born in Copenhagen, Denmark, on October 9, 1846, and was educated at the Copenhagen University and Academy of Fine Arts. He studied marine painting, and traveled much, but has devoted himself chiefly to literature, in both poetry and prose. His bibliography comprises *Poems* (1872); *Muffled Melodies* (1875); *Young Blood* (1876); *Songs of the Sea* (1877); *Over the Frontier* (1877); *Tendrils and Roses* (1879); *On the Faith and Honor of a Sailor* (1879); *Paul and Virginia* (1879); *Lars Kruse* (1879); *East of the Sun and Moon* (1880); *Chrysalis and Butterfly* (1882); *Once Upon a Time* (1885); *Volund Smed* (1899); *Brave Karl* (1889); *Gurre* (1889); *Dædalus* (1900); *Halfred Vandraadeskjald* (1900). His works are highly imaginative, but deal largely with the stern and somber phases of human experience, and in spite of their imaginative character profess to present realistic views of life. He ranks high among modern Danish men of letters. Died Mch. 2, 1908.

DRACO, a constellation in the northern hemisphere. The star Draconis is celebrated as the one used in determining the co-efficient of aberration of the fixed stars.

DRACONTIUM (Gr., *drakon*, a dragon), an apetalous evergreen creeper native of India and Ceylon, having the stems spotted like the skin of a snake. *D. polyphyllum*, of the natural order *Araceæ*, has a powerful effect on the nervous system, as it possesses antispasmodic virtues, and is a valuable remedy in asthma. It has the reputation of curing the bite of a snake, a doubtful quality suggested by its mottled stem. The flower, when it first expands, emits an intolerable stench. W.R.B.

DRAFT, a tentative copy of a legal document or other formal writing, made for the purpose of adjusting the matter afterward to be admitted into the fair copy, or engrossed, as it is called. Manuscripts and proof-sheets are the drafts of printed works. A bill of exchange is called a draft. See Vol. III, p. 582.

DRAFT RIOTS, the outbreak which occurred in the summer of 1863 in the city of New York, upon the attempt to make the first draft under the Enrollment Act of March 3d of that year, which declared that all able-bodied male citizens of the United States, and all persons of foreign birth who had declared on oath their intention to become citizens, between the ages of eighteen and forty-five, should be liable to perform military duty, with some exceptions. In New York City, Provost-Marshal Jenkins and his deputies, who had received from the President requisitions calling for specified numbers of men, were instructed to commence operations, July 11th. There had been rumors of dissatisfaction, and as trouble was anticipated, the police were held in readiness. The day, Saturday, arrived, and, unexpectedly, the day's proceedings passed off pleasantly. Next morning the names of the conscripts appeared in the papers. In the neighborhood in which the initial working of the law was undertaken there resided a rather unruly element. Among them were many very poor men, heads of families, whose sole support they were, and who were, by the mere turn of a wheel, forced to leave home and family to the care of Providence. Such men began to reflect upon this phase of the conscription. Another cause for disapproval was the clause allowing the purchase, for three hundred dollars, of substitutes, which sum was far above what such poor men could raise. On the Monday following, committees of discontents went around the various places where laboring-men were engaged, enjoining them to fall into line with the various processions which were on their way to the place of conscription. Proceedings had barely commenced there, when a huge boulder crashed into the room, discomposing the serenity of the presiding officers. Immediately the mob was aroused, and the place was attacked and set on fire, which extended to the whole block, the fire brigade being prevented, by the force of the mob, from its attempts to reduce the flames. The city was in the power of the rioters, there being no troops at hand. The incendiaries, now increased tenfold, commenced plundering and fire-raising. Citizens were maltreated, and many were cruelly tortured to death. Private residences were looted and destroyed. A detachment of marines, about fifty in number, was sent on the street-cars to quell the mob, but could get no farther than Forty-third Street, the mob at Forty-sixth Street having torn up the rails at that point. The marines formed in line, and after an ineffectual appeal to the mob to disperse, they were fired upon by the marines, with blank cartridges. The mob was roused to fury, and before the marines could take any more effective means of dispersing the rioters, they were attacked and desperately maltreated. The police were also dealt with in the same way. The colored people in particular, and their sympathizers, were marked out for especially brutal treatment. The Colored Orphan Asylum was burned. Trade was paralyzed. A quorum of aldermen could not be collected to consider the situation. On Tuesday, Governor Seymour arrived and issued a proclamation, but it produced little effect, and the second day was even worse than the first. Not a store was opened. The murder of Colonel O'Brien, who had heroically attempted, single-handed, to pacify the mobs, was treacherous, inhuman and implacable. The arrival of the militia, that had been on duty in Pennsylvania, however, had the desired effect, and on Wednesday Mayor Opdyke was able to announce the quelling of the riot and the establishment of quietude. The mortality statistics for the week showed an increase of 450 over the figures for the corresponding week of the previous year, 90 deaths were reported as having been caused by gunshot-wounds, and about $1,300,000 were paid to claimants for damages.

In the following month the draft was resumed and completed without further trouble, President Lincoln, considering the draft urgent, refusing at that time to consider the petition of Governor Seymour to have the provisions of the act relaxed, or suspended, until its constitutionality could be determined.

DRAG-BAR, a bar or link for attaching carriages together, or to the motive power, as on railways.

DRAGOMAN. See GREECE, Vol. XI, p. 111.

DRAGON. See LIZARD, Vol. XIV, p. 742.

DRAGON, GREEN (*Dracunculus vulgaris*), a plant of the family *Araceæ*, which receives its name from the spotted stem. It is a native of southern Europe. Its flowers are black, remarkably fœtid, and give out exhalations which cause headache, giddiness and vomiting. The root is emetic, and, probably for no better reason than the peculiar appearance of the stem, has been supposed useful for curing serpent-bites. The name is also sometimes applied to *Arisæma Dracontium* of the United States.

DRAGONET, a small fish of the spiny-finned group, genus *Callionymus*, and classified by some

as belonging to the family *Gobiidæ*. Members of this group are brilliantly colored and are characterized by the head and anterior portion of the body being flattened, while the remainder is cylindrical. The foremost of the two dorsal fins has three or four flexible spines and the pelvic fins are five rayed. They are further characterized by having the gill-openings reduced to a small hole on each side. Most of the species inhabit the coast regions of the temperate zone of the Old World. R.W.C.

DRAGONNADE. See CAMISARDS, Vol. IV, p. 656.

DRAGON-ROOT (*Arisæma Dracontium*), a plant of the family *Araceæ*, a native of North America, whose tuber is a powerful local irritant, and is used as a stimulant of the secretions in chronic bronchitis, asthma, rheumatism, etc. The powder, made into a paste with honey, is beneficially applied to the mouths and throats of children in aphthæ; and milk in which the root has been boiled is a useful ointment in cases of scald-head, ringworm, etc. The tuber is probably used interchangeably with that of the nearly allied and more common *A. triphyllum*, the common "Indian turnip."

DRAGON'S MOUTH (Span. *Boca del Drago*), the name of two straits or passages in the New World. One of them is in South America, separating Trinidad from the mainland, and connecting the Gulf of Paria with the southeast extremity of the Caribbean Sea. The other is in Central America, being on the northeast coast of Veragua, the most northwest portion of Colombia, between the Carribean Sea and Lake Chiriqui.

DRAGOON-BIRD, a South American bird having the feathers on the head arranged in a helmet-like crest. It is also known as black fruit-crow, and umbrella-bird.

DRAINAGE. See SEWAGE, Vol. XXI, p. 747; and AGRICULTURE, Vol. I, pp. 292, 293.

DRAKE, CHARLES DANIEL, (1811–1892). Served in the navy, admitted to the bar in 1833; from 1834–64 prominent in politics; from 1867–71 Senator, and from 1871–85 Chief Justice of the the Court of Claims. He wrote *Law of Suits by Attachment, Union* and *Anti-Slavery Speeches.* (1864). G.A.S.

DRAGO DOCTRINE. First advanced by Calvo, professor of international law at Buenos-Ayres, and further enunciated by Drago, Minister of Foreign Affairs of Argentina. It asserts that private claims should not be made the basis of armed intervention by any government. G.A.S.

DRAKE, FRANCIS MARION, an American statesman and soldier; born in Rushville, Illinois, December 30, 1820. At the outbreak of the Civil War he enlisted as a private in a volunteer regiment and won rapid promotion for bravery in action. He was twice wounded. In 1865 he was brevetted brigadier-general. After the war he became identified with various Western railroad enterprises and was the first president of the Missouri, Iowa and Nebraska railway. In 1899 he was president of the Indiana, Illinois and Iowa railroad. In 1895 he was elected governor of Iowa. He made liberal gifts and endowments to Drake University at Des Moines, Iowa. He died in Centerville, Ia., Nov. 20, 1903. W.M.C.

DRAKE, FRANCIS SAMUEL, an American author and editor; born in Northwood, New Hampshire, February 22, 1828. He was a son of Samuel Gardner Drake (q. v.) with whom he was associated in the conduct of an antiquarian bookstore in Boston. In 1872 he published his *Dictionary of American Biography* and in 1873 appeared his *Life of General Henry Knox.* He also wrote *Tea Leaves* (1884) and *Indian History for Young Folks* (1885). Before his death he had gathered material for a new edition of his *Dictionary* which was afterwards incorporated in *Appleton's Cyclopedia of American Biography.* He died in Washington, District of Columbia, February 22, 1885. W.M.C.

DRAKE, JOSEPH RODMAN, an American physician and poet; born in New York city, August 7, 1795. He studied medicine and graduated in 1815, becoming meanwhile an intimate friend of Fitz-Greene Halleck, with whom he collaborated in writing *The American Flag* (1819). His best known poem *The Culprit Fay* appeared in the same year. He wrote also some shorter pieces, notably the poem *Abelard to Héloïse.* He died in New York city, September 21, 1820. W.M.C.

DRAKE, SAMUEL GARDNER, author, was born at Pittsfield, N. H., on October 11, 1798, and was educated and became a teacher in the common schools. In 1828 he established in Boston one of the first antiquarian bookstores in America. Thereafter he devoted himself largely to antiquarian research and to historical writing. He republished Church's *Entertaining History of King Philip's War* and other works of colonial times, and wrote and published *Indian Biography, Book of the Indians, Old Indian Chronicles, Indian Captivities, Tragedies of the Wilderness, History and Antiquities of Boston*, and *History of the French and Indian War.* He was one of the founders of the New England Historic Genealogical Society, and was its president in 1858. He lived for several years in London, and conducted important researches among archives there, in the interest of American history. He also edited for many years the *New England Historical and Genealogical Register.* Some of his works have gone through many editions and are esteemed as standard authorities. He died in Boston on June 14, 1875. W.F.J.

DRAKENBERG MOUNTAINS. See NATAL, Vol. XVII, p. 246.

DRAMA, THE AMERICAN. The first theatrical performances in North America were given in Quebec, in 1694, by amateur players, although there is little doubt that the Spaniards in Mexico had established the stage, which, in the times of the Spanish invasions, was in the height of its

glory in the mother-country. The next positive date was 1745, when the first English performances were given in the island of Jamaica, and so successfully that the leader, Moody, famous as an actor of Irish characters, went to England, and in the following year brought out a regular company of actors, returning to Jamaica, where he remained for many months.

The first performance of an English play in what is now the United States was in Boston, in 1749, when Otway's *Orphan* was acted, but received by the Puritans with such horror that at the next general court a law was passed, fining actors, as well as spectators, £5 ($25) apiece, and the owner of a building £20 ($100), "for each and every day or time" a play was attempted or permitted. This law was enforced for nearly fifty years. In 1749 an attempt was also made to open a theater in Philadelphia, but the parties were arrested and bound over to their good behavior. They went to New York, and in February, 1750, rented a convenient room on Nassau Street, where they opened, on the 5th of March following, with a play announced as *The Historical Tragedy of King Richard III.* "Wrote originally by Shakespeare, and altered by Colley Cibber, Esq." The season lasted 16 months, with the exception of six weeks in the summer of 1750. The managers and chief actors were Murray and Kean. In July, 1750, the company disbanded, but the remains were gathered together by a Mr. Upton. The following season does not seem to have been very successful, as it was brought to a close in February, 1751.

Moody's success in Jamaica caused him to return to England in 1749, when he was at once engaged by David Garrick for Drury Lane. The rumors of his exploits had spread in London, and caused Mr. and Mrs. Lewis Hallam to organize a company, and with a stock of scenery and costumes from the Goodman Fields Theatre, they came to America, went to Williamsburg (then the capital of Virginia), altered an old storehouse over into a theater, and opened it, Sept. 5, 1752, with the *Merchant of Venice* and Garrick's farce, *Lethe*. The reception they received was very different from that accorded their friends in Boston and Philadelphia. Governor Dinwiddie gave them a certificate, drawn up and signed in council, testifying in high terms as to their ability as comedians, as well as to their conduct as men. They went to Annapolis, Maryland, and acted in the first regular theater erected in the colonies. In June, 1753, they went to New York, but met with unexpected opposition, through the abuse of a trust reposed in their advance agent. Mr. Hallam pleaded his case in the public press, and appealed to the authorities, with ultimate success. A prosperous season of six months followed, when they went to Philadelphia, where they met the most determined opposition. Petitions and counter-petitions were signed, and the city was divided in the dispute. Permission was at last obtained for the presentation of 24 plays, on the condition that the players "offered nothing indecent or immoral." The season was so satisfactory and successful that six more nights were added. Mr. Hallam then went to the West Indies, where he died. A Mr. Douglass led the actors back to New York, and built a theater on Cruger's wharf, the Nassau Street theater having been converted into a church.

In the spring of 1759 Mr. Douglass went to Philadelphia, where he built the first regular theater erected in that city. Shortly after, a theater was built in Newport, Rhode Island, where the first performance by professional actors was given in the New England states, on Sept. 7, 1761. In 1762 the company went to Providence, and in that year was formed the first theatrical circuit. It began at Williamsburg, Virginia, and included Annapolis, Philadelphia, New York, Newport, Providence, and a few smaller places, where a courthouse or proper building might serve the purpose of a theater. In New York a new theater was built in Chapel Street, and was, during one of the disturbances caused by the Stamp Act, the scene of the first theatrical riot. During the succeeding ten years several other theaters were built, but on Oct. 24, 1774, the Continental Congress recommended a suspension of all public amusements. Douglass, who had been fairly successful, was obliged to yield, and took his company to the West Indies, where he had been always welcome.

During the Revolutionary struggle there were no theatricals, except those given by British officers. A remarkable incident brought these to an end. Burgoyne, the British commander, wrote a play, *The Blockade of Boston*, and while it was being played a sergeant dashed in and announced, "The rebels have attacked the lines on the Neck" (the "Neck" was a strip of land connecting Boston with the mainland). The audience applauded his spirited delivery, and it was some minutes before the truth of his statement was realized. The play ended without completion; the British were driven from Boston and went to New York, where they took possession of the John Street Theater, which they called the Theater Royal. Major André was among the chief actors.

After the war the players came back. Up to 1794 there was in the United States but one stock company of recognized merit. After this date the growth of the drama was marked for its rapid development. Owing to prejudice, which had not yet subsided, various efforts to avoid the rigid laws were adopted. As late as 1792 a play-bill announced "A Moral Lecture in Five Parts, in Which the Dreadful Effects of Conspiracy will be Exemplified." It was but an underhand way of advertising Otway's *Venice Preserved*. *Hamlet* and *Romeo and Juliet* were also given as "moral lectures" or "moral dialogues." Such a violation of the law could not last long, and in December, 1792, the "exhibition rooms" were closed. Fortunately, in 1793, the legislature of Massachusetts repealed the law against theaters, and in February, 1794, the Federal Street Theater

was opened with a prologue by Robert Treat Paine, Jr.

In New Orleans the first performances seem to have been given in 1791, by a company who had escaped from the insurrectionary troubles in Santo Domingo. The first theater in the Crescent City seems to have been built about 1808, and in 1822 the first American theater in New Orleans was built. A brick theater was built in Natchez, Mississippi, in 1828. From the beginning of the century the drama prospered, and kept pace with the growth of the country.

The first play written and acted in America seems to have been Burgoyne's *Blockade of Boston*, already referred to. The first professional dramatist in the United States was William Dunlap, one of the most fertile of playmakers. He was one of the founders of the National Academy of Design, and the author of several works. His *History of the American Theater* is an invaluable authority.

John D. Burke, killed in a duel in 1808, was the successful author of the plays *Bunker Hill; or, The Death of General Warren; Joan of Arc;* and several others. Other actors and authors followed; among them, John Howard Payne, the author of *Home, Sweet Home.* He is credited with some sixteen plays. Samuel Woodworth, the author of *The Old Oaken Bucket*, was also the writer of successful plays. George P. Morris, the author of *Woodman, Spare That Tree*, produced *Briercliff*, which held the stage for years.

The first actor to "star" was Cooper. He attached himself to no company, but went from one theatrical point to another, playing the chief part. The first great actor to follow him was George Frederick Cooke, who died in 1812. In 1820 Edmund Kean appeared as Richard III in New York. After filling his New York engagement he went to Boston; but one night, there being a sparse audience, he refused to act, and left the country. Five years later he returned and appeared in New York, but the memory of his slight to the Boston audience was not dim, and one of the worst riots known in theatrical history was the result. Kean apologized, and filled his engagement, but when he went to Boston, another riot occurred, which resulted in the destruction of the greater part of the theater.

In 1821 Junius Brutus Booth appeared as Richard III in Richmond, Virginia, then went to New York. He was immediately acknowledged as a master, and no actor exerted so much influence on acting in America as he. He died in 1852, four days after he had played in New Orleans, and while on his way to Cincinnati. Edwin Forrest was, if not the equal of Booth, at least a fit successor. He began playing in 1820, when but 14 years of age. At 19 he was the leading actor at the Albany Theater, and at the age of 20 made his appearance at the New York Park. In 1848, while in England, he became involved in a trouble with Macready, which culminated in the Astor Place riot, in New York, in 1849.

Macready, although 13 years older than Forrest, did not appear on the stage until 1826. Mrs. Duff made her first appearance in 1810 as Juliet, and while on the stage, a period of 28 years, was regarded as the foremost actress in America. In 1838 she left the theater and went into a self-imposed retirement, having taken upon herself a religious life. Fanny Kemble was another brilliant star. She was hailed as a beauty as well as a genius, and during her time she had none to dispute her place or sway. She left the stage in 1834 and married. Several plays came from her pen, the best known being *Francis the First.* Charlotte Cushman began as a singer, and was for a time prima donna at New Orleans, but, the climate affecting her voice, she gave up singing and became an actress. Her influence did much to elevate the stage and break down Puritanical prejudice.

Charles Mathews, whose eccentric comedy was as highly esteemed in England as Kemble's light comedy, first appeared in America in 1822. His trip was profitable and he returned to England. In a play written by himself, and acted in London, called *Mathews in America*, there were many caricatures which gave great offense to the sensitive Americans, and were not readily forgiven. His son, Charles James, usually known as Charles Mathews "the younger," appeared in 1834. He was a comedian of extraordinary lightness and ease, and his influence on the younger generation still survives.

The drama had grown to large proportions, and each succeeding year witnessed the advent of brilliant geniuses. In 1826 James H. Hackett, the first to make a specialty of Yankee parts, went on the stage. He journeyed to England, and introduced the stage Yankee to the English public with great success. Hackett was probably the earliest performer of *Rip Van Winkle.* He repeated his visit to England, when George Handel Hill became the favorite as a delineator of Yankee character. Hill followed to England, and even went to Paris, but the Parisians failed to appreciate his *Solomon Swop*, and but a few performances were given.

Dan Marble, as Sam Patch, appeared in 1838. F. S. Chanfrau, in *Mose, the New York Fireman*, and later, in *Kit, the Arkansas Traveler*, achieved a remarkable success. Joseph Jefferson, in *Our American Cousin*, and later in *Rip Van Winkle*, became noted for ease and simplicity of method, and for more than twenty years his *Rip Van Winkle* has held the stage. The play, as given by Hackett, was rewritten at the request of Jefferson, by Dion Boucicault, with suggestions and emendations by Jefferson, and has proved one of the most remarkable successes on the American stage.

With the increase in the number of stars, it began to be difficult to get a good stock company together. At first, stars acted only on special nights, but for personal profit eventually were willing to act every night. Then the star, seeing that the manager relied on him or her to get people into the house, demanded the lion's share of the profits.

In the latter part of the history of the American drama the array of prominent names is very large. James W. Wallack, the handsome, dashing actor, gentlemanly and popular in the best and most refined society; William E. Burton, perhaps the best actor of broad, low-comedy parts; John Brougham, the genial Irish-American actor and author; John Lester Wallack; Augustin Daly; Edwin Booth, son of Junius Brutus Booth, and heir of much, if not all, of his histrionic genius; Dion Boucicault, and scores of others, have made the American stage one of the great social forces.

The number of theaters and opera-houses in the United States is about 3,100; of actors, actresses, and professional singers actively employed, 5,127; of professional itinerant theatrical, operatic, and musical "attractions," 347. See also DRAMA, Vol. VII, pp. 339–384.

DRAMMEN, a seaport town in Jarlsberg and Larvik province, Norway; has a college and various factories, and does a large trade in timber, iron, and pitch. Population, 1890, 32,091.

DRANESVILLE, a village of Fairfax Co., Va., 17 miles N.W. of Washington, the scene of a battle between the Union and the Confederate troops, Dec. 20, 1861, in which the Federals gained a slight advantage.

DRAPER, ANDREW SLOAN, an American educator; born in Westford, New York, June 21, 1848. He was graduated from the Albany Academy in 1866, and from the Albany Law School in 1871. He began his law practice in Albany, was elected to the board of education, and in 1881 was sent to the state legislature. In 1885 he was appointed by President Arthur one of the judges of the court of Alabama claims. He was state superintendent of public instruction in New York from 1886 to 1892 and superintendent of schools in Cleveland from 1892 to 1894. In 1894 he became president of the University of Illinois. He has published *American Schools and American Citizenship; American Universities and the National Life; The Rescue of Cuba; Origin of the New York Common School System; Powers and Obligations of Teaching; How to Improve the Country Schools*, and other works. W.M.C.

DRAPER, HENRY, an American chemist and astronomer; son of John William Draper (q.v.); born in Prince Edward County, Virginia, March 7, 1837. He was graduated from the University of New York in 1858, and in 1859 was appointed professor of physiology there. In 1873 he became professor of analytical chemistry, and in 1882 succeeded his father as professor of systematic chemistry. He became well known for his discoveries and work in celestial photography. He published *Changes of Blood Cells in the Spleen; A Text Book on Chemistry*, and a work on the *Construction of a Silvered-Glass Telescope*. In 1877 he discovered oxygen in the sun by photography and also a new theory of solar spectrum. He was photographer of the Transit of Venus Commission appointed by Congress, and for his work on this occasion the government of the United States caused a special medal to be struck in his honor. He organized the party for the observation of the eclipse of July 29, 1878, and at his private observatory at Hastings-on-the Hudson, and carried out many works which are usually defrayed out of the public purse. He was a member of the National Academy of Sciences, and in 1881 the University of New York and the University of Wisconsin simultaneously, but independently, conferred on him the degree of LL.D. He was one of the most valued contributors to the *American Journal of Science* and wrote for various other scientific journals. He died in New York city, November 20, 1882. W.M.C.

HENRY DRAPER.

DRAPER, JOHN CHRISTOPHER, physician; son of John W. Draper (q. v.); was born in Virginia on March 31, 1835, and was educated at New York University, being graduated from its Medical School in 1857. He had a distinguished career as a physician and surgeon, as an educator and as an author. He was professor of analytical chemistry in New York University from 1858 to 1871; professor of chemistry in the New York University Medical School from 1866 to 1885; professor of chemistry in Cooper Union from 1860 to 1870; and professor of natural sciences in the College of the City of New York from 1863 to 1885. He wrote several standard works on medicine, surgery, and chemistry. He died on December 20, 1885. W.F.J.

DRAPER, JOHN WILLIAM, an American chemist, physiologist and historian; born near Liverpool, England, May 5, 1811. He received his early education at a Wesleyan school in Liverpool. On the opening of the University of London, he proceeded to London and studied chemistry, natural philosophy and the higher mathematics. He removed to the United States in 1833, and continued his chemical and medical studies in the University of Pennsylvania, where he graduated in 1836. In 1837 he received an appointment as professor of chemistry and natural philosophy in Hampden-Sidney College, Virginia. In 1839 he was elected professor of chemistry in the University of New York and was subsequently one of the founders of its medical department, of the faculty of which he became president in 1851. Meanwhile he had acquired a wide reputation as a teacher and scientist and made many contributions to scientific literature, among which are *Treatise on the Forces Which Produce the Organization of Plants* (1844); *Human Physiology, Statistical and Dynamical, or the Conditions and Cause of Life in Men* (1856), and papers to the *Edinburgh Scientific Journal*. In these works the subject to which he chiefly devoted his

attention was the chemical action of light, in connection with which he effected some discoveries. His doctrine of the causes of the circulation of the blood and physiological writings generally, have met with extensive acceptance among physicians. But his name is perhaps as widely known in the literature of philosophy and history. In 1863 he published *The History of the Intellectual Development of Europe* which has been translated into French, German, Italian, Polish, and Russian. This work won for Professor Draper warm words of commendation from Professor Tyndall in his well-known Belfast address. The *History* passed through many editions and was revised and reprinted in two volumes in 1876. In 1865 he brought out *Thoughts on the Future Civil Policy of America;* in 1870 *The History of the American Civil War* in three volumes, and in 1874 *History of the Conflict between Religion and Science*, which ran through many editions and was translated into nearly all the languages of Europe. He died at Hastings-on-the-Hudson, New York, January 4, 1882. W.M.C.

DRAPER, Lyman Copeland, antiquarian, was born at Evans, N. Y., on September 4, 1815, became an editor at Pontotoc, Mississippi, and after 1834 devoted his attention chiefly to the collection of biographical and historical matter pertaining to the Mississippi valley. He removed to Madison, Wisconsin, in 1852; became secretary of the State Historical Society; collected for it a library of 100,000 titles, and published many volumes of historical compilations. He was state superintendent of public instruction in 1858–60, and died at Madison on August 26, 1891. W.F.J.

DRAPER, William Henry, physician, was born at Brattleboro, Vermont, on October 14, 1830, and was educated at Columbia University, New York, and in London and Paris. He was professor of diseases of the eye and ear, and of clinical medicine, in the College of Physicians and Surgeons, and president of the New York Academy of Medicine. He died on April 26, 1901. W.F.J.

DRAUGHT or DRAUGHT OF WATER, in maritime affairs, a technical name for the depth to which a ship sinks in the water when fairly afloat. The draught is marked on the stem or stern-post, or both, from the keel upward. When a ship is in good trim, the draught does not differ much at the two ends. Ships with sharp bottoms draw more water, or have a greater draught, than those of flatter construction.

DRAUGHTSMAN. A draughtsman differs from a designer, inasmuch as he lays no claim, in that capacity at all events, to the character of an originator.

DRAVE, Austria, one of the principal tributaries of the Danube which it joins 14 miles east of Esseg, after an east by south course of 380 miles from its source in the Tyrol, 17 miles east of Brunecken. The upper part of its course is through Carinthia and Styria; in the lower portion it separates Croatia and Slavonia from Hungary. Its principal affluents are the Mur, Mohi, Gurk, Lavant and Gail. It is navigable throughout nearly three-fourths of its course, and a railway extends throughout almost the whole length of its valley. C.L.S.

DRAVIDIAN LANGUAGES and LITERATURE. See India, Vol. XII, pp. 817–818; Philology, Vol. XVIII, p. 793; and Tamils, Vol. XXIII, pp. 46–49.

DRAWBACK, a term in commerce, employed in connection with the remitting or paying back of excise duties on certain classes of articles exported. Excise duties, as a matter of course, enhance by so much the natural price of the commodity on which they are imposed. Were these duties not remitted, the commodity so taxed would not be ordered from those foreign countries where articles of the same kind could be purchased free of such duties. To afford facility for the exportation of these articles, the state resorts to the expedient of returning to the exporter a sum equal in amount to what he or the manufacturer had paid to the excise.

DRAW–BAR or DRAW–HEAD, in railway mechanics, a buffer to which a coupling is attached.

DRAWING–BOARD, a board on which drawing-paper is strained for painting on in water-colors. The paper is wetted for the purpose of being strained, and when attached at the edges it is permitted to dry and contract. Formerly, the drawing-board was fitted into a frame, the edges of the wet paper being made fast by the pressure of the frame on the board. But the much simpler drawing-board which is now in use is made of a flat piece or pieces of wood, held together and prevented from warping by an edging of other pieces, the grain of which runs in the opposite direction. The wet paper is attached to the board with paste or thin glue, and when dry becomes perfectly firm and flat. When the work is finished, the paper is cut beyond the drawing with a knife.

DRAW–PLATE, a steel plate with a graduated series of holes, through which metals are drawn in making them into wires or bars. Also a name given to a plate of metal placed before a fire or before the lateral opening between the top of the fireplace and the throat of the chimney. Its use is to force the air to pass through the fire on its way into the chimney, instead of allowing it to pass over the fire.

DRAYTON, William Henry, an American statesman; born in Drayton Hall, S. C., in September, 1742. He was educated at Westminster School, London, and Balliol College, Oxford, studied law, and was admitted to the bar. Returning to America in 1764, he became an active worker in political affairs, and in 1769 published letters on the side of the government which brought him into controversy with Christopher Gadsden and other patriotic leaders. In 1771 he was appointed by George III privy councillor for South Carolina; but as the Revolutionary crisis approached he espoused the popular cause and protested against the proceedings of his colleagues.

In 1774 he was appointed judge of the Province. Suspended from his offices under the Crown, he was made a member of the popular Committee of Safety, and was prominent in advising the seizure of the provincial arsenals and British mails. In 1775 he was president of the Provincial Congress, and in 1776 was elected chief justice of South Carolina. In 1778 he was elected to the Continental Congress, and sat therein until he died in Philadelphia in September, 1779. E.E.T.

DRAYTON–IN–HALES OR MARKET DRAYTON, a town in the northeast of Shropshire, western central England. It is an old town, on the banks of the Fern, 19 miles N.N.E. of Shrewsbury and 153 miles N.W. of London. It is supposed to be the *Caer-Draithon* of the Romans. Here, in 1459, the Yorkists defeated the Lancastrians with great loss. The parish church was built in the reign of King Stephen. Drayton has manufactures of paper and haircloth, markets during the week and several fairs during the year. Population, 4,039, chiefly agricultural.

DREDGING–MACHINE. See STEAM-SHOVELS AND DREDGES, in these Supplements.

DRED SCOTT CASE. See UNITED STATES, Vol. XXIII, p. 812,

DREIBUND, THE, is the league or compact formed between Germany, Austria and Italy for mutual defense in case of attack. In 1579 an alliance between Germany and Austria, known as the "dual alliance," was formed, and in 1882, on the addition of Italy to the agreement, the dual alliance became the dreibund. The alliance has been maintained since, Emperor William of Germany announcing, in 1902, that it had then been resumed for a period of six years. The relation of these powers makes this dreibund an important safeguard in the maintenance of a balance of power on the continent of Europe.

DREISSENA. See MOLLUSCA, Vol. XVI, p. 715.

DRESDEN, a town of Bothwell County, western Ontario. Population 1901, 1,613.

DRESDEN, capital of Saxony, Germany. Substantial improvements have marked the recent growth of the city in commerce, industry and art. Pop. 1905, 516,996. See DRESDEN, Vol. VII, 404–405.

DANIEL DREW.

DRESDEN, BATTLE OF. See NAPOLEON, Vol. XVII, p. 227.

DRESS. See COSTUME, Vol. VI, pp. 400–425.

DRESSINGS in architecture, a term loosely used to signify moldings and all the simpler kinds of sculptured decorations.

DREW, DANIEL, an American capitalist and philanthropist; born in Carmel, Putnam County, New York, July 29, 1788. Early in life he was a cattle-drover; embarked in the steamboat business. in which he assumed a position of great influence, and later became identified with railroad enterprises, especially the Erie railway. He was also for several years a leading stock speculator in Wall street. He gave liberal sums of money to the Wesleyan University and other institutions, founded the Drew Ladies' Seminary at Carmel, and in 1866 donated $250,000 toward the founding of the Drew Theological Seminary at Madison, New Jersey, which was opened, under the auspices of the Methodist Episcopal Church, November 2, 1867. His donations to this institution were increased to over $1,000,000. He also gave large sums of money to various Methodist colleges and schools throughout the United States. He died in New York city, Sept. 19, 1879. W.M.C.

DREW THEOLOGICAL SEMINARY, founded at Madison, N. J., 1866, for the education of M. E. ministers, opened Nov. 6, 1867, with Dr. John McClintock president. Has a three-years course and in 1904 had 168 students, 8 instructors, 82,263 volumes in library and productive funds of $500,000. President, Henry A. Buttz, D.D. LL.D. A.R.R.

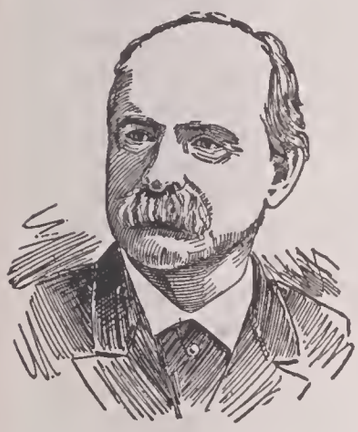
DREW, JOHN, actor, was born at Dublin, Ireland, on September 3, 1825, came to America, and made his first stage appearance in New York, at the old Bowery Theatre, in 1845, in the part of Doctor O'Toole in *The Irish Tutor*. Later he became proprietor and manager of the Arch Street Theatre in Philadelphia, where he had a prosperous career for many years. He made successful tours through the United States, England and Australia, and was much esteemed as a comedian. He married Louisa Lane, an English actress of great ability, who as Mrs. John Drew became one of the most famous players of her day. Mr. Drew made his last appearance on May 9, 1862, at his own theatre in Philadelphia, and died twelve days later, on May 21. W.F.J.

DREW, JOHN, JR., actor, son of John and Louisa (Lane) Drew (q. v.), was born in Philadelphia on November 13, 1853, and made his first stage appearance at his mother's Arch Street Theatre in that city in 1872, in the part of Plumper in *Cool as a Cucumber*. Under the efficient guidance of his distinguished mother he made rapid progress, and for a time was a member of Edwin Booth's company. He joined Augustin Daly's famous company at the opening of Daly's Theatre in New York in 1880, and remained with it for twelve years, during the time when it was the foremost comedy organization in America. In 1892 he withdrew from Daly's and became a "star" actor, playing at the head of various companies of his own, in a great round of comedy and romantic parts, in which he has easily maintained his rank as one of the most popular and meritorious comedy actors of his time. W.F.J.

DREW, MRS. JOHN (Louisa Lane), actress, was born in London on January 10, 1818, the daughter of Mr. and Mrs. Lane, well-known actors of that day, and was carried upon the stage by them before she was a year old. In childhood she began to act, and she made her first appearance upon the American stage in 1827, playing the Duke of York to the elder Booth's Richard III.

After a tour in the British West Indies she appeared as Julia in *The Hunchback*, in Boston, in 1832, being then only fourteen years of age, and thereafter made rapid progress. She became leading lady to Edwin Forrest in 1836, and played tragic parts with much success, but after her marriage to John Drew (q. v.) in 1850 she devoted herself chiefly to comedy parts, in which she greatly excelled. Shortly before the death of Mr. Drew, in 1862, she became manager of the Arch Street Theater in Philadelphia, and conducted it with much success for many years. In the later years of her life she played with various companies, with Joseph Jefferson, William Florence, and John Gilbert, and took part in some notable productions of old English comedies. In early life she was an admirable Peg Woffington, Lydia Languish, and Lady Teazle; in her later years she was the best Mrs. Malaprop ever seen upon the American stage. She died on Aug. 31, 1897. W.F.J.

DREXEL, ANTHONY JOSEPH, financier; was born in Philadelphia, Penn., in 1826, the son of Francis Martin Drexel, a native of Austria and a banker in Philadelphia. At the age of 13 years he entered his father's bank, while still a schoolboy, and worked in every department of it until he reached its head. In addition to the Philadelphia house of Drexel & Co., he established the New York house of Drexel, Morgan & Co., and the Paris house of Drexel, Harjes & Co., in 1850 and 1867, respectively. These houses for many years were among the foremost American banking establishments, and exerted a great control over financial affairs. In 1876 the Drexels united with the Rothschilds and other houses in refunding three hundred million dollars of the United States public debt at 4½ per cent, and on other occasions did signal service to public finances. They also took a leading part in the financing and reorganization of various railroads and other corporate enterprises. Mr. Drexel in addition to being one of the most successful bankers was one of the foremost philanthropists of his day. He founded the Drexel Institute, a great school of science, art and industry, in Philadelphia, at a cost of more than $1,500,000, and gave several millions more for a hospital, and art gallery and museum, and other similar purposes in that city. In co-operation with his close friend, George W. Childs, he established and endowed the Childs-Drexel Home for Aged Printers, at Colorado Springs, Colorado, which was formally dedicated and opened in May, 1872. Although a man of conservative habits, little given to speculation, he amassed a fortune, which was estimated at more than $25,000,000. He died at Carlsbad, Bohemia, on June 30, 1893.



ANTHONY J. DREXEL.

W.F.J.

DREXEL, GEORGE W. CHILDS, editor and publisher of the Philadelphia *Public Ledger*, is the son of the late Anthony Joseph Drexel (see foregoing), banker and philanthropist, and was born at Philadelphia.

DREYER, JOHN LOUIS EMIL, a Danish astronomer; born in 1852 at Copenhagen. M.A. and Ph.D. of Copenhagen University. He was astronomer at the Earl of Rosse's Observatory, Birr Castle, 1874; assistant astronomer at the Observatory of Trinity College, Dublin, 1878; director of Armagh Observatory, 1882; he is the author of *Second Armagh Catalogue of 3,300 Stars for 1885, from Observations Made in the Years 1869–83* (1886); *A New General Catalogue of Nebulæ and Clusters of Stars* (1888); *Tycho Brahe: A Picture of Scientific Life and work in the Sixteenth Century* (1890); and various papers on astronomical and other scientific subjects.

DREYFUS CASE, THE. During the years 1898–99, France was thrown into paroxysms of excitement over a military scandal, known as the Dreyfus case, the revelations of which disclosed an alarmingly partisan, if not corrupt, condition of affairs in some lines of French public life under the republic. The facts of the case are as follows: Alfred Dreyfus, an Alsatian Jew, was, up to the year 1894, a captain of engineers in the French army, and held high position on the general staff. About the middle of October, in the year named, he was arrested on a charge of treason, secretly tried by court-martial, convicted, and publicly degraded. He was then sent off to a lonely convict station (Ile du Diable), on the coast of French Guinea, closely guarded, and, it is said, in shackles. The ostensible charge against Dreyfus was that he had sold military information to a foreign government. The chief evidence in support of the grave accusation was a compromising document stated to have been found in the waste-basket of the German Embassy in Paris, which was alleged, though not conclusively proved, to be in the handwriting of the incriminated officer. The arrest, trial, conviction, degradation from his rank in the army, and deportation to a penal colony, it would seem, were wholly unwarranted, and, in fact, despotic acts. A grave judicial error appears to have been committed, for there was little upon which to base so serious a charge, save the mere supposition by experts in handwriting, who of course might be entirely astray in their judgment, that the document said to have been found in the German Embassy incriminated Dreyfus.

Nor is this all, for the German minister in Paris has stated that no such document, or *bordereau*, as it is called, could have been found at the Embassy. He, moreover, desired to testify, but was refused permission at the preliminary enquiry, that he knew nothing of Dreyfus and had had no communication whatever with or from him. Further circumstances have to be noted, which throw doubt upon the *bona fides* of the trial, and give occasion for the widespread suspicion among fair-minded Frenchmen that the officer in question was either the victim of jealousy, and possibly of hatred

on account of his Jewish faith, or was cruelly made the scapegoat for someone else's perfidy. We refer to the fact that not only was the trial conducted with closed doors, and before those who seem to have been insanely prejudiced against Dreyfus, but that neither he nor his council saw or was informed of the evidence on which the unfortunate officer was convicted. Moreover, it is known that the victim of his anonymous accusers and of his irregularly governed judges had no ostensible motive for committing the crime, since he was well off, of good family, and though a Jew and an Alsatian, had a good record both as a gentleman and a soldier.

The trial was so manifestly unfair, and the doomed officer was so conscious of his innocence, that his family and friends took up the case and worked strenuously, though at first with little avail and against great and unreasoning prejudice, to get the affair reopened and the judgment reversed. A brother of the condemned officer, upon what evidence does not seem to have transpired, accused a Major Esterhazy of the crime for which Captain Dreyfus was punished, and his trial, which took place in Paris and appears to have been conducted also with closed doors, resulted in Esterhazy's acquittal. With the irregular methods of procedure at these military investigations, acquittal, morally, proves nothing, though in the highly prejudiced and inflammable condition of the public mind at the time in France the acquittal of Esterhazy was taken as an endorsement of the finding of the court upon Dreyfus.

At this juncture, M. Émile Zola, the novelist, appeared on the scene in the Dreyfus interest. In an open letter to the President of the Republic, M. Zola vehemently attacked the military administration for its conviction of Dreyfus and its acquittal of Esterhazy, and charged all and sundry with conspiring to ruin an innocent man and scandalously to screen the real culprit. So fierce and outspoken was his arraignment of all who had to do with the conspiracy against Dreyfus, from the Minister of War down to the Colonel who is supposed to have made a scapegoat of the convicted officer, that the Legislature, the Paris press, and almost the whole of France went into convulsions over the matter. So revolutionary was the tone of M. Zola's letter, and so heroically did he champion the cause of the cruelly treated Jewish officer, that the government was forced to prosecute him. The novelist was convicted, ordered to be imprisoned, heavily fined, and this in spite of the evidence of a Colonel Picquart, whose testimony, given with frank and fearless sincerity, was most damaging to his superior officers and to the prosecution of Dreyfus. The clamor to open the case against Dreyfus continued in France in spite of M. Zola's conviction. More insistent became the public voice when it was known that a Colonel Henry, one of the prisoner's accusers, had made confession that the evidence of guilt he had produced at the Dreyfus trial was a forgery. Henry was imprisoned in consequence of this confession, and while in confinement he committed suicide, which added to the excitement in Paris and precipitated a government crisis. While these events occurred, an effort was made to calm the tumult by M. Brisson, then President of the Council in France, who strove to reopen the Dreyfus case against all the sinister interests of the hour that sought to defeat his doing so, including the adverse interests of the War Office, the Legislative Chamber, and a hostile and mercenary press. Happily for Dreyfus, a new administration in France was courageous enough to assert its independence of the army and order a revision of the facts of the case before the Court of Cassation. Even when this was determined upon, satisfactory enquiry was burked in many ways, and long delays ensued. Finally, on June 3, 1899, the Court of Cassation quashed the verdict of the 1894 court-martial and ordered a retrial by a new court-martial at Rennes. The exile at Ile du Diable was notified of this and a French cruiser was despatched to bring him to France. He landed at Quiberon on July 1st, and while awaiting trial at Rennes the nation had largely recovered from its insane prejudice against Dreyfus and had turned round and espoused his cause. Before this had happened the Dupuy administration had given place to that of the Waldeck-Rousseau ministry, while M. Loubet had in the month of February (1899) succeeded M. Faure in the presidency of France. These were auspicious omens that justice would at last be done to Dreyfus, while there was hope also in the appointment of General De Gallifet, as Minister of War, since he had hitherto been unsmirched by anti-Dreyfusism, and was known to be a strong as well as a patriotic Frenchman. A further link in the chain of evidence that made for Dreyfus's vindication was wrought about this time in the confession of a Major Esterhazy, a weak tool hitherto of the army chiefs, that he was the author of the *bordereau* which had sent Dreyfus into exile. Esterhazy, if the real culprit, had, however, betaken himself out of the country, and his criminality could not, therefore, be legally brought home to him. It further transpired that the famous *bordereau* was *not* the work of an artillery officer or an officer of engineers, and this increased the suspicion that Major Esterhazy, who belonged to the infantry branch of the French army, was the culpable person.

The new court-martial began its sessions at Rennes on August 7, and so strong still was the animus in certain quarters against the accused that within a week of the opening of the court Maitre Labori, Dreyfus's leading counsel, was shot in the back on his way to court. The learned counsel, however, quickly recovered and went on with the case, ably assisted by M. Demange, who acted also for the defence. The taking of evidence and other proceedings in the case protracted the trial till Sept. 7, and two days later a verdict was reached. Dreyfus was again found guilty by a vote of 5 to 2; but a majority of the court, finding extenuating circumstances, signed a recommendation to mercy, which President Loubet met by a pardon. Throughout the new trial there was little of any incriminating value in the evidence pro-

duced, the six weeks proceedings being strung out by tattle of the flimsiest character, with great obsequiousness, even on the part of the bench, shown to military figureheads, and the manifest purpose of the army chiefs to endorse the previous conviction, and so save their face and gratify anew their class and racial hatred. For manifest reasons, important depositions likely to be favorable to Dreyfus, were refused to be heard by the court, and this weakened the defence and made it the more difficult to secure justice and salve the wounded honor of, obviously, a greatly injured man. The President signed a decree pardoning Dreyfus on the 19th of Sept. and he was set at liberty on the following day. The ill-used officer at once issued the following declaration: "The Government of the Republic restores me my liberty: it is nothing to me without my honor. From this day forth I shall continue to seek the reparation of the judicial error of which I am still the victim. I wish that France as a whole should know by a final judgment that I am innocent. My heart will not be at rest until there is no longer a Frenchman who imputes to me the abominable crime which another has committed."

The verdict was widely denounced outside of France as well as largely within it, since it proved how antiquated and farcical were French modes of justice, and how capable of abuse was the privilege, largely taken advantage of, of withholding testimony for so-called state or military reasons. Under such a system, it was widely held, any real defence of the accused was impossible, while prosecution by the government became a species of inquisition. Sympathy with France in her desire to conserve the honor of her army no one, no soldier at least, can withhold; but throughout the Dreyfus affair it was difficult to feel this sympathy when frenzied efforts — so characteristic of the entire proceedings — were resorted to, not to secure justice, but in large measure to shield culprits, screen rottenness, and conceal a great crime. This attitude of foreign critics in regard to the case has been well understood and even justified by Frenchmen themselves, one of whom thus frankly writes: "Under such conditions, why should we be astonished that a cry of amazement and disgust should be raised against us everywhere at the news that the Rennes court-martial had condemned Dreyfus? They have seen in this verdict a deliberate act of injustice; they have devoted the court-martial itself to infamy, and, what is more serious and at the same time supremely unjust, they have identified all France with this court-martial and have covered it with obloquy. This is the terrible situation. . . On March 5, 1904, the Court of Cassation granted another revision of the Dreyfus trial. In July, 1906, the decision of the court-martial at Rennes was annulled, and Dreyfus reinstated into the army as major of the 12th regiment of artillery. In October, 1906, he received the command of artillery in the arrondissement of St. Denis, resigning in 1907. On June 3, 1908, an attempt on his life was made by Gregori, the military editor of the *Gaulois*.

DREYSE, Nicholaus von, inventor of the needle-gun, was born at Sömmerda, near Erfurt, in 1787. He was the son of a locksmith and bred to his father's trade. At Sömmerda he established a large factory for a manufactory of firearms, and in 1864 was ennobled for his invention of the needle-gun. He died in 1867.

DRIFT, a name given to the boulder-clay a deposit of the Bleistocene epoch. More fully, it is called the Northern Drift, Glacial Drift or Diluvial Drift in allusion to its origin. Drift-wood is wood carried by tides and currents to a distance from its native locality. Specimens thus transported have been observed in the marine strata of the chalk, London clay and other formations. Sand-drift is sand driven and accumulated by the wind. See Geology, Vol. X, pp. 325–327.

DRIFT, in mechanics, a conical hand-tool of steel for enlarging or shaping a hole in metal, by being driven through or into it.

DRIFT, in navigation, a technical name for the deviation which a ship's course receives by the action of a contrary wind or currents.

DRILL–BABOON. See Mandrill, Vol. XV, pp. 484–485.

DRILL–PRESSES. See Machine Tools, in these Supplements.

DRILLS, tools for boring holes in metals. See Machine Tools, Vol. XV, pp. 156, 157.

DRILLS, implements for sowing grain. Machines have long been used for sowing grain. The object of the "drill" is to deposit seed in the ground in rows and then cover it. In this method of seeding, great advances have been made since colonial times. About the time of the adoption of the United States patent law the mechanical drill began to take practical form in England (for description of English drills, see Agriculture, Vol. I, p. 285). The first successful grain-drill in the United States was invented in 1837 by Moses Pennock of Chester County, Pennsylvania, and patented by him in March 1841. It was improved by his son and in 1853 received the highest award at the International Exhibition in New York. Many forms of the graindrill are now in use, over 5,000 patents for this machine having been issued in the United States alone. It has been developed in the United States and Great Britain to a high state of perfection.

DRINK QUESTION, The. See Liquor Laws, in these Supplements.

DRINKWATER, Jennie Maria, American author, whose surname is Conklin, was born near Portland, Maine, April 14, 1841, and educated at Brooklyn. In 1880 she married the Rev. Nathaniel Conklin. Her chief publications are *The Fairfax Girls; Second Best; Other Folk; Miss Prudence Cromwell; The Story of Hannah; Looking Seaward; Goldenrod Farm;* and *Dolly French's Household.*

DRISLER, Henry, classical scholar and educator, was born on Staten Island, New York, on December 27, 1818, and was graduated from Columbia College in 1839. He became a teacher in the Columbia College Grammar School, tutor in Greek and Latin in Columbia College in 1843,

adjunct professor in 1845, professor of Latin in 1857, professor of Greek to succeed Dr. Henry Anthon, deceased, in 1867, and acting president for a time in the last named year. He edited many classical text-books, including Liddell and Scott's great *Greek Lexicon*, and ranked among the foremost classical scholars of his time. He died on November 30, 1897. W.F.J.

DRIVER, Samuel Rolles, an English educator and author; born in 1846, educated at Oxford, of which he was elected scholar in 1865, and graduated with first-class honors in 1869; fellow of New College from 1870 to 1882, and tutor from 1875 to 1882. He applied himself early to the study of Hebrew and other Semitic languages, and obtained the two University Hebrew scholarships in 1866 and 1870, respectively, and was appointed, in 1875, member of the Old Testament Revision Company. In 1882 he was appointed to the regius professorship of Hebrew at Oxford (with a canonry of Christ Church attached). He wrote *A Treatise on the Use of the Tenses in Hebrew* (1874); *Isaiah: His Life and Times, and the Writings Which Bear His Name* (1888); *Notes on the Hebrew Text of the Books of Samuel* (1890); and of various articles relating to the Old Testament and Hebrew philology; and was also the joint editor of *The Holy Bible, With Various Renderings and Readings from the Best Authorities*, published by the Queen's printers in 1889. As a Hebraist and student of the Old Testament, he established a reputation upon the Continent and in America.

DRIVING. In the United States, furious driving in cities generally is a misdemeanor, punishable by fine and imprisonment. In the absence of state laws, municipalities regulate the rate of driving.

DROBISCH, Gustav Theodor, poet and humorist; was born in Dresden, Saxony, on December, 26, 1811, and became a writer in poetry and prose. He had a keen perception of the droll side of life and of the foibles of society, and portrayed them with irresistible humor, wit and satire. His best known work is a collection of miscellany called *Conceits and Satires*. He died in Dresden on April 15, 1882. W.F.J.

DROIT D'AUBAINE. See Alien, Vol. I, p. 506.

DROMORE, a town in the northwest of Down County, Ireland, on the Lagan, 17 miles S.W. of Belfast by rail. It is noted for its linen manufactures and as the burial-place of Jeremy Taylor. Population, 2,408.

DRONGO-SHRIKE, the birds of the family *Dicruridæ*, found in Asia, Africa and Australia. They are glossy black in color. In India they are called king-crows, because they so successfully attack intruders, as crows or kites.

DROSCHKE or DROSCHKY, a term originally used in Russia to designate any light vehicle, and applied in Germany to a public hack or cab, in the place of a fiaker. The name of fiaker, a public vehicle, is derived from the street of St. Fiacre in Paris, where the first public hacks, introduced in 1662 under Louis XIV, halted in front of an inn, having St. Fiacrius for its patron and sign. G.A.S.

DROSERACEÆ. See Insectivorous Plants, Vol. XIII, pp. 140–147.

DROSOMETER, an instrument for measuring the quantity of dew that collects on a surface exposed to the open air during the night. The simplest drosometer is a tussock of wool, weighed when dry, and again after the accession of dew. The general form is that of a balance, the portion for the weight protected, while the other side is left exposed so as to collect the dew.

DROUYN DE L'HUYS, Édouard, a French statesman, born in Paris, Nov. 19, 1805; died in Paris, March 1, 1881. From 1833–36 he was secretary to the embassy in the Hague and *chargé d'affaires* at Madrid in 1840; director of commercial affairs in the Ministry Exterior, and was in 1842 elected a deputy. He served as minister of foreign affairs from 1848–49 when he was appointed ambassador at London, and held again his former post in 1850, and from 1852–55, when he concluded the alliance with England, and (for the fourth time) from 1862–66. His failure to force Prussia to a concession of a French protectorate over the Rhenish provinces led to his resignation. He also was a senator from 1851–56. G.A.S.

DROWN, Thomas Messinger, chemist and educator, was born in Philadelphia on March 19, 1842, and was educated at the University of Pennsylvania, Yale, Harvard, Columbia, Freiberg, and Heidelberg. He was professor of chemistry at Lafayette College in 1874–81, and at the Massachusetts Institute of Technology in 1885–95, and since 1895 has been president of Lehigh University. He has also been chemist of the Massachusetts state board of health, and secretary and president of the American Institute of Mining Engineers. W.F.J.

DROWNING, as a capital punishment, was long the custom. Tacitus tells us that the Germans hanged their greater criminals, but that meaner and more infamous offenders were plunged under hurdles into bogs and fens. Drowning was also a Roman punishment. The *Lex Cornelia* decreed that parricides should be sewed up in a sack with a dog, cock, viper and ape, and thrown into the sea. The Anglo-Saxon codes ordered women convicted of theft to be drowned. The pit, ditch or well was for drowning women; but the punishment was sometimes inflicted on men. As late as 1611 a man was drowned at Edinburgh for stealing a lamb. The custom survived in Scotland until 1685, and in France as late as 1793. See also Capital Punishment in these Supplements.

DROYSEN, Johann Gustav, a German historian; born in Treptow on the Rega, July 6, 1808; was professor of history at Berlin from 1833–40; at Kiel from 1840–51; at Jena from 1851–59, and from 1859–64 in Berlin, where he died, June 19, 1884. Among his historical works are *Translations of Aristophanes* (1881), and *of Œschylus* (1884); *History of Alexander the*

Great (1833); *History of Hellenism* (1877–78). G.A.S.

DROZ, ANTOINE GUSTAVE, novelist; was born in Paris on June 9, 1832, and at first studied art, for which he inherited a taste from his grandfather, the sculptor, Jean Pierre Droz. Later he turned his attention with much success to writing fiction. His *Monsieur, Madame, et Bébé*, in 1866, was one of the most popular books of its time. He died in October, 1895. W.F.J.

DRUGGET, a woven and felted coarse woolen fabric, usually with a printed pattern, chiefly used for covering carpets, and hence often called crumbcloth. The name is also given to a stout dress fabric made with a linen warp and a worsted weft. This stuff is still made by hand-loom in Scotland.

DRUIDS, UNITED ANCIENT ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

DRUM ARMATURE. See ELECTRICITY, § 81, in these Supplements.

DRUMFISH, a large North American fish (*Pogonias chromis*) belonging to the family *Sciænidæ*, and so named from its peculiar sound, probably made by the clapping together of its large flattened molar-like teeth. R.W.C.

DRUMLIN, a term in geology for a low hill formed of an unstratified mass of glacial deposit. Such hills are found in Ireland, Scotland, and in the United States in Wisconsin, New York, and the New England states. The drumlins are generally rounded and smooth, but sometimes are rough, with steep sides.

DRUMMOND, HENRY, a Scottish clergyman and scientist; born near Stirling, Scotland, Aug. 17, 1851; graduated from the University of Edinburgh and afterwards studied at Tübingen University, Germany; ordained a minister of the Free Church, and was first stationed in Malta. In 1884 he was appointed professor in science in the Glasgow Free Church College, after a service of seven years as lecturer. He traveled a great deal and wrote an account of his African trip, *Tropical Africa* (1888). But it is as a scientific theologian that he is known to the world. He wrote *Natural Law in the Spiritual World* (1883); *Pax Vobiscum; The Changed Life; The Programme of Christianity* (1891); *The Greatest Thing in the World* (1893); *The Ascent of Man* (1894); *The City Without a Church;* and *Baxter's Second Innings.* Died in Tunbridge Wells, Eng., March 11, 1897. See his *Life*, by George Adam Smith, D.D. (1898).

REV. HENRY DRUMMOND.

DRUMMOND, THOMAS, an American jurist; born in Bristol Mills, Maine, October 16, 1809. In 1830 he was graduated from Bowdoin College and removed to Illinois in 1845 where he practiced law. In 1860 he was appointed United States circuit court judge for Illinois and in 1869 judge of the United States circuit court for Illinois, Wisconsin and Indiana. He was retired for age in 1884, and died at Wheaton, Illinois, May 15, 1890. W.M.C.

DRUMMOND ISLAND, an island at the northern end of Lake Huron, 18 miles long and 10 wide, belonging to Chippewa County, Michigan.

DRUMMOND LAKE. See DISMAL SWAMP, Vol. VII, p. 225.

DRUMMOND LIGHT OR LIME-BALL LIGHT, a very intense light, produced by directing an ignited stream of oxy-hydrogen gas upon a ball of lime. It was invented by Thomas Drummond of the British navy, in 1826. It was first used in coast-survey work to signal from one station to another.

DRUPE. See BOTANY, Vol. IV, p. 137.

DRUSUS, CLAUDIUS NERO. See TIBERIUS, Vol. XXIII, pp. 356–359.

DRYBURGH, a beautiful ruined abbey in Berwickshire, five miles E.S.E. of Melrose, on the Tweed. It contains the graves of Sir Walter Scott and of his son-in-law, Lockhart.

DRYDEN, a village of Tompkins County, central New York, 30 miles N. of Owego, on the Lehigh Valley railroad. It contains a graded school, a woolen mill, tannery, and a newspaper-office. It has a magnetic spring, and Dryden Spring Place attracts many health-seekers. Population 1900, 699.

DRYING-MACHINE, a name applied to an apparatus for drying long webs of calico and other fabrics. See BLEACHING, Vol. III, p. 710.

DRYOPHIDÆ. See SNAKES, Vol. XXII, pp. 203–206.

DRY-PLATE PHOTOGRAPHY. See PHOTOGRAPHY, in these Supplements.

DRY TORTUGAS, Florida, a coral bank with ten projecting and low-lying islets mostly covered with mangrove bushes, at the entrance to the Gulf of Mexico, about 70 miles W. of Key West, and 120 miles W.S.W. of Cape Sable, the southernmost point of the Florida mainland; administratively they belong to Monroe County. The Loggerhead lighthouse, 150 feet high, is on the southwesternmost islet; on Bird or Garden Key another lighthouse stands within Fort Jefferson. The fort was built from 1860 to 1862 and during the Civil War Confederate prisoners were interned there. It is still used as a military garrison post and occasional prison. C.L.S.

DUALIN, an explosive compound invented by Carl Dittmar. Its composition is: nitrate of potassa, 20 per cent; sawdust, 30 per cent; nitroglycerine, 50 per cent. It is more sensitive to heat than dynamite, and can be exploded by the slightest friction even when frozen. It has twice the explosive power of dynamite. See NITROGLYCERINE, Vol. XVII, pp. 534–535.

DUALISM, the name given to a philosophical theory, according to which two principles of different natures, original, and incapable of being derived the one from the other, lie at the bottom of everything; as, for example, the ideal and the real; the spiritual and the material; the

good and the evil, etc. See EVOLUTION, Vol. VIII, pp. 653–654.

DUAL NUMBER. See GRAMMAR, Vol. XI, p. 36.

DUANE, JAMES CHATHAM, soldier and engineer, was born at Schenectady, N. Y., on June 30, 1824, and was graduated from Union College in 1844 and from West Point in 1848. He was instructor in engineering at West Point in 1858, and treasurer of that Academy in 1859–61. In the Civil War he served at Fort Pickens, at Washington, and in the campaign from the Rapidan to the James River and before Petersburg. He served on the lighthouse board, and was the first to use steam whistles as fog signals. He was for some years president of the New York Aqueduct Commission. He rose to the rank of brigadier-general of the regular army. He died on November 7, 1897.

W.F.J.

DUANE, WILLIAM, an American journalist and politician; born near Lake Champlain, New York, in 1760. The son of Irish parents, when a boy was sent by them to Ireland to receive his training. He displayed throughout his life the spirit of the Irish agitator, to which he added a spitefulness which brought him many enemies and few friends. He was a printer by trade, and in 1784 went to India and began the publication of the Calcutta *World*, but soon made himself obnoxious to the authorities and was sent to England. There he became connected with the London *Times*. He moved to the United States in 1795; and in 1798 became editor of the *Aurora* of Philadelphia, a paper, in its time, of great political influence. He made use of his position to attack the Presidential administrations of Adams and Madison. While at first he had considerable influence, it was soon lost by reason of the coarse and vilifying editorials written by him. He left the *Aurora* in 1822 and went to South America, but returned the next year. He was given a small office as an attaché of the supreme court, and retaining it until his death, which occurred in Philadelphia, Pennsylvania, Nov. 24, 1835.

DUANE, WILLIAM JOHN, lawyer, son of the somewhat scurrilous editor, William Duane; was born in Ireland in 1780, and learned the printing trade from his father. He was admitted to the Philadelphia bar in 1815, drew up the will of Stephen Girard, won the favor of President Andrew Jackson, and was appointed by the latter Secretary of the United States Treasury to succeed Louis McLane, when the latter, in 1833, refused to aid Jackson in his war upon the United States Bank by withdrawing the government funds therefrom. Duane, however, also refused to withdraw the deposits, and Jackson accordingly soon dismissed him from the place, which was then given to Roger B. Taney. Duane then resumed the practice of law. He died on September 27, 1865.

W.F.J.

DUBBS, JOSEPH HENRY, clergyman and educator, was born at North Whitehall, Penn., Oct. 5, 1838, was graduated from Franklin and Marshall College in 1856, and became a clergyman of the German Reformed Church. Since 1875 he has been professor of history and archæology at Franklin and Marshall College. He has written a *Manual of the Reformed Church*, *History of the Reformed Church*, and other works, besides a great number of pamphlets, encyclopædia articles, etc. W.F.J.

DUBLIN, the metropolis and capital of Ireland. For early history, see Vol. VII, p. 428. Since 1880 the condition of the poorer parts of the city has been improved and blocks of artisans' dwellings have been erected. The most imposing structure, opened 1890, is the museum and library of the Royal Dublin Society. Modern means of transportation have been introduced and the harbor facilities increased. Pop. 1901, including suburbs, 379,861.

DÜBNER, FREDERICK, a German philologist; born in Gotha, December 21, 1802. He studied at Gotha and at Göttingen, and from 1826 to 1831 was professor in the gymnasium at Gotha. He then went to Paris and assisted Didot in preparing Stephen's *Thesaurus*. He next turned his attention to the *Bibliotheca Græca*, and the value of this collection is mainly owing to him. He also wrote for the *Revue de Philologie*. He died near Paris, October 13, 1867. W.M.C.

DUBNITZA, a town of Bulgaria, 33 miles S. of Sofia. It has iron-works. Pop. 6,000.

DUBOIS, a village of Clearfield County, western central Pennsylvania, located in the coal region, 129 miles N.E. of Pittsburg, on the Buffalo, Rochester and Pittsburg, and Mahoning Valley railroads. It has a machine-shop, planing and lumber mills, and a sash and blind factory. Population 1890, 6,149; 1900, 9,375.

DUBOIS, AUGUSTUS JAY, engineer and educator, was born at Newton Falls, Ohio, on April 25, 1849, and was educated at Yale (1869) and Freiberg. He was professor of civil and mechanical engineering at Lehigh University from 1874 to 1876, and since 1876 has filled the chairs of mechanical engineering, until 1884, and since 1884 of civil engineering, in the Sheffield Scientific School of Yale University. W.F.J.

DUBOIS, CLÉMENT FRANÇOIS THÉODORE, a French organist and composer; born in Rosney, Aug. 24, 1837. He early attracted attention in Paris, by his playing, and in 1861 won the prix de Rome. Since 1877 he has occupied Saint-Saëns's position as organist at the Madeleine, Paris. He is well known as a composer, chiefly on account of his *Les Sept Paroles du Christ* (1867). Others of his works are *Le Pain Bis* (1879); and *Aben-Hamet* (1884); and a number of single pieces.

DU BOIS, CONSTANCE GODDARD, author, was born at Zanesville, Ohio, the daughter of Delafield Dubois. She has written many historical and other tales, and has devoted much attention to the improvement of the condition of the Indians.

W.F.J.

DUBOIS, JOHN, a Franco-American clergyman; born in Paris, France, August 24, 1764. He studied at the college of Louis le Grande and the seminary of St. Magloire. He was ordained

a Roman Catholic priest in 1781. He was forced to flee from France during the revolution, and removed to the United States in 1791. His first charge in America was at Norfolk, Virginia, whence he was transferred to Richmond, where he was for a time a guest in the house of James Monroe, and was the friend of prominent citizens, Patrick Henry undertaking his instruction in the English language. From Richmond he was transferred to Frederick, Maryland, the only priest then stationed between Baltimore and St. Louis. In 1809 he founded Mount St. Mary's College, near Emmittsburg, Maryland, and was its first president. He also at this time assumed the duties of chaplain and director of the House of the Sisters of Charity, then founded by Mrs. Seaton in the neighborhood of Emmittsburg. He was subsequently appointed bishop of New York, the diocese including the state and New Jersey. In 1838 he obtained a coadjutor in the person of John Hughes, who became his successor. He died in New York city, December 20, 1842. W.M.C.

DU BOIS, PATTERSON, assayer and educator; is a son of William Ewing Du Bois, who for many years was United States assayer in the Philadelphia mint, and who left the notable collection of coins now treasured there. He was born in Philadelphia on October 10, 1847, and was for many years in the assay department of the mint. In later years he has devoted himself to writing and lecturing on educational topics. He was for a time an editor of *The Sunday School Times*. W.F.J.

DUBOIS, PAUL, a French sculptor; born in Nogent-sur-Seine, July 18, 1829. He studied under Toussaint, in Paris. His first exhibited work was *Saint-Jean, a Child*, in 1860, done at Florence. He was made an officer of the Legion of Honor and a member of the Institute. Among the more famous of his works are *A Florentine Singer of the Fifteenth Century; Charity*, and *Narcissus at the Bath*. Was also a portrait-painter, an example of his work is *My Children*. Died May 23, 1905.

DU BOIS-REYMOND, EMIL, a German physiologist; born in Berlin, Nov. 7, 1818; noted for his researches in animal electricity, described in *Researches in Animal Electricity* (1848–60). In 1851 he was elected to the Berlin Academy of Sciences, of which he was permanent secretary from 1867–95. From 1849–55 he was teacher of anatomy at the Academy of Arts, succeeding, in 1858, his teacher, Johannes Müller, in the professorship of physiology at the University of Berlin, where he died, Dec. 26, 1896. He also wrote *The Limits of Knowledge of Nature and Ignorabimus; Voltaire as Naturalist*. G.A.S.

DUBUFE, EDOUARD, a French painter; born in Paris, March 30, 1820. He studied under his father, Claude Dubufe and Delaroche. He made a specialty of portrait-work, although he has done much on religious subjects. Among his portraits are those of the Princess Mathilde, Empress Eugénie, Rosa Bonheur and Alexandre Dumas, the younger. He was an officer of the Legion of Honor. He died in Versailles, Aug. 11, 1883.

DUBUFE, ÉDOUARD MARIE GUILLAUME, a French painter, son of the preceding; born in Paris, May 16, 1853. He studied under Mazerolle, and was taught by his father. Among his works are *The Death of Adonis* and *A Study* (1877) and *April* and *Saint Cecilia* (1878). The first year he received a medal of the third class, and the second year one of the second class.

DUBUQUE, a city of eastern Iowa and capital of Dubuque County (see Vol. VII, p. 435). It has extensive manufactories of carriages, wagons and plows, and its lumber and pork-packing interests are large. It has also manufactories of wooden-ware, brick, leather, white lead, shot, engines, machinery, farming implements, beer, flour, soap, candles, artificial stone, boots and shoes, etc. In addition to an excellent system of public schools, its educational interests include a German Presbyterian Theological Seminary, St. Joseph College and Academy (Catholic), St. Mary's Academy, the Iowa Institute of Science and Arts, several convents, a business college, and an Episcopalian school. Pop., 1900, 36,297.

DU CAMP, MAXIME, author; was born in Paris on February 8, 1822, and traveled extensively in the East. He wrote *Egypt*, *Nubia*, *Palestine and Syria* (1852), *The Convulsions of Paris*, a history of the Commune in four volumes (1878–79), and *Paris: Its Organs, Its Functions and Its Life*, his *magnum opus*, in six volumes (1869–75). Other works of minor value were *Modern Chants*, a volume of lyrical poems (1855); *Convictions* (1858), and several novels, including *Memoirs of a Suicide* (1853); *The Six Adventures* (1857), and *The Man with the Gold Bracelet* (1862). He died at Baden-Baden on February 8, 1894. W.F.J.

DUCAT. See NUMISMATICS, Vol. XVII, p. 673.

DUCATO CAPE, an abrupt headland, in lat. 38° 33′ N., long. 20° 23′ E., at the southwest extremity of Leukas or Santa Maura, one of the Ionian islands, dreaded by sailors for the fierce currents around it. From its summit criminals were anciently cast into the sea.

DUCCIO DI BUONINSEGNA. See SCHOOLS OF PAINTING, Vol. XXI, p. 451.

DU CHAILLU, PAUL BELLONI, a Franco-American traveler and author; born in Paris, July 31, 1835. As a youth he went to live in the French settlement at the Gaboon, on the west coast of Africa, where his father was a merchant. In 1852 he removed to the United States, where he afterward became a naturalized citizen, under the name of "Chaylion." In October, 1855, he left New York for the west coast of Africa, where he remained nearly four years, traveling on foot and in canoes, unaccompanied by any white man, upwards of 8,000 miles. During this time he shot and preserved the skins of over 2,000 birds and more than 1,000

PAUL B. DU CHAILLU.

quadrupeds. The greatest novelties in the collections he made were several gorillas, never before hunted, and rarely, if ever before seen by any European. The results of his expedition were given in his *Explorations and Adventures in Equatorial Africa* (1861), a work which provoked considerable controversy. In 1863 he left England on a second expedition, reaching the mouth of the Ogobai, western Africa, in October. Here he lost his scientific apparatus by the swamping of a canoe, and was obliged to send to England for a fresh supply, occupying himself meanwhile in hunting excursions, during which he again had an opportunity of studying the gorilla. He subsequently traversed large portions of previously unknown country, but was in September, 1865, obliged to return to the coast in consequence of a conflict with the natives. He published an account of this expedition under the title, *A Journey to Ashango Land* (1867). He also wrote *The Land of the Midnight Sun* (1881); *The Viking Age* (1889); *The Land of the Long Night* (1899); *The World of the Great Forest* (1900); *How Animals, Birds, Reptiles and Insects Talk, Think, Work and Live* (1900). He died in St. Petersburg, Russia, April 30, 1903. W.M.C.

"DUCHESS, THE." See HUNGERFORD, MRS., Vol. XXVII. p. 340.

DUCHOBORTZI, one of the numerous sects of mystics, which flourish in Russia, traceable to the eighteenth century, who depend upon an inward light, like the Quakers; attach little importance to the sacraments, priesthood, and services of the church; and reject the doctrine of the Trinity and of the divinity of Christ. Alexander I allowed them to settle in Taurida, in south Russia; Nicholas I, in 1841, transferred them to Transcaucasia and Siberia, where they have become quite a powerful sect. Their refusal to bear arms led to their persecution by the government, and in 1899 some thousands of them emigrated to Canada.

DUCKBILL. See PLATYPUS, Vol. XIX, p. 225.

DUCK RIVER, rises in Coffee Co., Tenn., follows a westward course, and enters the Tennessee river 16 miles S.W. of Waverly; length about 200 miles; navigable for about 50 miles for small craft.

DUCKWEEDS, the common name of species of the family *Lemnaceæ*, small, free-swimming water-plants, including the smallest of flowering plants. The plant is a small, floating, leaf-like body, from which roots hang downward. The extremely reduced flowers arise from a pocket-like hollow of the thallus-like body. Duckweeds multiply rapidly by branching, each branch repeating the form of the parent body, and thus speedily cover the surface of stagnant water. The genera are *Lemna*, *Speirodela* and *Wolffia*. The species are regarded as very much reduced arums.

DUCLERC, CHARLES THÉODORE EUGÈNE, a French politician; born Nov. 9, 1813, at Bagnères-de-Bigorre, in the Pyrenees. At the revolution of 1848 he became Under-Secretary of Finance March 6, and Minister of Finance May 10, when he retired from active politics on the nomination of Cavaignac for the Executive. In 1870 elected to the National Assembly, he became president of the Republican Left; in 1875 Vice-President of the National Assembly, and a Senator in August, 1882, Minister of Foreign Affa[illegible] under Grévy, which post he held till Jan. 15, 1883. He died in Paris July 21, 1888. G.A.S.

DUCROT, AUGUSTE ALEXANDRE, a French soldier; born in Nevers, Feb. 24, 1817, He entered the army in 1840 as a lieutenant, and at the time of the battle of Sedan, was a general in command of a division. At that battle he was taken prisoner and imprisoned. He escaped, however, and reached Paris in time to take an active part in the last battles of the Franco-Prussian war, and to help suppress the Commune. He afterward was elected to the Assembly, and used his influence against the Empire. He published *The Day of Sedan* (1871); *The Defense of Paris* (1878), and works of minor importance. He died in Paris, Aug. 17, 1882.

DUCTILITY. See WIRE, Vol. XXIV, p. 647.

DUDLEY, BENJAMIN WINSLOW, surgeon, was born in Spottsylvania County, Virginia, on April 12, 1785, and was educated at Transylvania University and the University of Pennsylvania, from which latter he received his doctor's degree in 1806. He afterward studied in London under Sir Astley Cooper and in Paris under various eminent surgeons. When he returned to America in 1814 he already had a wide reputation as a skilful practitioner. He settled at Lexington, Kentucky, and remained there until 1854, ranking as the foremost surgeon west of the Alleghany Mountains. He was the first professor of surgery at Transylvania University, and was a particularly successful instructor. He ranked as one of the foremost lithotomists of his time, and wrote a number of papers on such operations. He died at Lexington on January 20, 1870. W.F.J.

DUDLEY, CHARLES EDWARD, an American public man; born in Staffordshire, England, May 23, 1780. He came with his mother to Newport, R. I., in 1784. He entered into mercantile pursuits and removed to New York, and in 1811 settled in Albany. He was State senator, 1820–25; mayor of the city in 1821 and 1828; and in 1829 was appointed United States Senator to serve out the unexpired term of four years of Martin Van Buren. He founded and endowed the Dudley Observatory at Albany. He died in Albany, Jan. 23, 1841. E.E.T.

DUDLEY, EDMUND, an English jurist and statesman under Henry VII. He and Richard Empson were the principal tools of Henry in his maladministration of law which brought such a hatred of the people on their head, that Henry VIII, successor of Henry VII, sent Dudley and Empson to the block, Aug. 18, 1510. G.A.S.

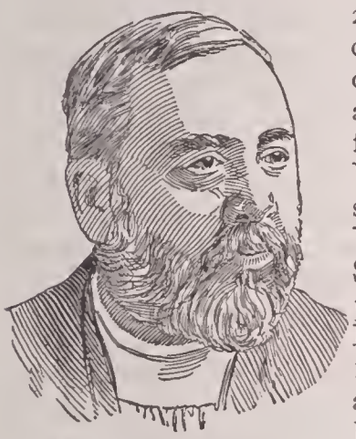
DUDLEY, HENRY BATE, a British journalist and clergyman; born in 1745, in Fenny Compton, England. A man of great ability, he distinguished himself in several lines. He was a writer of no mean talent; his *Rival Candidates* (1775), and *Travelers in Switzerland* (1793), both comic

operas, established him among the dramatists of his time. His services as a magistrate were such as to bring him a baronetcy. As a clergyman, he became prebendary of Ely. He established the *Morning Post* in 1775 and the *Morning Herald* in 1780. He was the author of several pamphlets on political economy. He died in London, Feb. 1, 1824.

DUDLEY, Joseph, an American colonial governor; born in Roxbury, Mass., Sept. 23, 1647. He graduated at Harvard in 1665; was sent to England as agent of the Province in 1682 and 1689; was president of New England in 1686; and a few months later was made chief justice. He was chief justice of New York, 1690–93; lieutenant-governor of the Isle of Wight, 1694–71; and governor of Massachusetts, 1702–15. He died in Roxbury, April 2, 1720. E.E.T.

DUDLEY, Paul, an American jurist; born in Roxbury, Massachusetts, September 3, 1675. He was graduated from Harvard College in 1690 and finished his law studies at the Temple in London, England. He returned to Massachusetts in 1702 with the commission of attorney-general, which he held until he was appointed judge in 1718. In 1745 he was appointed chief justice. In his will he bequeathed $500 to Harvard College, the interest of which was to be applied to the support of an annual lecture which, is called from its founder, the Dudleian lecture. He died in Roxbury, January 15, 1751. W.M.C.

DUDLEY, Thomas Underwood, clergyman, was born at Richmond, Virginia, on September 26, 1837, and was educated at the University of Virginia. He served as an officer of the Confederate army in the Civil War, and afterward studied theology at the Virginia Theological Seminary and became a priest of the Protestant Episcopal Church. In 1875 he was made assistant bishop and in 1884 bishop of Kentucky, in which office he had a distinguished and useful career. In 1901 he was elected chairman of the house of bishops. He was the author of several ecclesiastical books. He died in New York City on January 22, 1904. W.F.J.



BISHOP DUDLEY.

DUE PROCESS OF LAW, a legal term which means according to law, in the regular course of its administration by courts of justice. The fifth amendment to the constitution of the United States provides that no person shall be deprived of life, liberty or property, without due process of law, and the fourteenth amendment provides that no state shall deprive a person of life, liberty or property without due process of law. The state constitutions contain similar provisions. The term "due course of law," or "the law of the land," is sometimes used in the same sense.

DUER, John, an American jurist; born in Albany, N. Y., Oct. 7, 1782. He served two years in the army, and then studied law. He commenced practice in Orange County, N. Y., whence, about 1820, he removed to New York. In 1825 he was appointed a member of the statute revision committee. In 1849 he was elected a justice of the superior court of New York city, a position which he held till his death. In 1857 he became the presiding justice. He compiled six volumes of reports of cases decided in his own court. He died on Staten Island, Aug. 8, 1858. E.E.T.

DUER, William Alexander, an American jurist and educator; born in Rhinebeck, Dutchess County, New York, September 8, 1780. He studied law and was admitted to the New York bar in 1802. From 1814 to 1820 he was a member of the state legislature, taking a prominent part in the debates on the establishment of canals and other important questions. He was also the author of the New York state school laws, upon which the laws of the present day are based. In 1822 he was appointed judge of the supreme court in the third circuit, an office which he held until the close of 1829, when he was elected president of Columbia College. He retired from this office after twelve years of service. He was the author of a treatise on the *Constitutional Jurisprudence of the United States*, published in 1847; *A Life of William Alexander, Earl of Sterling*, and wrote numerous papers upon American historical subjects for the magazines and reviews. He died in New York city, May 30, 1858. W.M.C.

DUEZ, Ernest Ange, a French painter; born in Paris, March 8, 1843; studied in the atelier of Pills, and made his appearance in the Salon of 1868. He was a figure-painter of unusual talent. He was made an officer of the Legion of Honor in 1889. Among his paintings are *Combat Between Roland and Oliver* (1869); *The End of October* (1877); *Saint Cuthbert* (1879), and a number of scenes from Parisian life. He died in Paris, April 5, 1896.

DUFF, Alexander, a Scottish Presbyterian missionary; born in Moulin, April 25, 1806. He went to India in 1829, the first missionary sent out by the Church of Scotland to that country. He was the first missionary to combine educational with religious teaching. He founded a school at Calcutta which grew into large proportions. He joined the Free Church party of the Church of Scotland after the rupture of 1843. He continued in missionary work until 1863, when his health compelled him to remain in Scotland. He was a professor in New College, Edinburgh, at the time of his death. He was perhaps the most influential member of the Free Church. He died in Edinburgh, Feb. 12, 1878.

DUFF, Sir Mountstuart Elphinstone Grant, a British lawyer and statesman; born in 1829, and educated at Edinburgh and Oxford, where he graduated in 1853. He was called to the bar in 1854, and entered the House of Commons in 1857,

as member for the Elgin burghs, continuing to represent that constituency in the Liberal interest till 1881. He was appointed Under Secretary of State for India in 1868, and held that office till 1874. On the formation of Mr. Gladstone's second administration in May, 1880, he was appointed Under Secretary of State for the Colonies. This office he resigned in July, 1881, on being appointed governor of Madras. During his successful administration of this great province, he made several tours from end to end of the presidency, in order to see with his own eyes what was requisite to be done. In 1886 he resigned the governorship. He was lord rector of the University of Aberdeen from 1866 to 1872. He is the author of *Studies in European Politics*, and other works.

DUFFERIN AND AVA, Frederick Temple Hamilton-Temple Blackwood, Marquis of, a British diplomat, statesman and author; born in Florence, Italy, June 24, 1826, of Irish parentage. He was the son of Hon. Price Blackwood, fourth baron of Dufferin. He was educated at Eton and at Christ Church, Oxford, and succeeded to the title of baron in 1841. During the potato famine in Ireland, he visited the affected districts and gave a straightforward account of his terrible experiences in *A Narrative of a Journey from Oxford to Skibbereen.* He also wrote on *Irish Emigration, and the Tenure of Land in Ireland; Mr. Mill's Plan for the Pacification of Ireland Examined*, and *Contributions to an Inquiry on the State of Ireland.* In 1855 he was attached to Lord John Russell's mission to Vienna. In 1859 he made a yacht voyage to Iceland, and published the highly popular *Letters from High Latitudes.* In 1860 he he was sent by Lord Palmerston as British commissioner in Syria, where he investigated with firmness and ability the difficult question of the massacre of the Christians and was rewarded with a K.C.B. From 1864 to 1866 he was under-secretary of state for India, but was transferred from that post to the War Office, as under-secretary, where he remained until June, 1867. From 1867 to 1872 he was chancellor of the Duchy of Lancaster, and was then appointed governor-general of Canada. He ranks among the highest of the administrators of the Dominion. The growing prosperity of Manitoba was carefully encouraged, the discontent which inspired British Columbia to secede from the Dominion was overcome by his wise administration. Upon his return to England in 1878 when the Marquis of Lorne succeeded him, honors were showered upon him in the shape of honorary degrees. Appointed ambassador to Saint Petersburg in 1879, he was sent to Constantinople in May, 1882, to conclude a convention with the Porte for the joint occupation of Egypt. In October, 1882, he went to Cairo, and remained there until April, 1883, to settle the affairs of the country after Araby Pasha's rebellion. Immediately after his arrival, the Dual Control was abolished by Khedival decree. In December, 1884, he succeeded Lord Ripon, who had become highly unpopular with the European community, as the Viceroy of India. In December, 1885, Burmah was annexed to England on the deposition of King Thebaw, and in a Budget speech made shortly afterwards the Viceroy announced the necessity of increased military preparations in view of the southward advance of Russia. The attack on Penj-deh was replied to by the fortification of Herat under British supervision, but the crisis gradually passed away, and in 1886 the Viceroy was able to congratulate the Afghan Boundary Commission on the completion of its labors. Lord Dufferin's viceroyalty came to an end in 1888, when he was created a marquis and was appointed minister at Rome in 1888, and ambassador to France in 1891. A volume of his *Speeches and Addresses* appeared in 1882 and *Speeches Delivered in India* (1890). He died at Clandeboye, Ireland, February 12, 1902. W.M.C.

MARQUIS OF DUFFERIN.

DUFFERIN, Lady Harriet, an English authoress, and wife of the Marquis of Dufferin and Ava, was born in 1843 at Killyleagh Castle, County Down, Ireland, her father being Captain Archibald Rowan Hamilton. She married Lord Dufferin in 1862, and contributed largely to her husband's popularity while he filled the posts of Governor-General of Canada and India, and served the crown on his various embassies at St. Petersburg, Constantinople, Rome and Paris. In Canada, during his administration, in the years 1872–78, Lady Dufferin took a hearty interest in woman's educational work, and by her social graces and inimitable tact she endeared herself to all. In India she devoted herself with rare enthusiasm to philanthropic work among the native women, an account of which she published in 1889 in *A Record of Three Years' Work*, and in *Our Viceregal Life in India*, which appeared in the following year. In 1891 she published *My Canadian Journal*, an interesting narrative of viceregal journeys through various portions of the Canadian Dominion, with some acute chapters on the social life as well as the physical beauties of the country.

DUFFIELD, George, clergyman, was born in Pennsylvania on October 7, 1732, was graduated from Princeton, and became a Presbyterian minister. For a time he was chaplain of the Continental Congress, and he was ardently devoted to the cause of American independence. He was a leader of the "New Light" party in the church and was the first stated clerk of the General Assembly. He died on Feb. 2, 1790. W.F.J.

DUFFIELD, George, 2nd, grandson of George Duffield, clergyman, was born in Pennsylvania in 1794 and became a minister of the Presbyterian Church. He wrote a number of books, on slavery,

the episcopacy, millenarianism, and other topics. He died in 1868. W.F.J.

DUFFIELD, George, 3rd, son of George Duffield, 2nd, clergyman, was born at Carlisle, Penn., on September 12, 1818, and was graduated at Yale in 1838 and from Union Theological Seminary in 1840. He was the pastor of a number of Presbyterian churches and was the author of many poems and hymns, some of which — such as *Stand up, Stand up for Jesus* — have gained wide popularity. He was for some years one of the regents of the University of Michigan, and he received the degree of D.D. from Knox College, Illinois, in 1871. His son was Samuel A. W. Duffield, clergyman and author (q. v.). He died on July 6, 1888. W.F.J.

DUFFIELD, John Thomas, an American mathematician; born in McConnellsburg, Pennsylvania, February 19, 1823. He was graduated from Princeton in 1841 and from the Princeton Theological Seminary in 1844. He taught at the Philadelphia Union Academy and was then called to Princeton where he was adjunct-professor of mathematics in 1847, and professor of mathematics in 1856. He wrote *The Discovery of Gravitation* (1863); *The Philosophy of Mathematics* (1867), and other works. He died in Princeton, New Jersey, April 10, 1901. W.M.C.

DUFFIELD, Samuel Augustus Willoughby, an American clergyman and poet; born in Brooklyn, New York, September 24, 1843. He was graduated from Yale College in 1863 and became a Presbyterian minister at Bloomfield, New Jersey. He wrote *English Hymns* (1866); *Latin-Hymn Writers* (1877), and contributed numerous poems to the magazines. He died in Bloomfield, May 12, 1887. W.M.C.

DUFFY, Sir Charles Gavan, statesman; was born in Ireland in 1816, and became a journalist in Dublin and Belfast. He joined Thomas Davis and John Dillon in 1842 in founding the *Nation*, the organ of "Young Ireland." In 1844 he was tried and convicted for sedition, but his conviction was quashed by the House of Lords. He was associated with O'Connell and Smith O'Brien, organized the Independent Irish party, and was elected to Parliament. In 1856 he went to Australia, became Victorian minister of public works, and prime minister in 1871. He was knighted in 1873, and in 1877 was speaker of the Victorian assembly. He published *Ballad Poetry of Ireland* in 1850; *Young Ireland* in 1880, and *Four Years of Irish History, 1845–49*, in 1883. He died on February 9, 1903. W.F.J.

DUFFY, John Gavan, Australian statesman, son of Charles Gavan Duffy; was born in Dublin on October 15, 1844, and has filled various ministerial offices in Victoria, Australia. W.F.J.

DUGHET, Gaspard. See Poussin, Vol. XIX, p. 670.

DUHAMEL, Joseph Thomas, clergyman, was born in Canada on November 6, 1841, and entered the priesthood of the Roman Catholic Church. In 1874 he became bishop and in 1886 first archbishop of Ottawa, Canada. W.F.J.

DÜHRING, Eugen Karl, a German philosopher and political economist; born in Berlin, Jan. 12, 1833. He was appointed referendary in the court of justice, but resigned and devoted himself to the study of philosophy and national economy. From 1864 to 1877 he was a private tutor in the Berlin University. He wrote extensively on economical and philosophical subjects; among them. *Capital and Labor* (1865); *The Cost of Living* (1865); *Critical Basis of Popular Economy; History of National Economy and Socialism* (1879); and *Theory and Logic of the Sciences* (1878).

DUHRING, Louis Adolphus, physician and educator, was born in Philadelphia on December 23, 1845, and was educated at the University of Pennsylvania, medical department. He served in the Philadelphia Hospital, and then pursued those studies in London, Paris and Vienna for several years. He was the head of a dermatological dispensary in Philadelphia from 1870 to 1880, and from 1871 to 1876 was lecturer at the University of Pennsylvania. Since 1876 he has filled the professorship of diseases of the skin in that university. He is the author of a work on skin diseases which has been translated into many other languages; of an Atlas of skin diseases, and of various other works. W.F.J.

DUILLIAN COLUMN. See Latin, Vol. XIV, p. 329.

DUKERIES, The, a familiar English name for the wooded district around Worksop, in Nottinghamshire, from the number of ducal residences it contains. The most interesting of these is Welbeck Abbey, the seat of the Duke of Portland, which lies four miles southwest of Worksop. It is approached by a tunnel two miles in length, leading to a curious series of underground apartments, including a large library, a ballroom, a picture-gallery with some valuable paintings, and a spacious riding-school. Worksop Manor, adjoining the town on the southwest, was formerly a seat of the Duchess of Norfolk, until its purchase by the Duke of Newcastle. The magnificent domain of this last-named nobleman, Clumber Park, is situated three miles southeast of Worksop. The house contains a fine collection of historical portraits and the lake is an angler's paradise. Thoresby, formerly the property of the Duke of Kingston, is here and these park glades reach Sherwood Forest, the legendary greenwood home of Robin Hood. The Dukeries is a resort of tourists and artists.

DULAG, a town in Leyte, near Manacagan Mt., Philippines, on E. coast of island. Pop. 1903, 14,884.

DULCE Y GARAY, Domingo, Marquis of Castell-Florit, soldier; was born in Spain about 1806, rose to eminence in the Spanish army, and took a leading part in the revolution of 1854. He was captain-general of Cuba in 1862–66, and won honorable distinction for his vigorous suppression of the African slave trade. He was an associate of Marshal Prim in the revolution which dethroned Isabella II, and in 1869 returned to Cuba as captain-general, but resigned in a few months, and died on November 29, 1869. W.F.J.

DULCIMER, a musical instrument resembling a flat box, with sounding-board and bridges, across which run wires tuned by pegs at the sides. It is played by striking the wires with a small piece of wood in each hand, or more usually with two cork-headed hammers. The dulcimer is one of the most ancient of instruments, appearing in Assyrian sculptures, and may be regarded as the ancestor of the piano. It is used to-day in Hungary by the gipsies, and is known in Transylvania as the "santir." It resembles very much the psaltery, the only great point of difference being in the manner of striking the wires. The psaltery is played by means of plectra of ivory or metal, and sometimes with the fingers.

DU LHUT or DU LUTH, Daniel Greysolon or Gresolon, Sieur de, pioneer; was a Frenchman, who came to America in early colonial days, and did much exploring in the upper valley of the Mississippi, and in the region of Lake Superior and in Canada. He was a contemporary of Hennepin and La Salle (q. v.), and on at least one occasion rescued the former from captivity among the Indians. He engaged in the fur trade, and seems to have had more influence with the Indians than almost any of his associates. History has paid somewhat less attention to him than to Hennepin, La Salle and others, but he deserves honorable remembrance as one of the foremost pioneers of the northwest. The very spelling of his name is uncertain, the various forms which we have indicated having been used, together with others. While, however, modern writers have generally adopted the form Du Lhut, and while there is reason to believe it is the more correct, the alternative Du Luth has been adopted as the name of the city at the head of Lake Superior, which is perhaps his best memorial, and which is said to have been founded by his son more than a hundred years before it became an organized city. (See Duluth, infra.) W.F.J.

DULONG, Pierre Louis, a French physicist and chemist; born in Rouen, Feb. 12, 1785; became, in 1820, professor, and in 1830, director of the Polytechnical School of Paris. He died July 19, 1838. Besides his work on the composition of chloride of nitrogen (1811), he, with Petit, discovered the Dulong-Petit law: that the specific heat, multiplied with the atomic weight, gives approximately the same product, *i. e.*, atomic heat, with all aggregate elements. G.A.S.

DULSE or DILLESK. See Algæ, Vol. I, p. 449.

DULUTH, a city of northeastern Minnesota, and capital of St. Louis County (see Vol. VII, p. 449). The city received its name from Jean Du Lhut, who built a hut on Minnesota Point in 1760. It dates as a city from 1869. Duluth is a port of entry, most advantageously situated at the western extremity of Lake Superior, at the head of navigation on the great lakes. It is also at the eastern terminus of the Northern Pacific, Duluth and Iron Range, St. Paul and Duluth, Great Northern, Duluth, Missaba and Northern, Chicago, St. Paul, Minneapolis and Omaha, Duluth and Winnipeg, and Lake Superior and Mississippi railroads. The harbor of Duluth has recently been improved greatly by the United States government, which has expended large sums in dredging. The harbor is protected by a narrow strip of land, called Minnesota Point, which forms a natural breakwater, and through which there is a ship-canal. Duluth has large saw-mills, blast-furnaces, grain-elevators with a combined capacity of over 20,000,000 bushels, car-works, and over 433 other manufactories. Numerous regular lines of steamers connect the city with the lake ports. Duluth has fine public schools and buildings, the high school building costing $300,000. It has private, business, college-preparatory and parochial schools, and a large public library. Duluth has one of the finest park and boulevard systems in America. The terrace or boulevard drive, 9 miles in length, winds about the hillsides at a height, in some places, of 500 feet above the lake shore, connecting Glenwood, Grand View and Cascade parks. This system of driveway and parks is rapidly being extended, and will cover about 50 miles. Extensive deposits of iron, granite and freestone are found in the vicinity. Population 1880, 3,483; 1890, 32,725; 1900, 52,969. See Duluth, Vol. VII, p. 449.

DUMAGUETE, capital of the province of Negros Oriental, P. I., north of point of same name on S. E. coast. Inhabitants chiefly engaged in gathering turtle shells and trading in cotton. Pop., 1903, 14,894.

DUMAS, Alexandre, the younger, a French novelist; was born in Paris, July 28, 1824; was educated at the Collége Bourbon. He was the son of Alexandre Davy Dumas, the author of *Monte Cristo* and the *Three Musketeers*, and the grandson of General Dumas, a distinguished officer of the first empire. The younger Dumas was brought up among actors and literary people, and at an early age began to write poetry and sketches. His first important work, *La Dame aux Camélias* (1848), was produced as a drama in 1852. It forms the basis of Verdi's opera, *La Traviata*. M. Dumas's novels deal chiefly with the *demi-monde*. He wrote a number of bright comedies. He became a member of the French Academy in 1875, and a grand officer of the Legion of Honor in 1894. Among his most popular writings are *Le Fils Naturel* (1858); *L'Ami des Femmes* (1864), produced in New York in 1896, under the title, *The Squire of Dames; L'Affaire Clémenceau* (1873); *Dénise* (1885); and *Francillon* (1887). Died in Paris, Nov. 27, 1895.

ALEXANDRE DUMAS (FILS).

DUMAS, Jean Baptiste André, a French chemist; born in Alais, July 14, 1800. He made numerous important discoveries in organic chemistry, isomerism, the law of substitutions, and other departments of chemical philosophy. He

was professor of chemistry at the Athenæum, and afterward at the Sorbonne. From 1849 to 1851 he was Minister of Agriculture and Commerce, and afterward became a life senator. He was a member of the Academy of Sciences, of the Institute, and of the French Academy. His chief work is a *Treatise on Chemistry Applied to the Arts.* He died in Cannes, April 11, 1884.

DU MAURIER, George Louis Parmella Busson, a Franco-English caricaturist, book-illustrator and author; born in Paris, March 6, 1834. In 1851 he studied chemistry at University College, London, but returned to Paris and adopted art as a profession. After doing miscellaneous work in illustration and caricature for *Once a Week* and the *Cornhill Magazine*, he finally joined the staff of *Punch*, the pages of which he has enriched with well-known caricature sketches of society life. He was elected an associate of the Royal Society of Painters in Water-Colors. During 1890 he published a series of essays on his art, and numerous reprints of his sketches in *Punch.* He has illustrated Thackeray's *Henry Esmond*, and *The Story of a Feather*, by Douglas Jerrold, and a number of other works. He was more famous as a writer than an artist. In 1891 he published *Peter Ibbetson*, which attracted attention, but did not attain the popularity of his later work, *Trilby*, which, published in 1894, was the phenomenal success of that or many a year. It is an attractive story of artist life in the Quartier Latin of Paris, with a pathetic and more than beautiful center figure, who gave her name to the tale. A tinge of hypnotism, "out of the mysterious East," added to the crispest of dialogue, completed the positive quantities of the work. It appeared serially in *Harper's*, and, while it was favorably received, the *furore* did not come until the entirety of the story came in book form. Then a "Trilby craze" seized America and traveled across the Atlantic. The story was also dramatized and was a success on the boards. But to attribute to *Trilby* any permanent place in English literature is beyond the dreams of any reviewer. In 1896 a new story, *The Martian*, was published in *Harper's Magazine*, and to its first appearing a melancholy interest attaches, owing to the demise, in London, Oct. 8, 1896, of its versatile author. In his novels, as well as in his art contributions to *Punch*, he struck an entirely new note. With not a little of the art and much of the *bonhomie* of Thackeray; he had none of that novelist's biting cynicism, for his pictorial satires of society and representations of Bohemian life are wrought in the manner of an accomplished and gay-hearted man of the world.

GEORGE DU MAURIER.

DUMB. See Deaf and Dumb, Vol. VII, pp. 5–13.

DUMB-CANE (*Dieffenbachia Saguine*), a plant of the family *Araceæ*, differing remarkably from the plants of that family generally, in its almost arborescent character, but agreeing with them in its acridity, which is in none of them more highly developed. It has a cylindrical stem, with ringed scars and oblong-ovate leaves. It is a native of the West Indies, and has received its English name from the property which it has of producing dumbness when chewed, its acrid poisonous juice causing an immediate swelling of the tongue, accompanied with excruciating pain. It has, however, been used medicinally.

DUMICHEN, Johannes, a German Egyptologist; born in Weissholz, Silesia, Oct. 15, 1833. After a course of study in archæology at Berlin and Breslau, in 1862 he made an expedition into Egypt, studying the monuments of the valley of the Nile, exploring Nubia, the Soudan and parts of the White and Blue Nile. He returned to Prussia in 1865, with valuable copies of hieroglyphic inscriptions. Afterward he was sent on several scientific expeditions, and in 1872 was appointed a professor at the University of Strasburg. Among his works are *Geographic Inscriptions on the Ancient Monuments of Egypt* (1866); *Temples and Tombs of Ancient Egypt, Their Sculptures and Inscriptions* (1872); and a *History of Ancient Egypt* (1877). Died Feb. 7, 1894.

DU MOND, Frank V., artist, was born at Rochester, N. Y., in 1865, and studied art in Paris under Boulanger, Lefebvre and Benjamin Constant. He received a medal at the Paris Salon of 1890, and is an associate of the National Academy of Design. W. F. J.

DUNA FÖLDVAR. See Földvar, Vol. IX, 311.

DUNBAR, Paul Laurence, author; was born of African parentage at Dayton, Ohio, on June 27, 1872, and was educated at the Dayton high school. He has done newspaper work, and has written novels and several volumes of poems, is a frequent contributor to the principal magazines, and has appeared in public as a reader of his own poems and as a lecturer. W. F. J.

DUNCAN, Sara J., the maiden and pen-name of Cotes, Mrs. Everard, q. v., Supplements.

DUNCAN, William Wallace, clergyman, was born at Boydton, Virginia, on December 20, 1839, and was educated at Randolph-Macon and Wofford Colleges. He became a minister of the Methodist Episcopal Church, South, in 1859; was a chaplain in the Confederate army in the Civil War; was professor of intellectual and moral philosophy in Wofford College in 1875–86, and was elected a bishop in 1886. Died March 2, 1908.

DUNCKER, Maximilian Wolfgang, historian; born in Berlin, Oct. 3, 1811. After studies at Bonn and Berlin he settled to the study of history at Halle, and became professor there in 1842. His greatest work is his *History of Antiquity*, which embraces the early history of the Egyptians, Babylonians, Lydians, Persians, and Hindus. Died in Anspach, July 22, 1886.

DUNDAS or JUBA ISLANDS, British East Africa, a chain of about 500 coral islets fringing the coast southward from the mouth of the Juba River on the Indian Ocean. C. L. S.

DUNDAS, a strait in North Australia, separating Melville Island from Coburg Peninsula, and connecting the Arafura Sea with Van Diemen's Gulf. It is 18 miles wide and 40 long.

DUNDAS, a town of Wentworth County, southern Ontario, at the head of Burlington Bay, west of Lake Ontario, on the Grand Trunk railroad and the Desjardins canal. It has unlimited water-power, and manufactures iron castings, machinery, tools, woolen and cotton goods and wooden articles. Population 1901, 3,173.

DUNDAS, an island in Dixon Entrance, British Columbia, 40 miles N.E. of Queen Charlotte Island, and separated by Chatham Sound from the most southerly of the Alaskan Islands. Lat. 54° 25′ N., long. 30° 35′ E.

DUNDAS, Henry. See Melville, Viscount, Vol. XV, pp. 851–852.

DUNDEE, a village of Monroe County, southeastern Michigan, on the Raisin River, 44 miles S.W. of Detroit, on the Ann Arbor, the Cincinnati, Jackson and Mackinaw, and the Lake Shore and Michigan Southern railroads. It contains flouring-mills, a furniture factory, creameries, a pulp-mill, tannery, and factories where lumber and staves are made. The region about is a fertile agricultural one. Population 1900, 1,118.

DUNDEE, a village of Yates County, western central New York, 3 miles W. of Seneca Lake and 32 miles N. of Elmira, on the Fall Brook railroad. It has foundries, flour-mills, a brewery and a planing-mill. Population, 1900, 1,291.

DUNDRUM BAY, an inlet of the Irish Sea, on the east coast of Ireland, in County Down, five miles S. of Downpatrick. It is 13 miles wide at the entrance and only 5 miles long to its inmost recess, forming a long curve into the shore.

DUNE. See Geology, Vol. X, p. 236; Sahara, Vol. XXI, pp. 157–158.

DUNEDIN, New Zealand, a seaport city of South or Middle Island at the head of the picturesque land-locked Otago Harbor on the E. coast. New features include the Town Belt, an encircling driveway, improved waterworks, electric lighting and street-railways, botanical and acclimatization gardens, and the Jubilee Park. See Vol. VII, p. 467. Pop., 1901, 52,390. C.L.S.

DUNFISH, codfish that have been cured so that they are of a dun color. The usual process, formerly much used in New England, was to pack them in salt and keep them covered in a dark place for two or three months. They were then unpacked, resalted and covered, and after two or three months more they were ready for use. R.W.C.

DUNGENESS, England, a low-lying projection in the English Channel with a light-house. It is the southernmost point of Kent. C.L.S.

DUNGLISON, Robley, physician and educator, was born at Keswick, England, in 1798, and came to America in 1822. He was professor of medicine in the University of Virginia from 1824 to 1833, professor of materia medica and therapeutics in the University of Maryland from 1833 to 1836, and after 1836 professor of the institutes of medicine and medical jurisprudence in Jefferson Medical College, Philadelphia. He is best known by his writings, which have world-wide acceptance as standard treatises on physiology, therapeutics, materia medica, and medical science generally. He has been called, with justice, the "father of American physiology." He died on April 1, 1869. W.F.J.

DUNKIRK, an important city of Chautauqua County, New York, in the western part of the state. It is a port of entry on Lake Erie, and is reached by the Lake Shore and Michigan Southern, the Erie (of which it was the original western terminus), the New York, Chicago and St. Louis, and several other railroads. It has a good harbor, which is marked with a lighthouse. Its population in 1890 was 9,416, and in 1900 it was 11,616. W.F.J.

DUNLAP, a village of Harrison County, western Iowa, on Boyer River, 51 miles N.E. of Omaha, on the Chicago and North-Western railroad. It has a flour-mill, a newspaper-office, a fine hotel and carries on a thriving trade. Population 1900, 1,355.

DUNLAP, William, an American artist and dramatist; born in Perth Amboy, New Jersey, February 19, 1766. He studied art in New York city and under Benjamin West in London. Upon his return to America he wrote several plays, including *The Father* (1789); *Leicester* (1794), and *André* (1798). He also wrote *Life of George Frederick Cooke* (1813); *Life of Charles Brockden Brown* (1815); *History of the American Theater* (1832), and *History of the Rise and Progress of the Art of Design in the United States* (1834). He died in New York city, September 28, 1839. W.M.C.

DUNLIN. See Sandpiper, Vol. XXI, p. 273.

DUNMORE, an important village of the Lackawanna valley, in Lackawanna County, northeastern Pennsylvania, three miles N.E. of Scranton, on the Erie and Wyoming Valley railroad. The coal business is the chief employment of the town, as rich mines of anthracite are in the vicinity. Population 1890, 8,315; 1900, 12,583.

DUNMORE, Earl of, whose name was John Murray, was born in Scotland in 1732, and succeeded to the peerage as fourth earl in 1756. He was appointed governor of New York, and afterward of Virginia, in 1770. In 1773 he dissolved the Virginia legislature because of its adoption of resolutions for the appointment of a Committee of Correspondence with the other colonies for concerted action to secure their rights. Another dissolution followed in 1774, because of the appointment of a fast day over the Boston Port bill. In 1775 he prohibited the meeting of a convention, and removed the powder from the Williamsburg arsenal to a ship of war, thus provoking a revolt of the people. When he removed his seat of government to a warship, the legislature voted that he had thus abdicated. He engaged in acts of war against the colony, and tried to rouse the slaves to revolt. After he had

burned Norfolk he was driven out and returned to England in 1776. He died in 1809. W.F.J.

DUNNAGE, a name applied to miscellaneous fagots, boughs, bamboos, odd mats or sails, or pieces of wood, laid in the bottom of the hold to keep the cargo of a ship out of the bilge-water, or placed between parts of the cargo to keep them steady.

DUNNETT HEAD. See CAITHNESS, Vol. IV, p. 574.

DUNNOTTAR CASTLE, the ancient seat, now in ruins, of the Keiths, the Earls Marischal of Scotland, on the Kincardineshire coast, 1½ miles S. of Stonehaven. It occupies the top of a rock 4½ acres in extent and 160 feet high, overhanging the sea, with a deep though dry chasm between it and the mainland, and it is approached by a steep, winding path. The area is surrounded by a wall. Dunnottar Castle was dismantled after the rebellion of 1715, on the attainder of the last Earl Marischal.

DUNRAVEN, WYNDHAM THOMAS WYNDHAM-QUIN, EARL OF, a British yachtsman; born at Adare Abbey, County Limerick, Ireland, Feb. 12, 1841. He was graduated from Christ's College, Oxford. He entered the army, but left after two years' service, and engaged in journalism as war correspondent for the London *Daily Telegraph*. He was chosen Under-Secretary for the Colonies by Lord Salisbury in 1881 and again in 1885. After 1887 he took little part in politics, but devoted himself to sport, and became a recognized British authority on hunting. To the American people he is best known on account of his yacht-racing experiences. With his yacht, the *Valkyrie*, he tried thrice to win the American cup, each time without success. The last trial was in 1895, and resulted in a dispute, in which Dunraven accused the Americans of unfair treatment and tactics. The charges were disproved and he was censured by the British and American press.

DUNS, JOHN, a Scottish Free Church clergyman; born in 1820, in Duns, Berwickshire, Scotland. After his graduation from Edinburgh he entered the ministry of the Free Church in 1844, and continued in active pastoral labor until 1864, when he was appointed professor of natural science in New College, Edinburgh. The *North British Review* has been edited by him since 1857. Among his publications are *Christianity and Science* (1860); *Biblical Natural Science* (1868); and *Speculative Natural Science and Theology* (1877).

DUNSTANBOROUGH CASTLE, a picturesque ruin on the basaltic sea-cliffs of the Northumbrian coast, eight miles N.E. of Alnwick. Crystals of quartz found here are called Dunstanborough diamonds and amethysts.

DUNSTER, HENRY, an American educator; born in Lancashire, England, about 1612. He was the first president of Harvard College, and was inaugurated as such, Aug. 27, 1640. He was president until 1654, when, having become a supporter of the principles of the Baptists, he was persuaded to resign his office. He was respected as a modest and pious man, and esteemed an excellent Oriental scholar. In conjunction with Richard Lyon he improved the new version of the Psalms made by Eliot, Welde, and Mather, printed in 1640. He died in Scituate, Mass., Feb. 27, 1659. E.E.T.

DUNTZER, JOHANN HEINRICH JOSEPH, a German philologist; born in Cologne, July 11, 1813. In 1836 he became privat-docent in Bonn, where he had received his education. In 1846 he took charge of the Cologne Catholic gymnasium library. He is the author of a number of philological and historical works. Among his publications are *Goethe's Faust in Its Unity and Perfection* (1836); *The Myth of Doctor Faust* (1848); *Schiller and Goethe* (1859); *The Poetry of Aristotle* (1840); and *Fragments of the Epic Poetry of Greece.* D. 1901.

DUODENUM. See DIGESTIVE ORGANS, Vol. VII, pp. 196, 197.

DUPANLOUP, FÉLIX ANTOINE PHILIPPE, bishop of Orléans; born at St. Felix, Savoy, Jan. 3, 1802. He was ordained in 1825, became in 1828 tutor of the young Prince of Orleans, in 1835 first vicar at the Church of St. Rock, in 1837 emperor of the Little Seminary of St. Nicolas, in 1838 grand-vicar to the archbishop of Paris, and was created a Roman prelate and apostolic prothonotary and doctor of theology by Gregory XVI. Appointed bishop of Orléans in 1849, Dupanloup was one of the foremost and earnest champions of Papal temporal power and of independence of church and education from governmental supervision. In the Vatican Council he vehemently opposed the dogma of Papal infallibility, but submitted to it later on. For his instigation of a crusade against Germany in 1870, he was held a prisoner for a while by the German troops. In 1871 he was elected to the National Assembly, where he advocated a fusion of the Legitimists with the Orléanists. In 1875 he became senator for life, and died Oct. 11, 1878, near Grenoble. Among his writings are *On Education* (3 vols., 1855–57); *Select Works* (4 vols., 1865); *New Select Works* (7 vols., 1873–75). G.A.S.

DUPONCEAU, PIERRE ÉTIENNE (PETER STEPHEN), was born in France on June 3, 1760, and came to America as secretary to Baron Steuben in 1777. He served in the American army, was naturalized in 1781, and then entered the office of the Secretary for Foreign Affairs. In 1785 he was admitted to the bar and rose to eminence. He declined the chief justiceship of Louisiana, and wrote a number of scholarly works on philology. He died on April 1, 1844. W.F.J.

DUPONT, HENRY, an American powder manufacturer; born near Wilmington, Delaware, Aug. 8, 1812. He was graduated from the West Point Military Academy in 1833, and for a year afterward served in the army. He joined his father at the Dupont Powder Works, established in 1800, in Delaware, and from that time until his death continued in the business. During the Civil War he was major-general of the state militia, and, by his prompt and severe measures, prevented the secession of the state. He supplied the larger part of

the powder used by the Union army during the war. Died in Wilmington, Del., Aug. 8, 1889.

DUPONT, Samuel Francis, an American naval officer; born in Bergen Point, New Jersey, September 27, 1803. He entered the navy in 1817 and was promoted to commander in 1845. He took an active part in the Mexican War and during the Civil War was in command of the South Atlantic blockading squadron. He was promoted to rear-admiral in 1862. He wrote a treatise on coast defense. He died in Philadelphia, Pennsylvania, June 23, 1865. W.M.C.

DUPORTAIL, Louis Lebeque, French soldier, was engaged by Franklin and Deane to come to America in the Revolution, and was made a brigadier-general in 1777 and a major-general in 1781. He was with Washington at Monmouth, and directed the engineering operations at Yorktown. He returned to France in 1782, and was made field marshal and minister of war, but fell into disgrace and died in 1802. W.F.J.

DUPRÉ, Jules, painter; born in Nantes, France, in 1812. Self-taught, he exhibited, at the Salon of 1831, five landscapes which at once called attention to his ability. He was classed by critics of his time as the grandest portrayer of field-life in France, and was even more popular at the time of his death than at any time previous. Among his works are *The Return of the Flock; The Sluice;* and *The Landscape.* His *Balloon* and *Old Oak* are in the Museum of Art, New York; and another *Old Oak* is in the Walters Gallery, Baltimore. Died at L'Isle-Adam, near Paris, Oct. 6, 1889.

DUPREZ, Gilbert Louis, the most famous tenor singer of his time; born in Paris, Dec. 6, 1806, the 12th of the 22 children of a Paris perfumer. At the age of ten he entered the Paris Conservatoire and studied under Choron; in 1820 he sang in the chorus of *Athalie*, at the Théâtre Français; made his début at Milan about 1824; in 1825–28 sang at the Odéon, Paris, with no great success; and in 1828–36 in Italy, creating the role of Edgardo, in *Lucia*, at Naples, in 1835, the part having been composed expressly for him. From 1837 to 1849 he sang with great success at the Grand Opéra, Paris, creating a large number of tenor parts, including those in *La Favorita*, *Othello*, and *I Lombardi*. In 1842–50 he was professor of singing at the Conservatoire; and in 1853 founded an École Spéciale de Chant, which turned out many fine singers. In 1865 he was decorated with the Legion of Honor. He composed eight operas, an oratorio (*The Last Judgment*), two masses, and some romances and chamber music; and wrote *L'Art du Chant* (1845); *La Mélodie* (1873); *Souvenirs d'un Chanteur* (1880); and *Sur la Voix* (1882). Died at Passey, Sept. 23, 1896.

DUPUY, Charles Alexandre, a French statesman; born at Puy, Nov. 5, 1851. He began his career by teaching philosophy in various colleges in the provinces, and became school inspector. In 1885, just after he had been appointed head master of Corsica College, he was elected to the Chamber of Deputies as an advanced Republican. In Dec., 1892, he took office for the first time in M. Ribot's ministry, on whose fall, in March, 1893, he became premier. He was in the cabinet of President Casimir-Perier until 1895, and in 1898 became premier again, but resigned in 1899; senator, 1900.

DUQUESNE, an iron-manufacturing town in Allegheny Co., Pa., S. E. of Pittsburg. Pop. 1900, 9,036.

DUQUESNE, Fort. See Pittsburgh, Vol. XIX, p. 161.

DUQUOIN, Illinois, a city of Perry County on the main line and Eldorado & St. Louis division of the Illinois Central railroad, 68 miles S.E. of St. Louis, Mo. It is a coal mining and manufacturing center. Pop., 1900, 4,353. C.L.S.

DURA DEN, a small glen between Cupar and St. Andrews, in Fife, Scotland, through which runs a tributary of the Eden; famous on account of the numerous beautifully preserved fossil fish entombed in its yellow sandstone.

DURA MATER. See Anatomy, Vol. I, p. 759.

DURAMEN. See Botany, Vol. IV, p. 89.

DURAN, Carolus Auguste Émile, a French painter; was born in Lille, July 4, 1837. In 1853 he began to study in Paris; in 1861 he went to Rome and afterward to Spain, where his style was influenced powerfully by Velasquez. For *L'Assassiné* (1866) he gained his first medal; and in 1878 he exhibited his design, *Gloria Mariæ Medicis*, for a ceiling in the Luxembourg. He is most widely known, however, by portraiture, which is distinguished by great vigor, force of coloring, and power of direct realism. Among his paintings are *The Evening Prayer* (1863), a portrait of Émile Girardin, an equestrian portrait of Mlle. Croizette, and portraits of his own children.

DURANCE, France, an affluent of the Rhone, which it joins 3 miles below Avignon after a S.W. course of 160 miles from its source in the Cottian Alps. Through an aqueduct 50 miles long, it furnishes the water-supply of Marseilles. C.L.S.

DURAND, a city, the capital of Pepin Co., Wis., on the Chippewa river (here navigable), and on the Chicago, Milwaukee, and St. Paul railroad, 20 miles W.S.W. of Eau Claire; has a lumber-mill, six creameries, factories of woodenware; and trades largely in wheat and pork. Pop. 1900, 1,458.

DURAND, Alice Marie Céleste (Fleury), born in Paris, Oct. 12, 1842; died in Paris, May 26, 1902. She was educated by her father, and went with him to St. Petersburg, Russia, where he was professor of modern languages in the university. She contributed to Russian journals under the pseudonym "Henry Gréville." In 1872 she married Émile Durand, professor of French in the college at St. Petersburg, and returned to France, where she wrote novels on Russian life, etc., and contributed to French periodicals. Among her works, published under the name "Henry Gréville," are *Dosia* (1876); *Madame de Dreux* (1881) *Aurette* (1891); and *Péril* (1891).

DURAND, Asher Brown, an American artist and engraver; born in South Orange, New Jersey, August 21, 1796. His engraving of Trumbull's *Declaration of Independence* first brought him into notice, and for many years his services were in demand for portraits and figure

pieces. In 1835, having been a regular contributor of paintings to the exhibitions of the National Academy of Design, he finally abandoned engraving as a profession and devoted himself mainly to landscape painting. The Corcoran Art Gallery at Washington, contains his *Mountain Forest* (1869). His other well known works include *The Close of Day; Franconia Notch*, and *The Capture of André*. From 1845 to 1861 he was president of the National Academy of Design. He died in New Jersey, Sept. 17, 1887. W.M.C.

DURAND-CLAY, ALFRED; born in 1841; distinguished himself as chief engineer of the works of purifying the River Seine and of carrying the sewage of Paris to fields exposed to irrigations, begun in 1869. He was appointed teacher at the School for Bridges and Roads and at the Institute of Liberal Arts at Paris, where he died April 30, 1888. He published many works on sewage and sewerage in *Annales des Ponts et Chaussées*.

G.A.S.

DURANGO, Colorado, the seat of La Plata County, and terminus of branches of the Denver & Rio Grande, and the Rio Grande Southern railroads, on the Animas River, 358 miles S.W. of Denver. It was settled in 1881, and is the trade center of a coal-mining, farming, fruit, and stock-raising region, with large smelting, and iron-founding establishments. Pop., 1900, 3,317. C.L.S.

DURANT, HENRI, a French physician; famous as the originator of the Red Cross Society. The horror and despair with which he contemplated the terrible scenes that attended or immediately succeeded the battle of Solferino, June 24, 1859, led him to write the book *Un Souvenir de Solferino*, published in 1862, in which was popularized the idea of such a society as now exists under the name of the Red Cross Society for the care of the wounded and sick in battle. He was long baffled in his endeavors in this direction, but he was at length rewarded by the conclusion, in August, 1863, of the Geneva convention, and the institution of the Red Cross Society. Delegates were present from Austria, Baden, Bavaria, Belgium, France, Great Britain, Hanover, Hesse-Darmstadt, Italy, Prussia, Russia, Spain, Saxony, Sweden, Switzerland and Wurtemberg. The work of the society was first brought into operation during the Franco-Prussian war.

DURANT, HENRY TOWLE, lawyer, merchant and philanthropist, was born at Hanover, New Hampshire, on February 20, 1822, and was educated at Harvard, where he was graduated in 1842. He then changed his name from Henry Welles Smith, which he had originally borne, to that of Henry Towle Durant, by which he was ever after known. For some years he was a prominent lawyer in Boston, and then turned his attention to manufacturing and mercantile enterprises. Upon the death of a much-loved son, in 1863, he retired from business and decided to devote his life and fortune to good works. He was for some years a lay preacher, but finally turned his attention to the promotion of higher education of women. To this end he built Wellesley College, at Wellesley, Massachusetts, at a cost of $1,000,000, and gave it an endowment of $50,000 a year. It was opened in 1875. He died in Wellesley on October 3, 1881.

W.F.J.

DURAZZO, a maritime town of Albania, European Turkey, built on the rocky peninsula of Peli, in the Adriatic, lat. 41° 19′ N., long. 19° 27′ E. It is fortified, and is a place of considerable antiquity. Its situation in a fertile district gives it an export trade in grain, oil, etc.; but in recent years, owing to partial failures in crops and disease in olives, the exports have been small. Population, 1,200.

DURBAN, the seaport of the colony of Natal, situated on a railroad, and on the northern shore of a nearly land-locked tidal bay. The 30th degree of south latitude passes about six miles to the south of the town, and the 31st degree of east longitude about two miles to the west. The population at the census taken in 1902 was 60,466. Durban or Port Natal is situate 800 miles from Capetown. The climate, though hot in one or two summer months, is healthy and suitable for Europeans, the death rate for 1887 being 17 per 1,000. The town was laid out by the Dutch, who formed a republic in Natal before the British, under Sir Benjamin D'Urban, took the colony in 1842.

DURBIN, JOHN PRICE, clergyman and author, was born in Kentucky in 1800, was educated at Miami University and Cincinnati College, and became a preacher of the Methodist Episcopal Church. In 1826 he was professor of languages in Augusta College, Kentucky; in 1831 was chaplain of the United States Senate; in 1832 became editor of the *Christian Advocate* in New York, and from 1834 to 1845 was president of Dickinson College. He afterward travelled abroad; was missionary secretary of the Methodist Episcopal Church, and wrote several books. He died on October 18 1876. W.F.J.

DURESS, personal restraint or force, or the fear of injury to the person, or of imprisonment. When any contract has been entered into, or any transaction made, or act done, under duress, the consequences thereof may be avoided by the party thus compelled, or unduly influenced, to act. The acts which will constitute duress, and give the injured party the right to redress, have been considerably extended in recent times, and it is now generally the law that the restraint of property, or a threat of destroying or carrying away property, when accompanied with apparent power to carry the threat into execution, will constitute such duress as to avoid a contract entered into for the purpose of protecting the property threatened. Duress of person or property is generally sufficient ground for the recovery of a payment of money to avoid the threat, where the payment might otherwise be considered a voluntary payment. Thus the payment of money levied as a license under a void city ordinance may be recovered from the city, if the payment was made under threat of arrest or imprisonment. Excessive charges paid to a railroad company refusing to carry or deliver goods, under

such circumstances that the goods would otherwise perish or be greatly injured, have been recovered upon the ground of duress.

DURET, Francisque Joseph, a French sculptor; born in Paris, Oct. 19, 1804. He first attracted public attention by his statue of *Mercury*, finished in 1831. He afterward did a large amount of statue-work. Among his best executions are statues of Molière, Richelieu, and Chateaubriand the *Fisher-Boy Dancing* (1833); *Neapolitan Dancer* (1838); and *Vintager* (1839). He was awarded many prizes, and was made a member of the Institute. He died in Paris, May 25, 1865.

DURFEE, Job, an American jurist; born in Tiverton, R. I., Sept. 20, 1790. He graduated at Brown University in 1813 and studied law. He was a member of the Rhode Island legislature, 1813–19 and 1827–29; and a Representative in Congress, 1821–25. In 1833 he was appointed associate justice of the supreme court of Rhode Island, and in 1835 became chief justice. He died in Tiverton, July 26, 1847. E.E.T.

DURHAM, a city and the county seat of Durham County, North Carolina, in the north-central part of the state. It is most noted as the center of a tobacco producing region, its name serving as a trade-mark of tobacco. It is 20 miles north of Raleigh, on the Richmond and Danville, the Norfolk and Western, and the Durham and Northern railroads. Its population in 1900 was 6,679. W.F.J.

DURHAM BREED OF CATTLE. See Agriculture, Vol. I, p. 343.

DURIVAGE, Francis Alexander, author, was born in Boston in 1814, and became a popular writer, mostly over the signature of "The Old Un." He was the author of poems, stories, and plays. He was also the translator, in association with W. S. Chase, of Lamartine's *History of the French Revolution of 1848;* edited an encyclopædia, and was connected with *Ballou's Illustrated* (magazine). He spent his life chiefly in Boston and died on February 1, 1881. W.F.J.

DURKEE, Charles, an American statesman; born in Royalton, Vt., Dec. 10, 1805. He removed to Wisconsin and served in the Territorial legislature in 1836 and 1838. He sat in Congress as a Free-Soil Republican from Wisconsin from Dec. 3, 1849, to March 3, 1853; was a delegate to the World's Peace Convention in Paris; and was elected United States Senator from Wisconsin as a Republican, serving from Dec. 3, 1855, to March 3, 1861. He was appointed governor of Utah in 1865, and occupied that position until failing health caused him to resign. He died at Omaha, Neb., Jan. 14, 1870. E.E.T.

DUROC, Gérard Christopher Michel, Duke of Friuli, a French general; born Oct. 25, 1772, at Pont-à-Mousson; served under Napoleon I in Italy as aide-de-camp, and in Egypt as brigadier-general. A trusted friend of the great Corsican, he was sent on several diplomatic missions, he fought with distinction at Austerlitz, Aspern, Essling and Wagram and took part in the Russian campaign, after which he reorganized the Imperial Guards. He was killed May 22, 1813, at Markersdorf. G.A.S.

DÜRRENSTEIN, a town of the governmental district Krems in lower Austria, on the left bank of the Danube, has ruins of an old castle, in which Richard Cœur-de-Lion was held a prisoner in 1193. G.A.S.

DURSLEY, a town of Gloucestershire, south western central England, 15 miles. S.W. of Gloucester by rail. Population of parish, 2,344.

DURUY, Victor, a French historian; born Sept. 11, 1811, in Paris; teacher of history at the Collége Henry IV, and at the Polytechnical School of Paris, and, in 1863, appointed Minister of Public Instruction by Napoleon III, retired in 1869, and became a Senator. Since 1879, member of the Institute of France, and since 1885 of the French Academy, he died in Paris, November 25, 1894. Aside from his diverse school-histories, he wrote *History of the Romans* (7 vols., 1870-74); *History of the Greeks* (3 vols., 1874). G.A.S.

DURYEA, Joseph Tuthill, an American clergyman; born in Jamaica, New York, December 9, 1832. He was graduated from Princeton in 1856 and from the Princeton Theological Seminary three years later. He was then ordained minister in the Presbyterian Church, joined the Dutch Reformed Church in 1862, returned to the Presbyterian Church in 1867 and in 1879 joined the Congregational Church. Until 1888 he was pastor of the Boston Congregational Church, then removed to Omaha, Nebraska, where he was called to the First Congregational Church. In 1895 he removed to Brooklyn, New York, where he died May 17, 1898. W.M.C.

DUSE, Eleonora, an Italian actress; born about 1860, in Venice. The child of poor parents, she began to earn her living as a strolling player. Going on the stage in 1874, she achieved no great degree of success until 1893, when she scored a hit in New York and Boston. This recognition of her abilities at once assured her success, and her subsequent display of talent established her popularity and gave her a place among the foremost of actresses.

ELEONORA DUSE.

DÜSSELDORF, one of the handsomest cities of Western Germany, in the Rhine province, Prussia. Among the new improvements, in line with its extension and growth, are enlargement of harbor, new central station, boulevards, iron bridge across the Rhine, an academy of art in the Renaissance style, the art exhibition building, the industrial art school, and the Heil Empfängniss Kirchen. Pop. 1905, 253,274. See Vol. VII, p. 488.

DUSSARD, Hypolite, a French political economist; born at Morez, Sept. 4, 1798; was from 1843–46 editor-in-chief of the *Journal des*

Economists; became in 1848 prefect of the department of Lower Seine and member of the state council appointed by the Constitutional Assembly. He died at Myer, Jan. 22, 1876. He wrote *L'Exposition Universelle de Londres* (1851); *Le Crédit et La Production Agricole* (1853).

G.A.S.

DUST, ATMOSPHERIC. See CHEMISTRY, in these Supplements.

DUSTIN, HANNAH, colonist and patriot, was born in 1659, and married Thomas Dustin in 1677. When on March 15, 1697, the Indians attacked Haverhill, Mass., she let herself, ill in bed, be captured so that her husband and children might escape. She was taken far into the woods, with her week-old baby and nurse. The Indians murdered the child, whereupon she resolved to be avenged. One night, camped on an island in the Merrimac near what is now Concord, N. H., she stabbed to death and scalped nine of her guards as they slept, a captive English boy killing the tenth and chief. Then with the boy and nurse she descended the river in a canoe, and after indescribable perils and hardships regained her home and friends at Haverhill. The General Court of Massachusetts received the scalps as trophies of her valor, and gave her and the boy fifty pounds sterling each. The governor of Maryland added a reward. In 1874 the States of Massachusetts and New Hampshire erected a granite monument in her memory, bearing her name and those of her companions, Samuel Leonardson and Mary Neff.

W.F.J.

DUTCH EAST INDIES, a name applied collectively to the Dutch possessions in the East Indies, including Java and Madura, Sumatra, Borneo, Riau-Lingga Archipelago, Banca, Billiton, Celebes, Molucca Archipelago, and the small Sunda Islands. They are situated between lat. 6° N. and 11° S. and between long. 95° and 141° E. In 1602 the Dutch created their East India Company. This company slowly conquered the Dutch East Indies and ruled them during nearly two centuries. This company had a monopoly of all trade east of the Straits of Magellan. They governed as though an independent state. They founded Batavia, in Java, and established a large trade. After the dissolution of the company in 1798, the Dutch possessions were governed by the mother-country. Politically, the territory, which is under the sovereignty of the Netherlands, is divided into (1) lands under direct government, (2) vassal lands, and (3) confederate lands. With regard to administration, it is divided into residencies, divisions, regencies, districts, and dessas (villages). (For earlier information concerning the countries of Dutch East India, see those countries, severally, in these volumes.) The superior administration and executive authority of Dutch India rests in the hands of a governor-general. He is assisted by a council of five members, partly of a legislative, partly of an advisory character. The following table gives the area and population of Java, including Madura, and the outposts, either official or carefully estimated:

Territorial Divisions.	Area. English sq. miles.	Population at the end of 1900
Java and Madura	50,554	28,746,688
Island of Sumatra — Sumatra, West Coast	31,649	1,527,297
Island of Sumatra — Sumatra, East Coast	35,312	421,090
Island of Sumatra — Benkulen	9,399	162,396
Island of Sumatra — Lampongs	11,284	142,396
Island of Sumatra — Palembang	53,497	804,299
Island of Sumatra — Atjeh	20,471	110,804
Riau-Lingga Archipelago	16,301	86,186
Banca	4,446	106,305
Billiton	1,863	43,386
Borneo, West Coast	55,825	413,067
Borneo, South and East Districts	156,912	716,822
Island of Celebes — Celebes	49,390	454,368
Island of Celebes — Menado	22,080	429,773
Molucca Islands	43,864	410,190
Timor Archipelago	17,698	119,239
Bali and Lombok	4,065	1,041,696
New Guinea to 141° E. long	151,789	200,000
Total	736,399	36,000,000

Of the total population in 1900, only 75,833 were Europeans. Of the remainder, about 537,000 were Chinese. There is entire freedom in religious worship. In 1896 there were 103 missionaries of various societies at work, and there were 309,258 Christians.

The total revenue, according to the budget estimates for 1907 was about 167,373,758 guilders, and the expenditure about 168,773,265, showing a deficit of about 1,400,507 guilders. About one-third of the annual expenditure is for the army and navy, and another third for the general administration, both in Java and in the Netherlands.

In 1896 about 8,950,399 acres were under cultivation, the greater part of which was the property of the government and European owners. The principal products are tobacco, coffee, rice, sugar, cotton, and indigo. The amount raised has increased from year to year. The government ceased to cultivate sugar in 1891, and turned the plantations over to private parties. In 1896–97 the product of the tin-mines of Banca and Billiton was 15,600 tons. There were 328 mines in the two islands.

The imports in 1905 amounted to 218,781,371 guilders, and the exports to 309,103,428 guilders. At the end of 1905 there were about 2,950 miles of railway, 8,613 miles of telegraph lines, with 445 offices, 300 post offices, and 28 telephone offices. The legal coins are those of Holland, as are the weights and measures. There were, in 1905, 214 public elementary schools for Europeans, with 19,382 pupils, and 662 public schools with 132,670 and 1,170 private schools with 94,137 pupils. See also INDIAN ARCHIPELAGO, Vol. XII, p. 857.

DUTCHFLAT, a mountain village of Placer County, northeastern California, 67 miles N.E. of Sacramento. There are productive hydraulic gold-mines here. Pop. 1890, 682.

DUTCH LANGUAGE AND LITERATURE. See HOLLAND, Vol. XII, pp. 87–101.

DUTCH WEST INDIES. The Dutch possessions in the West Indies are Surinam, or Dutch Guiana (see Vol. XI, pp. 223–25), and the colony

of Curaçao (see Vol. VI, p. 626). These colonies were founded through the agency of the Dutch West India Company, which was organized in 1621, and for over fifty years planted and maintained its colonies in North and South America and the West Indies. This company began to lose power about 1674, and ceased to exist in 1794. The area of Surinam is 46,060 square miles, and the population at the end of 1905 was 75,465, besides about 12,000 Indians and negroes living in the forest. The capital is Paramaribo, with a population of 34,000. There were, in 1905, 56 schools, with 7,489 pupils. The productions for 1905 were: sugar, about 21,580,000 pounds; cacao, about 2,990,000 pounds; bananas, 624,696 bunches; coffee, about 538,400 pounds; rice, about 2,298,200 pounds; rum, 793,155 litres; and molasses, 1,570,000 litres. Gold was discovered in 1876, and the value of the product amounted in 1905, to 1,071,316 grames. The imports amounted to 6,557,314 guilders, and the exports to 4,431,733 guilders.

Dutch Curaçao consists of the islands of Curaçao, Bonaire, Aruba, St. Martin (as far as it belongs to Holland), St. Eustache, and Saba. It has an area of 403 square miles, and a population of 53,466 in 1905. At the end of 1899 there were 33 schools with 6,621 pupils. The imports for 1907 were 3,196,113, and the exports 960,667 guilders.

DUTIES, in the broadest sense of the term, means taxes, but in the limited sense in which it is generally used, the term refers to a tax levied upon imported or exported goods, and in this sense has much the same meaning as imports or customs. See CUSTOMS DUTIES, Vol. VI, p. 643.

DUTTON, CLARENCE EDWARD, soldier and scientist, was born at Wallingford, Conn., on May 15, 1841, and was graduated from Yale in 1850. He entered the army in the Civil War as a volunteer and served until the end of the war. Afterward he entered the ordnance corps at Washington, and devoted his attention to geology, being attached for a time to the U. S. Geological Survey. He has written a number of official reports and other treaties on the geology of the high plateaus of Utah, the Hawaiian volcanoes, the Charleston earthquake of 1886, and other topics. W.F.J.

DUUMVIR, in ancient Rome, one of two officers united in the performance of the duties of an office, and appointed usually for some special magistracy or command. The duumvir usually was chosen for ability, and was treated with great respect. Municipal towns had judges, who were their chief magistrates, and were known as duumviri. Superintendents of the erection of buildings and equipment of navies were duumviri.

DUVAL, CLAUDE, cutpurse, about whom many undeserved romances have been woven, was a Frenchman, born in 1643, who went to England with Charles II, was a highwayman for some years, but was captured while drunk and hanged on January 21, 1670. W.F.J.

DUVERGIER DE HAURANNE, PROSPER, a French politician and writer; born at Rouen, Aug. 3, 1798; in 1824 contributor of the *Globe*, and in 1831, as member of the Chamber of Deputies, an ardent supporter of the monarchy. In 1837, however, he sided with the Left Center, defending the latter by his work *The Principles of Representative Government and Their Application* (1838). In 1840 he opposed the Ministry of Guizot. In the Constitutional Assembly and in the Legislature, however, he sided with the Royalists. A most bitter opponent of Napoleon III, he was imprisoned Dec. 2, 1851, and banished, but recalled. His principal work is *History of Parliamentary Government in France from 1814–1848* (10 vols., 1857–72). Since 1870, a member of the French Academy, he died May 19, 1881. G.A.S.

DUVEYRIER, HENRI, a French African explorer; born in Paris, Feb. 28, 1840. In 1857 he visited Algiers, and from 1859–61 the Central Sahara, southern Algiers, Tunis, Tripoli, and Fessan. In 1874 he again visited southern Tunis, and in 1876, Morocco. He killed himself at Sèvres, April 25, 1892. His principal work is *Exploration of the Sahara*. He also published the annuals of the *Société Géographic*, and was editor of the *Dictionnaire de Géographie Universelle*. G.A.S.

DUYCKINCK, EVERT AUGUSTUS, author, was born in New York City on November 23, 1816, was educated at Columbia College (1835), and became the editor of various literary periodicals, the chief of them being the *Literary World*, which he founded in 1847. His most important work appeared in 1856. This was an *Encyclopædia of American Literature*, prepared by him and his brother, George L. Duyckinck, a work which still retains a standard rank. In 1865 he added a *Supplement* to it. Other works of his were *The Wit and Wisdom of Sidney Smith*, *A History of the War for the Union*, *The National Portrait Gallery of Eminent Americans*, a *History of the World*, and *Eminent Men and Women of Europe and America*. He edited the poems of Philip Freneau, and wrote a memoir of that poet. He died in New York on August 13, 1878. W.F.J.

DUYCKINCK, GEORGE LONG, author, brother of Evert A. Duyckinck (q.v.), was born in New York City on October 17, 1823, and was educated at New York University, from which he was graduated in 1843. After extended travels in Europe he joined his brother in publishing the *Literary World* and in preparing the *Encyclopædia of American Literature*. Later he became treasurer of the Church Book Society, and prepared for it a series of biographies of prominent clergymen of the Church of England. He died in New York on March 30, 1863. W.F.J.

DUYSE, PRUDENS VAN, a Belgian poet; born in Dendermonde, in Belgium, Sept. 28, 1804. After completing his academical career, he was appointed archivist of his native town, from which he was removed to the same office in Ghent. He soon afterward received the office of professor of national history in the Athenæum.

SUPPLEMENT CONTINUED IN REAR OF VOLUME VI.

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